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50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States; Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico; Proposed Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket Nos. FWS–R6–ES–2012–0107 and FWS–R6–ES–2012–0106; 4500030113]

RIN 1018–AY26; 1018–AZ22

Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States; Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rules; withdrawal.

SUMMARY: We, the U.S. Fish and Wildlife Service, withdraw the proposed rule to list the distinct population segment of the North American wolverine (*Gulo gulo luscus*) occurring in the contiguous United States as a threatened species under the Endangered Species Act of 1973, as amended (Act). This withdrawal is based on our conclusion that the factors affecting the DPS as identified in the proposed rule are not as significant as believed at the time of the proposed rule's publication (February 4, 2013). We base this conclusion on our analysis of current and future threat factors. Therefore, we withdraw our proposal to list the wolverine within the contiguous U.S. as a threatened species. As a result, we also withdraw our associated proposed rule under section 4(d) of the Act contained in the proposed listing rule and withdraw the proposed nonessential experimental population designation under section 10(j) of the Act for the southern Rocky Mountains, which published in a separate document on February 4, 2013.

DATES: The February 4, 2013 (78 FR 7864), proposal to list the distinct population segment of the North American wolverine occurring in the contiguous United States as a threatened species and the February 4, 2013 (78 FR 7890), proposal to establish a nonessential experimental population of the North American wolverine in Colorado, Wyoming, and New Mexico are withdrawn as of August 13, 2014.

ADDRESSES: The withdrawal of our proposed rules, comments, and supplementary documents are available on the Internet at *http://www.regulations.gov* at Docket Nos. FWS–R6–ES–2012–0107 (proposed listing rule and proposed rule under section 4(d) of the Act) and FWS–R6–ES–2012–0106 (proposed nonessential experimental population). Comments and materials received, as well as supporting documentation used in the preparation of this withdrawal, are also available for public inspection, by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Montana Ecological Services Office, 585 Shepard Way, Helena, MT 59601; telephone (406) 449–5225.

FOR FURTHER INFORMATION CONTACT: Jodi Bush, Field Supervisor, U.S. Fish and Wildlife Service, Montana Ecological Services Office (see **ADDRESSES**). Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish this document. Under the Endangered Species Act, a species may warrant protection through listing if it is endangered or threatened throughout all or a significant portion of its range. Listing a species as an endangered or threatened species can only be completed by issuing a rule. We issued a proposed rule to list the distinct population segment (DPS) of the North American wolverine (*Gulo gulo luscus*) occurring in the contiguous United States as a threatened species (78 FR 7864; February 4, 2013), hereafter, referred to as ''wolverine'' unless otherwise noted. However, this document withdraws that proposed rule because we have determined that factors affecting the DPS cited in the proposed listing are not threats to the DPS such that it meets the definition of an endangered or threatened species under the Act. Because of our withdrawal of that action, we also withdraw the associated proposed rule under section 4(d) of the Act contained in the proposed listing rule (78 FR 7864; February 4, 2013) and withdraw the proposed nonessential experimental population designation under section 10(j) of the Act for the southern Rocky Mountains (78 FR 7890; February 4, 2013).

The basis for our action. Under the Endangered Species Act, we can determine that a species is an endangered or threatened species based on any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence. We have determined that based on new information and further analysis of the existing and new data, factors affecting the DPS cited in the proposed listing rule do not place the wolverine in danger of extinction now or likely to become so in the foreseeable future.

Peer review and public comment. We sought comments from seven independent specialists to ensure that our proposed listing determination was based on scientifically sound data, assumptions, and analyses. We invited these peer reviewers to comment on our evaluation of the science underlying our listing proposal. We received substantive peer reviews from all seven reviewers. We also considered all comments and information we received during the comment periods. In April 2014, we convened a panel of experts to provide us with assessments of the available scientific information on the potential impacts of climate change on wolverines and their habitat. A report containing the results of that workshop can be obtained from the Service's Region 6 peer-review Web site at the following link: *http://www.fws.gov/mountain-prairie/science/PeerReviewDocs/Final_Wolverine_Panel_Report.pdf*. That report was made available for public comment through the Regulations.gov Web site.

Previous Federal Actions

Please refer to the proposed listing rule for the wolverine (78 FR 7864; February 4, 2013) for a detailed description of previous Federal actions concerning this DPS.

Following publication of the proposed rule, there was scientific disagreement and debate about the interpretation of the habitat requirements for wolverines and the available climate change information used to determine the extent of threats to the DPS. Differing interpretations of the available climate change information led to scientific disagreement regarding the current status of the DPS. In particular, some commenters and peer reviewers raised questions regarding:

(1) The interpretation of scientific literature in the proposed rulemaking and scientific literature that may not have been readily available for our use in our analysis to define habitat parameters. Specifically, some commenters and peer reviewers questioned the basis for defining wolverine habitat based on persistent spring snow used by Copeland *et al.* (2010). Some peer reviewers and

commenters suggested that other methods of habitat definition or other dates used to define habitat based on persistent snow are more scientifically defensible and would yield very different results.

(2) Commenters suggested that McKelvey *et al.* (2011) used an invalid habitat model developed by Copeland *et al.* (2010) to project future climate impacts to wolverine habitat, and for that reason, the commenters believe projections in McKelvey *et al.* (2011) are also invalid.

(3) Commenters asserted that there is high uncertainty with projections made using downscaled global climate modeling, which we used to analyze the impacts of climate change on wolverine habitat and ecology.

Based on this substantial disagreement regarding the sufficiency or accuracy of the available data relevant to the proposed listing, on February 5, 2014 (79 FR 6874), we announced a 6-month extension of the final determination of whether to list the wolverine DPS as a threatened species. We also reopened the comment period on the proposed rule to list the contiguous U.S. DPS of the North American wolverine for 90 days.

On April 3–4, 2014, the Service and partners from wildlife agencies in the States of Idaho, Montana, and Wyoming convened a panel of nine experts in climate change, wolverines and other mammalian carnivores, habitat modeling, and population ecology to discuss climate-related habitat issues and possible future population trends for wolverines. The objective of this workshop was to better understand the strength of the relationships between climate change, wolverine habitat, and future wolverine population trends through dialogue with an expert panel. The workshop was conducted using a structured agenda with exercises and discussions to investigate whether and how climate change might affect wolverines in the contiguous United States. We did not seek consensus or conformity among panelists, but instead scored panelists' opinions and elicited discussion regarding the range of variance among expert opinion. The agenda was divided into four parts: defining wolverine habitat, evaluating future snow coverage, evaluating future habitat projections, and evaluating future wolverine population trends. A full report was generated from the workshop. The report was made available for public comment through the Regulations.gov Web site and is available as cited in this withdrawal.

Background

Species Information

Refer to the February 4, 2013, proposed listing rule at 78 FR 7864 for information about the wolverine's taxonomy; life history; requirements for habitat, space, and food; densities; status in Canada and Alaska; geographic range delination complexities; distribution; and habitat relationships and distribution.

Distinct Population Segment

Please refer to our December 14, 2010, 12-month petition finding (75 FR 78030) and our February 4, 2013, proposed rule to list the North American wolverine (78 FR 7864) for a detailed evaluation of the wolverine under our DPS policy.

This Action

Based upon our review of the public comments, comments from other Federal and State agencies, peer review comments, issues raised by the wolverine science panel workshop, and other new relevant information that became available since the publication of our February 4, 2013, listing proposal, we have determined that the North American DPS of the wolverine does not warrant listing as an endangered or a threatened species. This document therefore withdraws the proposed rule published on February 4, 2013 (78 FR 7864), as well as the associated proposed rule under section 4(d) of the Act (16 U.S.C. 1531 *et seq.*) (78 FR 7864; February 4, 2013) and the proposed nonessential experimental population in Colorado, Wyoming, and New Mexico (78 FR 7890; February 4, 2013).

We have re-analyzed the effects of climate change on the wolverine under listing factor A (the present or threatened destruction, modification, or curtailment of the species' habitat or range). While there is significant evidence that the climate within the larger range of the wolverine is changing, affecting snow patterns and associated wolverine habitat, the specific response or sensitivity of wolverines to these forecasted changes involves considerable uncertainty at this time (see *Summary of Impacts of Climate Changes,* below).

We also reevaluated all other risk factors cited in the February 4, 2013, proposed rule, as well as any new potential risk factors that have come to light since the proposed rule through the public comment process or new information. We reaffirm our determination in the proposed rule that these risk factors are not threats to the DPS.

Summary of Comments and Recommendations

The proposed rule published on February 4, 2013 (78 FR 7864), opened a 90-day comment period on our proposal to list the wolverine as a threatened species and establish a rule under section 4(d) of the Act for the subspecies. That comment period closed on May 6, 2013. On October 31, 2013, we reopened the comment period on the proposed rule (78 FR 65248) for an additional 30 days, ending December 2, 2013. On February 5, 2014, we extended our final determination of the proposed actions for 6 months (79 FR 6874), and at that time we reopened the comment period for another 90 days, ending May 6, 2014. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting public comment were published in newspapers of general circulation in each of the Service regions within the DPS. We held several public hearings throughout the range of the DPS; these were held in Boise, Idaho, on March 13, 2013; in Lakewood, Colorado, on March 19, 2013; and in Helena, Montana, on March 27, 2013. All substantive information provided during the comment periods and at the hearings has either been used to support this withdrawal or is addressed below.

Peer Reviewer Comments

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinion from seven knowledgeable individuals with scientific expertise that included familiarity with the wolverine in the contiguous U.S. DPS and its habitat, biological needs, and threats. We received responses from all seven of the peer reviewers.

We reviewed all comments received from the peer reviewers for substantive issues and new information regarding the proposed listing of the DPS of the North American wolverine. Five peer reviewers generally concurred with our methods and conclusions and provided additional information, clarifications, and suggestions to improve the rule, while two peer reviewers disagreed substantially with the conclusions in our proposed rule. Peer reviewer comments are addressed in the following summary and are used to support this withdrawal document as appropriate.

(1) *Comment:* Peer reviewers and commenters stated that the assessment in the proposed rule of the impacts of winter recreation on wolverines

understated the potential effect of this risk factor. Commenters stated that there are significant gaps in our knowledge of the potential effects of winter recreation on wolverines and recommended more caution in how we approach the subject.

Our Response: We agree that there is significant uncertainty about many aspects of wolverine biology and the many potential risk factors that may affect the species. Our 5-factor analysis considers the best scientific information currently available. Our determination in the proposed rule was that the best available information does not indicate that winter (or summer) recreation is a threat to the DPS. As stated in the proposed rule, much of the recreational winter use by humans occurs in relatively small areas, like ski areas, that make up only a small portion of the large home range of a wolverine, and do not occur at a scale that is likely to have a population-level effect. We acknowledge that there are a limited number of studies that have evaluated the impact of human activities on wolverines (Heinemeyer *et al.* 2001, Heinemeyer and Copeland 1999, Heinemeyer *et al.* 2012, Pulliainen 1968); however, what information is available indicates there is no threat to wolverines from recreational activities. This does not mean that new scientific information, should it show significant impacts from this factor, would be ignored, or that the case is closed and no more research is needed. To the contrary, we hope the current research on the impacts of recreation on wolverines now taking place will shed significant new light on this issue. Until new data indicate otherwise, we stand by our assessment that the best available information does not indicate that winter recreation is a threat to the DPS.

(2) *Comment:* Multiple reviewers and commenters stated that the claim in the proposed rule that human-caused mortality is likely additive to natural mortality is not well-founded, and that under sufficient scrutiny, it is apparent that human-caused mortality is not additive in Montana.

Our Response: Very little is known about wolverine populations in the DPS including population size, trends, mortality, or reproductive rates. As described in the proposed rule, the population in the DPS is thought to be around 250–300, and consists of small, semi-isolated subpopulations that likely interact as a metapopulation with some connection to the larger population in Canada. It is true that human-caused mortality has never been demonstrated to be additive or compensatory in this area. We agree that, given the small amount of human-caused wolverine mortality and the fact that wolverine populations are increasing, current levels of mortality are sustainable and that human-caused mortality is not currently additive. We have changed this conclusion in this document.

(3) *Comment:* One peer reviewer stated that the characterization of the wolverine niche as ''unproductive'' ignores the fact that wolverines are adapted to exploiting their particular environment. A niche that is unproductive for most species may be highly productive for wolverines.

Our Response: Overall, the habitats used by wolverine are considered unproductive relative to other habitats across the globe. However, wolverines are specially adapted to take advantage of the resources offered in the habitats they occupy, and so, the niche is productive from the wolverine's perspective.

(4) *Comment:* One peer reviewer and several commenters thought that the proposed rule states that historical densities would have likely been higher than today leading to larger historical populations.

Our Response: In the proposed rule, we meant that the overall population would have been larger historically due to the larger area occupied by wolverines. We did not mean to suggest that we believed that densities would have been higher.

(5) *Comment:* One peer reviewer stated that Aubry *et al.* (2007) did not suggest that the habitat in which extralimital records were found is unimportant and that we incorrectly relayed this in the proposed rule.

Our Response: We agree with the reviewer that there may be important areas for wolverines that contain habitat important for behaviors other than residential home range use or reproduction (for example, areas of connectivity used for movement between suitable habitat patches). However, available information on this topic is lacking, and it is not possible to accurately identify these types of habitats at this time.

(6) *Comment:* One peer reviewer commented that lack of adequate gene flow should be considered a major threat to wolverines. The potential for human occupation of linkage habitat could adversely affect movement of wolverines between habitats, making gene flow a more important issue in the future.

Our Response: We agree that it is possible that lack of sufficient connectivity between populations and resultant lack of genetic exchange could affect wolverines. However, at this time, the best available information does not suggest that lack of adequate gene flow or reduced genetic diversity has had negative effects on wolverines in the DPS, as is discussed below. Human disturbance in wolverine habitat in the contiguous United States has likely resulted in the loss of some minor amount of wolverine habitat, but this loss has not yet been quantified. Wolverines have been documented to persist and reproduce in areas with high levels of human use and disturbance, including developed alpine ski areas and areas with motorized use of snowmobiles (Heinenmeyer 2012, entire), which suggests that that such activities are not likely to impede movement of wolverines between habitats. Whether human occupation or disturbance reduces wolverine gene flow, and ultimately wolverine population or metapopulation persistence, is uncertain at this time.

(7) *Comment:* Several peer reviewers and commenters thought that climate change is likely to have the effect of concentrating human activities, like winter recreation, into remaining cold, snowy habitat, further increasing the effect of these activities on wolverines.

Our Response: This scenario, while possible, is speculative. It is also possible (but similarly speculative) that winter recreation will become less popular as opportunities diminish. However, we have no evidence to suggest that winter recreation activities have a negative effect on wolverines;, and whether further concentrating recreation into smaller areas (should this occur) would affect wolverine population and metapopulation persistence is uncertain. These potential effects were considered but do not rise to the level of a threat because available information does not indicate evidence of such effects at this time.

(8) *Comment:* One peer reviewer and several commenters stated that a population viability analysis would provide better information on which to base the listing decision than what is currently relied upon.

Our Response: While a population viability analysis may be desirable, at this point in time, none exists for wolverines in the DPS due to a lack of demographic information that would be required to do such an analysis. The Act requires that we base the listing decision on the best scientific and commercial information available at the time of the decision.

(9) *Comment:* One peer reviewer and many commenters asserted that loss of genetic diversity due to small population size is a threat to the DPS regardless of climate change.

Our Response: Small population size and reduced genetic diversity are potential, though as-yet undocumented, threats to wolverines in the contiguous United States. There is some evidence that genetic diversity is lower in wolverines in the DPS than it is in the more contiguous habitat in Canada and Alaska. The consequence of this lower genetic diversity to wolverine conservation is unknown. We do not discount the possibility that loss of genetic diversity could be negatively affecting wolverines now and continue to do so in the future. It is important to point out, however, that wolverine populations in the DPS area are thought to be the result of colonization events that have occurred since the 1930s. Such recent colonizations by relatively few individuals and subsequent population growth are likely to have resulted in founder effects, which could contribute to low genetic diversity (Schwartz *et al.* 2007). While we acknowledge that the effect of small population size and low genetic diversity may become more significant if populations become smaller and more isolated, we lack reliable information to conclude if and when this would occur.

(10) *Comment:* One peer reviewer stated that the proposed rule should not have considered trapping a threat because trapping only occurs in Montana, and to be considered a threat, an activity must occur across the entire range of the DPS.

Our Response: In a listing analysis, we consider all potential threats regardless of the extent of their occurrence to make a determination as to whether all of the threats, when considered individually or cumulatively, indicate that the DPS meets the definition of an endangered or threatened species under the Act. Therefore, threats that occur in only a portion of the range of the DPS may affect the conservation status of the whole, or affect a substantial enough portion of the whole so that the future of all or a significant portion of the range of the DPS is at risk.

(11) *Comment:* The conclusion that females are unlikely to move into the southern Rocky Mountains on their own is speculative.

Our Response: Although most studies document greater dispersal distances for males than females (Hornocker and Hash 1981, p. 1298; Banci 1994, pp. 117–118; Copeland and Yates 2006, Figure 9; Moriarty *et al.* 2009, entire; Inman *et al.* 2009, pp. 22–28; Brian 2010, p. 3;), Vangen *et al.* (2001, p. 1644) found that both males and females are capable of long-distance dispersal. They documented female dispersal distances of up to 178 km in one case, with average dispersal distance (60 ± 48 km) not significantly different from males (51 ± 30 km). Given this scientific evidence, we believe it is possible that females could move into the southern Rocky Mountains without human facilitation.

(12) *Comment:* One peer reviewer commented that the proposed rule indicates that we have strong information about where wolverine dens occur in Idaho and Montana. This may lead the reader to believe that all potential denning areas are known. This is not the case.

Our Response: We agree with the reviewer that we do not know where all potential wolverine dens are located. Dens may occur outside of the conditions described in the proposed rule. Although the proposed rule provided an accurate summary of the existing scientific information pertaining to documented den sites in Idaho and Montana, we did not mean to imply that all potential denning sites are known.

(13) *Comment:* One peer reviewer noted that, in the proposed rule, we indicate that the elevations used by wolverines that once inhabited the Sierra Nevada Range are unknown. In fact, we do have reliable information that is compiled in Aubry *et al.* 2007.

Our Response: While we agree that the account of location data in Aubry *et al.* (2007) provides some information on wolverine use of the Sierra Nevada Range, the information contained in that report is not comparable to habitat use information from radio-telemetry studies used elsewhere in the proposed rule, where we reported highly credible elevation information (Copeland 1996, p. 94; Magoun and Copeland 1998, pp. 1315–1316; Inman *et al.* 2007c, p. 71). The information reported in Aubry *et al.* (2007) represents opportunistically collected wolverine encounters and trapping information, which are likely biased by factors that affect the probability of humans detecting wolverines. These biases include the confounding factor of human use and baiting of traps, which could cause wolverines to venture into habitats they otherwise seldom use. These potential biases led us to conclude that the elevation data for California compiled by Aubry *et al.* (2007) are not reliable for drawing conclusions regarding wolverine habitat use in the Sierra Nevada at any but the grossest of scales.

(14) *Comment:* One peer reviewer stated that the proposed rule was premature in concluding that the Great Lakes and Northeast regions do not support a wolverine population now, and likely did not support wolverine populations historically. This conclusion is not well supported by the available information, which shows a relatively consistent historical record for the early post-settlement period for the Great Lakes and a sparser record for the Northeast.

Our Response: Our conclusion that the Great Lakes area was not historically wolverine habitat was based on a review of historical occurrence records for wolverines in this area. We agree that the conclusion about historical populations was premature, and that this area may have supported wolverine populations prior to and into the settlement period. We continue to conclude that the Northeast was unlikely to have supported wolverines historically, but agree that the evidence is not definitive.

(15) *Comment:* One peer reviewer asserted that the proposed rule erred by stating that wolverines are habitat generalists. Wolverines require very specific habitat conditions and are correctly considered habitat specialists.

Our Response: Wolverine habitat in the contiguous U.S. appears to consist of disjunt patches of rugged, high alpine areas with with a mix of tree cover, alpine meadow boulders, avalanche chutes, and patches of spring snow (Copeland *et al.*2010, entire; Inman *et al.* 2012, p.785; Inman *et al.* 2013, p. 283). We agree that they could be considered habitat specialists.

(16) *Comment:* One peer reviewer noted that the proposed rule indicates that the wolverine found in the Sierra Nevada Range of California in 2008 was from Idaho based on genetic information. The genetics of that individual were not diagnostic of Idaho, and could in fact have come from other portions of the wolverine range.

Our Response: Moriarty *et al.* (2009, entire) used mitochondrial and microsatellite genetic evidence, as well as stable isotope analysis, to verify the wolverine's origin. That analysis placed the California wolverine into a group primarily comprised of individuals from the Sawtooth Mountains of Idaho with a confidence level of 73.4 percent.

(17) *Comment:* Several peer reviewers and commenters were confused by our use of wolverine science from Scandinavia or were unsure when our conclusions were based on Scandinavian data.

Our Response: We have attempted to clarify when referring to data collected in Scandinavia. In many cases when we do not have data from North America, we found Scandinavian wolverine data are the best available information regarding general wolverine biology,

where behavior is consistent regardless of geographic region.

(18) *Comment:* One peer reviewer commented that there are historical wolverine records from New Mexico, and this should be noted in the rule.

Our Response: The potential for wolverine presence in New Mexico is confounded by a sparse historical record that may not accurately reflect wolverine distribution. One 19th century record from New Mexico—without precise locality information—was reported in Aubry *et al.* (2007). The lack of precise location data in this area so close to Colorado and its known historical (pre-1930) wolverine population leaves open the possibility that the animal in question was actually from the mountains of adjacent Colorado. Habitat in the Sangre de Cristo Mountains of northern New Mexico is contiguous with habitat in Colorado that contained verifiable historical wolverine records. Based on this evidence of contiguous habitat and a documented record, it is likely (though uncertain) that wolverines in the southern Rocky Mountains occurred in adjacent contiguous habitat in New Mexico's Sangre de Cristo Mountains and possibly other mountain ranges in northern New Mexico. It is not known whether wolverines in this area, if present, would have been established as an extension of the southern Rocky Mountain population, or rather might have been occasional migrants to the area.

(19) *Comment:* One peer reviewer commented that the proposed rule determined that the DPS is discrete based on the international boundary between the United States and Canada. The reviewer suggested that the Service could also conclude the DPS is discrete based on differences in genetics between the populations in Canada and the United States.

Our Response: As described in our December 14, 2010, 12-month petition finding (75 FR 78030) and our February 4, 2013, proposed rule to list the DPS (78 FR 7864), to be considered discrete under our DPS Policy, a population of a vertebrate species needs to satisfy either of two conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors (measures of genetic or morphological discontinuity may provide evidence of this separation); or (2) it is delimited by international governmental boundaries, across which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist. Having found that the population was discrete based on the differences in control of exploitation and conservation status across the international boundary, an evaluation of possible genetic discontinuity was not necessary, as only one of the conditions need be met to satisfy the discreteness criterion.

(20) *Comment:* One peer reviewer and several commenters said that climate changes to ecosystems can cause counter-intuitive movement of climatic conditions, resulting in changes that are difficult to predict. For example, in the proposed rule it states that wolverine habitat is likely to migrate northward and up mountain slopes as climate changes progress, but this result is not necessarily the case.

Our Response: We agree that there is considerable uncertainty in how climate change will affect wolverine habitat and population persistence. Climate modelling has been done at broad ecological scales, and we do not know how fine-scale changes in snow patterns may affect population viability. There are a variety of fine-scale local factors that determine where wolverines den, the quality of den sites, and how wolverines use the landscape. As is discussed further below, we lack a clear understanding of how changes in snowfall will affect wolverine habitat quality and ultimately population viability and persistence, and that is reflected in the text of this document.

(21) *Comment:* Two peer reviewers and multiple commenters stated that the proposed rule relies almost entirely on the Copeland *et al.* (2010) bioclimatic envelope model as a prediction of suitable habitat. This hypothesis is not based on sound theory.

Our Response: While Copeland *et al.* (2010) portrays a strong argument for wolverine reliance on spring snow cover, their modeling did not consider other factors such as land cover, topography, and human footprint that have been considered in the analyses by Inman *et al.* (2013) and Fisher *et al.* (2013). Further, Copeland himself (November 26, 2013; p. 2) stated his belief that there are other factors beyond snow that influence wolverine distribution. We have reflected these concerns in the text of this document.

(22) *Comment:* One peer reviewer commented that the model in Copeland *et al.* (2010) overestimates the habitat used for wolverine denning by approximately 75 percent. This means that up to 75 percent of that modeled habitat could be lost to climate change impacts without affecting wolverine populations. Therefore, the predicted impacts of the McKelvey *et al.* (2011) analysis are not likely to occur.

Our Response: It is unclear how much habitat wolverines need for denning purposes. However, den sites do not appear to be limited at this time. Available information suggests it is possible that changes in climate may affect availability of deep snow for den sites, but the specific response or sensitivity of wolverines to these forecasted changes is uncertain at this time.

(23) *Comment:* Two peer reviewers asserted that effective population estimates cited in the proposed rule from Schwartz *et al.* (2009) did not include sampling from portions of the range of the DPS. This lack of sampling the entire DPS area may have biased the estimated effective population size low.

Our Response: The reasons for excluding areas from the sample are covered in Schwartz *et al.* (2009) and have to do with reducing the effects of population substructure in the effective population size estimate. Essentially, when making this type of calculation, one attempts to sample those animals that are part of an interbreeding population. It is not desirable to include adjacent populations that may be semi-isolated, as this would bias the results. The purpose of estimating genetically effective population size is not to produce a population estimate, but to use the effective population size estimate as a tool to make inferences about the potential for the maintenance of genetic diversity. In that light, it is appropriate to sample only from areas that are thought to form cohesive populations. The estimate provided for the northern Rocky Mountains populations was low, and represents the effective population size for that area. This result is important to the listing decision because the northern Rocky Mountains portion of the DPS is thought to be the largest subpopulation in the DPS and is physically connected to Canada. Therefore, we expect that the northern Rocky Mountains would have the subpopulation that is most genetically resilient of the current subpopulations in the DPS.

(24) *Comment:* One peer reviewer commented that the bioclimatic envelope model in Copeland *et al.* (2010) does not encompass all habitat and all dens used by wolverines, and so is invalid.

Our Response: Copeland *et al.* (2010) acknowledge that information on wolverine historical range in Europe and Asia is lacking and the ''Methods'' section of their paper describes the timeframe and other criteria used as a basis for the habitat and den site information used in their modeling. Models typically do not encomass all

habitat and reproductive areas used by the particular species being assessed. The validity of models and their outcomes does not require that they encompass all habitat and all reproductive areas of a species. While we find that the model does provide valuable information on the correlation between wolverine and snow cover, we acknowledge that there are limitations.

(25) *Comment:* Two peer reviewers and several commenters stated that central to acceptance of the Copeland *et al.* (2010) snow model and the subsequent use of the snow model in McKelvey *et al.* (2011) for predicting future wolverine habitat in the western States, one must accept that wolverine denning extends to May 15 and that continuous snow cover is required until then in the western States.

Our Response: The habitat described in the Copeland model includes areas that retained snow until May 15, in as few as 1 of 7 years. In other words, if an area retained snow in only 1 of 7 years, it was still included in the model describing habitat, and 97.9 percent of the sample of den sites fell within this area. That means that some proportion of those den sites fell within an area that did not retain snow each year. We acknowledge that den abandonment often occurs earlier than May 15. Abandonment varies from March to May, with earlier timing associated with den sites in Idaho, and later abandonment documented in Alaska and Norway (Myrberget 1968, pp. 112–114; Magoun and Copeland 1998, pp. 1316–1317). However, 95 percent of summer and 86 percent of winter telemetry locations were concordant with spring snow coverage. It is important to note that factors beyond spring snow persistence were not considered in the model; therefore, the model may not present a complete picture of factors that influence wolverine distribution.

(26) *Comment:* Two peer reviewers and several commenters thought that the results in Copeland *et al.* (2010) are biased by the fact that most known wolverine dens occur in mountainous habitats. This is an artifact of where people have searched for wolverine dens rather than where most dens occur. If more searching had been done in lowland boreal habitats, the fit of the Copeland *et al.* (2010) model would not have been as good.

Our Response: It may be true that if more dens had been discovered in flat or lowland boreal forest areas that the fit of the model would have been worse. This is explained by the authors of Copeland *et al.* (2010) as an artifact of the remote sensing data used in the analysis. Heavily canopied habitats, such as lowland boreal forests, hide snow beneath canopy cover, and the snow may be missed by satellites. This problem is largely irrelevant to the listing determination, however, because the habitats in the contiguous U.S. DPS are not lowland boreal habitats but rather mountainous habitats where the model fit is very good.

(27) *Comment:* Two peer reviewers and several commenters said that the analysis in Copeland *et al.* (2010) is invalid as an estimate of wolverine habitat. McKelvey *et al.* (2011) relies on Copeland *et al.* for input data, and so is also invalid as an estimate of the potential impacts of climate change on wolverine habitat.

Our Response: Copeland *et al.* (2010) portrays a strong argument for wolverine reliance on spring snow cover; however, as discussed under Factor A, the analysis did not consider factors beyond snow that may influence wolverine habitat. Therefore, we believe that while Copeland *et al.* (2010) represents the best available information, the model outcome may not provide a complete picture of available habitat. In their climate change modeling, McKelvey *et al.* (2011) relied on conclusions in Copeland *et al.* (2010), that wolverine habitat is closely tied to persistent spring snow cover. Given the uncertainties in Copeland *et al.*'s (2010) bioclimatic envelope model, predictions of wolverine habitat under climate change in McKelvey *et al.* (2011) may also not be accurate.

(28) *Comment:* Two peer reviewers stated that the limitations of Moderate Resolution Imaging Spectroradiometer (MODIS)-based snow cover models should be recognized and taken into consideration when evaluating the accuracy of snow model predictions. For example, McKelvey *et al.* (2011) recognized that there are issues with the scale at which the MODIS data can be applied.

Our Response: We agree that there are limitations inherent in downscaled climate models and that it is important to understand the effect of climate-data spatial resolution on wolverine viability in complex terrain. Downscaling techniques improve understanding of climate at smaller, regional scales compared to Global Climate Models, but their spatial resolution is still inadequate to describe the variability of microclimates in which organisms live (Potter *et al.* 2013, p. 2935). Franklin *et al.* (2012, pp. 478–482) show that there can be large differences between suitable habitats predicted from coarse versus fine-scale climate models, and concluded that, on average, a scale approximately twice as fine as that used in McKelvey *et al.* (2011, entire) (280 m vs. 500 m) is adequate, and that in rugged terrain (such as that used by wolverines), even finer models (e.g., 10 to 30 m) may be needed to represent significant microclimates. McKelvey *et al.* (2011, p. 2895) reached similar conclusions about their own modeling efforts: ''although wolverine distribution is closely tied to persistent spring snow cover (Copeland *et al.* 2010), we do not know how fine scale changes in snow patterns within wolverine home range may affect population persistence.'' We concur; an improved understanding of how microclimatic variation alters the habitat associations of wolverines at fine spatial scales is needed. Ultimately, our final listing decision for the wolverine rested on the question of whether we can reliably predict how the effects of changes in climate on habitat may affect population persistence in the DPS; therefore, this limitation of the model was of critical importance in our reevaluation of the proposed rule.

Comments From States, Agencies, and the Public

(29) *Comment:* There is not enough information known about the wolverine population, such as size, demographics, distribution, and trend, on which to base a listing rule.

Our Response: We are required to use the best available scientific and commercial information when listing a species under the Act. Published findings on wolverine populations and their genetic structure has been available for many years, although we acknowledge that information on wolverine numbers, population trends, and potential effects of loss of genetic diversity is limited. Our analysis included a thorough consideration of all available literature, peer review, public comment, and results of a scientific panel (Service 2014, entire). Based on our analysis, through this document, we withdraw the proposed rule to list the DPS of the North American wolverine occurring in the contiguous United States as a threatened species under the Act (78 FR 7864; February 4, 2013), as well as our associated proposed rule under section 4(d) of the Act contained in the proposed listing rule (78 FR 7864; February 4, 2013) and the proposed nonessential experimental population designation for the southern Rocky Mountains (78 FR 7890; February 4, 2013).

(30) *Comment:* Several commenters stated that the global climate models used to predict habitat impacts of climate change are not precise enough to be useful for that purpose.

Our Response: We have carefully reexamined all of the best available scientific data used in our proposed rule, and any information that has became available through the review process since the publication of the proposed rule. As explained in detail in this document, we concluded that the analyses in McKelvey *et al.* (2011) and other sources were not conducted at a fine enough scale to serve as the basis for having sufficient certainty about how climate change may impact wolverine habitat in the future. In addition, we have recognized substantial uncertainty exists regarding projections of future snowfall amounts and persistence in areas most important for crucial wolverine life stages (i.e., denning), and as well as the possible response of the DPS to effects of climate change in the future.

(31) *Comment:* There are alternative hypotheses to explain the distribution of wolverines that should be explored further.

Our Response: We agree that it is important to consider all potential factors that may constrain wolverine distribution. The Copeland *et al.* (2010) model focused on one hypothesis, spring snow persistence, to explain wolverine distribution. The model did not consider other factors such as land cover, topography, and the human footprint that appear to also influence primary wolverine habitat use (Inman *et al.* 2013; Fisher *et al.* 2013). Copeland himself (November 26, 2013; p. 2) stated his belief that there are other factors beyond snow that influence wolverine distribution. These considerations were part of the basis for our decision to withdraw the listing rule.

(32) *Comment:* One commenter questioned the evidence for the assumption in the proposed rule that predation is part of the reason for wolverines denning in deep snow.

Our Response: Predation as an explanation for wolverines denning in deep snow has been suggested by several wolverine experts, including Magoun and Copeland (1998), Copeland *et al.* (2010), and Inman *et al.* (2012, p. 638).Wolverine kits are vulnerable to predation by other wolverines and other predators while they are in the den (Persson *et al.* 2003, p. 24). Female wolverines often dig elaborate snow tunnels down to ground-level substructure, such as boulders or avalanche debris, to birth and raise kits. A reasonable explanation as to why they go to this effort is that kits need security from predators that such snow tunnels provide.

(33) *Comment:* Several commenters asserted that the proposed rule relies on inadequate science regarding genetic connectivity and effective population sizes in wolverines. They also claim that the proposed rule is inconsistent in applying genetic information to designating the DPS and the discussion of effective population size.

Our Response: We are required to use the best available scientific and commercial information when determining whether to list a species under the Act. We have found in this determination that genetic factors are not a threat to the DPS due to increasing populations. Although we did not use the lack of genetic contiguity between Canada and the United States wolverine population as justification for the DPS, we do recognize the apparent lack of gene flow across the international boundary.

(34) *Comment:* Several commenters said that because wolverines have persisted through past climate changes that were severe, they will persist through future changes as well.

Our Response: While we acknowledge that the wolverine and other species have persisted through past changes in climate, it does not automatically follow that the wolverine or other species will persist through future changes since the conditions concerning the status of the species, its habitat, and other relevant factors and their responses to such changes are unlikely to be identical to what was present in the past. In our analysis of the best available data concerning the wolverine DPS, there is significant evidence that the climate within the larger range of the wolverine is warming, affecting snow patterns and associated wolverine habitat. However, as described in this document, we currently have a relatively high degree of uncertainty about the likely response of wolverines to future changes.

(35) *Comment:* The Service should monitor wolverine populations and habitat to determine if climate change impacts actually occur before pursuing a listing based on a speculative threat.

Our Response: The Act requires that we make a listing determination based on the best scientific and commercial data available at the time of our decision. When evaluating population trends or the impacts of a particular threat, we must rely on the best available science, rather than speculation, to assess the future status of a species and to determine whether it meets the definition of an endangered or threatened species. As explained above, we have determined that the best available information suggests that climate change may affect habitats used by wolverines; however, the specific response or sensitivity of wolverines to these current and forecasted changes is uncertain at this time.

(36) *Comment:* Management of wolverines is similar in Canada and the United States. There is no reason to conclude that wolverines in these areas are discrete based on differences in management.

Our Response: Wolverines are managed by regulated harvest throughout western Canada and Alaska; in the lower 48 U.S. States, regulated wolverine harvest occurs only in Montana, and at a very low level (average harvest = 3.25 wolverines/year; Montana Department of Fish Wildlife and Parks 2010, pp. 8–11). In November 2012, a district court issued a restraining order blocking the opening of Montana's trapping season on wolverine; the season remains closed (Case No. BDV–2012–868). Thus, we conclude there are differences in management across the international boundary. Please refer to our December 14, 2010, 12-month petition finding (75 FR 78030) and our February 4, 2013, proposed rule to list the DPS (78 FR 7864) for a more robust discussion of our analysis of wolverine in the contiguous United States and our DPS Policy. However, as described in this document, we have concluded that this DPS does not warrant listing, and we are withdrawing our February 4, 2013, proposed rule to list the DPS of the North American wolverine occurring in the contiguous United States as a threatened species under the Act (78 FR 7864; February 4, 2013), as well as our associated proposed rule under section 4(d) of the Act contained in the proposed listing rule (78 FR 7864; February 4, 2013) and the proposed nonessential population designation for the southern Rocky Mountains (78 FR 7890; February 4, 2013).

(37) *Comment:* Several commenters noted that regulatory mechanisms to combat climate change do not exist; therefore, it is not appropriate to use this threat to justify a listing.

Our Response: Under the Act, regardless of whether regulatory mechanisms exist to address a particular threat, we cannot ignore that threat if it contributes to the basis for a determination that the species meets the Act's definition of an endangered or threatened species. As a hypothetical example, if a severe disease is placing a species at high risk of extinction and no regulatory mechanisms exist to combat the disease, we would not ignore the disease as part of the basis for a listing determination. Also, with regard to climate change, we consider the ongoing and reasonably likely effects of such changes and how those

effects relate to the status of a species; we do not make listing determinations based on climate change *per se.* For example, our decision to list the polar bear was based on the likely loss of sea ice habitat and related impacts to polar bears. While it may seem like a fine point that we focus on the effects of changes in climate rather than climate change *per se,* it is an important distinction. With regard to the wolverine DPS, we have determined that potential habitat impacts due to climate change are not a threat to the DPS such that the species meets the definition of an endangered or threatened species under the Act at this time. Therefore, an analysis of the existing regulatory mechanisms that address the effects of climate change is not necessary in this case.

(38) *Comment:* Multiple commenters noted that there are several datasets available that Copeland *et al.* (2010) did not consider and that including those in the analysis would likely change the outcome of our proposed rule.

Our Response: We acknowledge that some available datasets were left out of the Copeland *et al.* (2010) model. The authors also acknowledge that information on wolverine historical range in Europe and Asia is lacking. While we believe the model does provide valuable information on the correlation between wolverine and snow cover, these omissions limit the ability to provide a complete picture of available wolverine habitat. We incorporated a discussion of these limitations of the dataset into the text of this document.

(39) *Comment:* Several States commented that the analysis in Copeland *et al.* (2010) excluded data from wolverines in the far north for their year-round analysis of habitat use relative to their snow model. If they had included these animals from places where persistent spring snow was ubiquitous they would have found that they did not select for snow.

Our Response: The Copeland *et al.* (2010) paper addressed this issue, saying that in areas of the far north in arctic and sub-arctic conditions, wolverines are able to use the entire landscape and that therefore their model loses effectiveness for predicting wolverine habitat use. This is not an issue in the contiguous U.S., where wolverine habitat occurs at high elevations in temperate mountains. In these areas, the correlation between the bioclimatic envelope and wolverine habitat use and denning is quite close.

(40) *Comment:* Several States and commenters asserted that wolverines do not need deep snow until May 15 for thermal buffering because temperatures have moderated by then.

Our Response: We agree. We do not know exactly what the causal relationship is between spring snow and wolverine dens. Thermal buffering is a hypothesis, but has not yet been tested. Additionally, as mentioned above, the timing of den abandonment varies geographically and seems to coincide with spring thaw. Wolverines in Idaho appear to abandon den sites earlier (March–April) than in other areas studied, including Alaska and Norway (late April–early May). It appears possible that wolverines in the DPS area do not need snow until May 15.

(41) *Comment:* One State commented that climate change may benefit wolverines due to increased productivity in their habitats.

Our Response: Although this hypothesis could possibly be true, the best available information does not support or refute this hypothesis. Our withdrawal of the proposed listing rule is based upon the lack of information concerning the likely biological response of wolverines to the effects of climate change. We do not assert that wolverines are likely to benefit from climate change or its effects on habitat.

(42) *Comment:* Several States commented that wolverines have expanded their populations in the DPS over the last 100 years. Simultaneous to this expansion, climate warming has also been reducing snowpack in the DPS. This is inconsistent with the hypothesis that persistent spring snow is important to wolverines or that changes in persistent spring snow in the future are likely to adversely affect wolverines.

Our Response: Wolverines were likely extirpated from the entire contiguous United States in the first half of the 20th century due to unregulated trapping and predator control; populations have since recolonized from Canada and are currently expanding within the DPS area (refer to the on February 4, 2013 proposed rule at 78 FR 7864 for a more robust discussion of wolverine population status and distribution). We believe this recolonization and expansion is primarily due to changes in harvest and predator control practices. The best available information does not indicate that climate change effects have caused contraction of wolverine habitat in the DPS area at this time, and consequently wolverine growth and expansion has not ceased. It is likely that climate change will impact snowfall and snow persistence in the future, but we have no reliable information to suggest how wolverines in the DPS will respond to these changes.

(43) *Comment:* One State disagreed with our determination in the proposed rule that wolverine genetic variation is low, or lower than historical levels, in the northern Rocky Mountain wolverine population.

Our Response: Available evidence indicates that genetic diversity among wolverines in the DPS is lower than it is in the founding population in Canada (Schwartz *et al.* 2009, p. 3229). Wolverines in the contiguous United States are thought to be derived from a recent recolonization event after they were extirpated from the area in the early 20th century (Aubry *et al.* 2007, Table 1). Consequently, wolverine populations in the contiguous United States have reduced genetic diversity relative to larger Canadian populations as a result of founder effects or inbreeding (Schwartz *et al.* 2009, pp. 3228–3230). Such a result is not unexpected following recolonization by relatively few individuals and subsequent population growth. Whether the DPS may be suffering any negative effects as a consequence of lower genetic diversity in comparison to the Canadian population is unknown. While we acknowledge that the effect of small population size and low genetic diversity may become more significant if populations become smaller and more isolated, we are uncertain if and when this response might occur.

(44) *Comment:* Several States commented that there is insufficient evidence to conclude that there is a genetic break between the DPS and Canadian populations. Insufficient sampling in the area near the international boundary means that the precise location of any break that may exist is in question.

Our Response: We reviewed the best available information on this subject. States did not provide additional citations. The analysis in Schwartz *et al.* (2009) provided evidence that there is a lack of genetic connectivity between wolverine populations in the area near the international boundary. The reason for the apparent lack of connectivity is not known. The authors speculated that it may be related to heavy trapping pressure on the Canadian side of the boundary, but this hypothesis remains untested.

(45) *Comment:* Several commenters stated that hunting and trapping of species that prey on wolverines would benefit the DPS.

Our Response: It is possible that hunting and trapping benefit wolverines by reducing populations of predators that may occasionally kill wolverines.

The magnitude of this potential benefit, if it exists, is unknown.

(46) *Comment:* Multiple commenters and States thought that the listing proposal essentially dismissed habitat impacts resulting from land management decisions.

Our Response: The Service recognized and acknowledged the effects of land management activities, as well as recreation, infrastructure, and development, on the wolverine DPS. However, as we stated in the proposed listing rule, the scale at which these activities occur is relatively small compared to the average size of a wolverine's home range. For that reason, we concluded that land management decisions do not substantially impact the wolverine. After reviewing the best available information, we stand by this assessment.

(47) *Comment:* One commenter believed the wolverine does not qualify as a DPS because the population is not discrete, and loss of the subspecies in the contiguous United States would not represent a significant gap in relation to its entire range, which includes areas within the contiguous United States, Canada, and Alaska. The population and habitat area in the lower 48 States represent a small fraction of the entire range; meaning that, for the purposes of the Act, the wolverine is insignificant when compared to the entire North American subspecies.

Our Response: Please refer to our December 14, 2010, 12-month petition finding (75 FR 78030) and our February 4, 2013, proposed rule to list the North American wolverine (78 FR 7864) for a more robust discussion of our analysis of the wolverine in the contiguous United States and our DPS policy. We recognize that there may be differences of opinion on the definition of ''significant.'' However, for the reasons detailed in the February 4, 2013, proposed rule, we conclude both that the contiguous U.S. population of the wolverine is discrete and that the loss of that population would result a significant gap in the range of the taxon, in accordance with our DPS policy. However, as described in this document, we have concluded that this DPS does not warrant listing, and we are withdrawing our proposed rule to list the DPS.

(48) *Comment:* Several States commented that the determination that the wolverine population in the contiguous United States is discrete is arbitrary and without merit because the only regulatory mechanism that the Service concludes is lacking is one that exists internationally, that is, the current inability to regulate climate change. Otherwise, the regulatory mechanisms currently in place in the lower 48 U.S. States have been deemed by the Service to be adequate.

Our Response: Please refer to our December 14, 2010, 12-month petition finding (75 FR 78030) and our February 4, 2013, proposed rule to list the North American wolverine (78 FR 7864) for a detailed evaluation of the discreteness criterion for the contiguous U.S. population of the wolverine under our DPS policy. In accordance with that policy, we concluded that this population is discrete based on differences in control of exploitation and conservation status of the wolverine across the border between Canada and the United States.

(49) *Comment:* Many States and public commenters stated that instead of future predictions of threats, Service should rely on current population status.

Our Response: Listing decisions under the Act require that we synthesize current status with threat projections in the future to determine if the species is presently in danger of extinction (endangered) or is likely to become endangered in the foreseeable future (threatened). Following these statutory definitions, it follows that although an evaluation of current population status may be sufficiently informative as to whether a species meets the definition of endangered under the Act, an evaluation of whether a species may be threatened necessarily invokes additional mechanisms that allow us to project future scenarios for the species based on scientific data, to reasonably forecast the conservation status of the species within the foreseeable future.

(50) *Comment:* Several commenters said that the threat of poisoning from 1080 or M–44s should be thoroughly explored in the rule and a prohibition on incidental take from poisoning should be instituted.

Our Response: Wolverines in the contiguous United States were likely severely affected by predator poisoning campaigns of the early 20th century. Those types of widespread, indiscriminant, government-instituted campaigns intending to eliminate predators from the landscape no longer occur within the range of wolverines. Remaining predator control efforts are targeted and geographically constrained so as to target control where predators are particularly problematic for stock growers and to minimize potential poisoning of non-target species. There is no evidence that wolverine populations are currently being affected by poisoning from 1080 or M–44s. Therefore, the best available information does not indicate that poisoning is a threat to the DPS.

(51) *Comment:* Several commenters suggested that current wolverine population densities and population levels are far below historical densities and populations. Some also said that the Service should not speculate as to historical population numbers or densities.

Our Response: There is no reliable estimate for wolverine densities historically or presently. Current wolverine densities are naturally low in areas with wolverine populations, and near zero in areas that have not been recolonized by populations such as the southern Rocky Mountains and Sierra Nevada Range. Wolverine densities are always naturally low relative to most other species due to their need for large territories and their tendency to defend those territories from other wolverines. Listing under the Act is predicated not on population densities and size, but rather on whether the species (here DPS) meets the definition of endangered or threatened 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.

(52) *Comment:* Several commenters said that mortality from collision with vehicles on roads is a threat.

Our Response: Wolverine mortality from collisions with vehicles has occurred in the contiguous United States, but at low levels. Wolverines use habitats that are not particulary conducive to roads or transportation corridors. Consequently, wolverines usually do not come into contact with high-traffic volume roads except in those areas where highways cross over mountain ranges, usually major passes. There have been recorded instances of wolverines being killed on roads in valleys between mountain ranges. These are likely the result of dispersal attempts by wolverines and appear to be rare occurrences. There is no evidence that this low level of effect is significant to the status of the DPS.

(53) *Comment:* One commenter stated that the Service should analyze the effects of trapping on wolverine habitat and that trapping itself modifies or destroys habitat.

Our Response: We cannot conclude that trapping modifies or destroys habitat. Trapping is a mortality factor but generally does not affect the ability

of habitat to provide the life-history requirements of wolverines, such as food and shelter. The habitat and its ability to support wolverines remains, but the animal is removed if it is trapped. The important point is not under what category a threat factor is considered, but that the effects of the threat factor are considered. The best available information does not indicate that impacts from trapping modify or destroy wolverine habitat.

(54) *Comment:* Several commenters said that we erred in the proposed listing rule by concluding that wilderness designation provides protection to wolverines from trapping. They said that trapping is allowed in wilderness areas, so they do not provide protection.

Our Response: Wilderness designations provide refuge from trapping by making access to wolverine habitat by trappers more difficult. Wolverine habitats tend to have very deep snow and cold temperatures during the trapping season. Most trappers access wolverines by motorized (snowmobile) transport. Motorized transport is prohibited in wilderness areas. This reduces, but may not eliminate, trapping in these areas, providing significant protection.

(55) *Comment:* One commenter wanted more explanation of why we concluded in the proposed rule that trapping was not a threat over most of the DPS.

Our Response: Targeted trapping of wolverines only occurs in Montana, and occurs at a low level that is compatible with the current population level. Montana is only a part of the DPS. Therefore, trapping is not a threat to the entire DPS.

(56) *Comment:* One commenter disagreed with our statement in the proposed rule that Montana has stopped trapping in isolated mountain ranges.

Our Response: The statement in the proposed rule is accurate as written. Montana has removed wolverine trapping from isolated mountain ranges in western Montana. The ranges cited in the comments are not isolated, but are located adjacent to other wolverine habitats.

(57) *Comment:* One commenter said that in contrast to the 2010 12-month petition finding, the proposed rule discusses the possible impacts of human activities very little. The proposed rule also suggests that research indicates that there is no effect of human activities, rather than that there is very little research on this factor.

Our Response: In the proposed listing rule (78 FR 7864; February 4, 2013), we reviewed the information, and consolidated the discussion of human activities because the lengthy discussion in the 12-month petition finding (75 FR 78030; December 14, 2010) did not conclude that there were significant threats from those activities. The proposed rule concluded that the best available scientific information does not indicate that a threat to the DPS currently exists from the impacts of human activities.

(58) *Comment:* Several commenters suggested that changes to snow structure caused by freeze/thaws that create hard surface on snow could increase competition or predation on wolverines by other carnivores.

Our Response: The commenters did not provide any citations with their comments. We have no information indicating whether such changes in snow structure are causing impacts to the wolverine.

(59) *Comment:* One commenter thought that the statement from the proposed rule that the current population levels in the contiguous United States may not be lower than those in the past is also incongruous with population densities in western Canada, where the population is vastly higher (15,000 to 19,000 individuals) than in the contiguous United States (USFWS 2013, p. 7869), despite being a slightly larger yet comparably-sized region.

Our Response: The reported numbers from Canada and Alaska are not population densities; they are population estimates. Densities are population per unit of area. The population densities for currently occupied areas in the DPS are not measurably different from those in adjacent Canada. Despite the two regions being roughly comparable in size, the DPS has much less wolverine habitat than Canada and Alaska, and the habitat that does exist occurs in semi-isolated patches at high elevations, whereas habitat in Canada and Alaska is much more extensive and well connected. This explains the difference in wolverine population numbers between the two areas historically.

(60) *Comment:* Several commenters said that other risk factors not considered threats should be considered cumulatively with climate change.

Our Response: We agree that threat factors must be considered cumulatively to determine if factors considered together may be a threat to the species. In the case of the wolverine DPS, in the proposed rule we concluded that trapping and the effects of small population size were threats to this growing population only cumulatively when considered with the projected effects of climate change on wolverine habitat. However, as described in this document, upon further consideration of the best available information, we have re-evaluated our determination on the effects of climate change on wolverine population persistence in light of new information presented below under Factor A. We now conclude that there is not sufficient information on the response of the wolverine DPS to the projected changes in climate and resulting impacts to habitat, and we do not find the effects of climate change to likely pose a risk of extinction to the DPS at this time. We find that absent a threat resulting from climate change, no other stressor rises to the level of a likely risk of extinction to the DPS, either individually or cumulatively, that results in the wolverine DPS meeting the definition of an endangered or threatened species under the Act.

(61) *Comment:* One commenter said that wolverine attraction to road kill is a risk that should be considered.

Our Response: Wolverines have been killed by automobiles on highways. It is uncertain whether road kill may have been a factor in some of these mortalities. We have no evidence that highway mortality is significant to the wolverine population or whether or not attraction to road kill is a significant contributor to mortality events. This hypothesis remains speculative until additional scientific evidence is obtained.

(62) *Comment:* One commenter opined that heavy recreational use does not occur in the central Idaho area where the recreation study (Heinemeyer *et al.* 2012) is occurring.

Our Response: The term ''heavy'' when used to describe recreational use is a subjective term. We consider some of the recreational use in the study area in central Idaho to be locally heavy. The scientists conducting the study consider the range of recreational use in central Idaho to be sufficient to detect effects on wolverines from recreation, if any.

(63) *Comment:* Many commenters took issue with our conclusions regarding winter recreation. Some thought that winter recreation is a threat. Others thought that the recreation study in Idaho could be interpreted to mean that there are significant effects to wolverines. Still others thought that the Service should only rely on peer-reviewed literature when assessing the effects of recreation on the DPS of wolverines.

Our Response: The best available information does not indicate that wolverines are significantly affected by winter recreation. Furthermore, the

question in the listing process is not whether there is any effect, but whether that effect rises to such a level of a threat to the DPS such that the DPS meets the definition of endangered or threatened now or in the foreseeable future. We find no evidence that winter recreation occurs on such a scale and has effects that cause the DPS to meet the definition of a threatened or endangered species. We continue to conclude that winter recreation, though it likely affects wolverines to some extent, is not a threat to the DPS.

(64) *Comment:* Several commenters suggested that changes in technology make access to wolverine habitat easier for snowmobilers. Others pointed out that Inman *et al.* (2013) says snowmobile use may affect wolverines.

Our Response: We agree that changes in technology increase access to wolverine habitat by snowmobilers and that winter recreation may affect wolverines. Significant effects to wolverines from winter recreation remain to be demonstrated scientifically. We do not agree that the available scientific information supports the conclusion that winter recreation is a threat to the DPS, for reasons discussed below under Factor A.

(65) *Comment:* One commenter wondered if there is there any information on wolf predation on wolverines and whether it might be significant to the listing decision.

Our Response: Wolves have been known to kill wolverines on occasion, but we are unaware of any information suggesting that wolf predation is a significant source of mortality for the DPS.

(66) *Comment:* Several commenters thought that immigration from Canada would bolster genetic diversity of wolverines in the DPS given that wolverines recolonized the DPS from Canada.

Our Response: It is possible that future immigration from Canada will provide for an increase in the genetic diversity of wolverines in the contiguous United States; however, data presented in Schwartz *et al.* (2009) suggest that wolverines are not presently moving between populations in the DPS and Canada with enough frequency to overcome the effects of genetic drift.

(67) *Comment:* Several commenters and States thought that wolverines may be able to adapt to earlier snowmelt by denning earlier.

Our Response: It is possible that wolverines may be more adaptable than the currently available scientific information would suggest. Earlier denning has not been reported for wolverines.

(68) *Comment:* The listing proposal fails to conduct an independent assessment of each of the four possible listing options: species, DPS, significant portion of range of the species, and significant portion of range of the DPS.

Our Response: In writing the proposed listing rule, we considered all of the possible listing options, including significant portion of the range (please refer to *Significant Portion of the Range* analysis, below).

(69) *Comment:* Several commenters suggested that small effective population size for wolverines in the northern Rocky Mountains is a significant threat regardless of climate change.

Our Response: In a static population, small effective population size may be a conservation concern because it can lead to loss of genetic diversity. In the case of the wolverine DPS, we expect that continued population growth is likely to ameliorate the effects of small effective population size by increasing the wolverine population and providing for better connectivity between subpopulations. Therefore, small effective population size is not a threat, but rather a risk factor that may resolve itself as population growth continues.

(70) *Comment:* Several States commented that there is no provision in the Act to list a DPS of a subspecies; therefore the DPS is invalid.

Our Response: We continue to support recognition of the wolverine DPS. The Act provides for recognition of DPSs for vertebrate species. The word ''species'' in that context refers to species or subspecies. Furthermore, our 1996 Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act states: ''The Services maintain that the authority to address DPS's extends to species in which subspecies are recognized, since anything included in the taxon of lower rank is also included in the higher ranking taxon'' (61 FR 4722, p. 4724; February 7, 1996). Therefore, it is appropriate to recognize the wolverine DPS as a listable entity.

Summary of Factors Affecting the Species

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations at 50 CFR part 424, set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, we may list a species based on (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. Each of these factors is discussed below.

Factor A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

Under Factor A, we will discuss a variety of impacts to wolverine habitat including: (1) Effects of climate change, (2) human use and disturbance, (3) dispersed recreational activities, (4) infrastructure development, (5) transportation corridors, and (6) land management. Many of these impact categories overlap or act in concert with each other to affect wolverine habitat. Climate change effects are discussed under Factor A because although increased temperatures due to climate change may affect wolverines directly by creating physiological stress, the primary potential impact of climate change on wolverines is thought to be through changes to the availability and distribution of wolverine habitat.

Reduction in Habitat Due to Climate Change

Our analyses under the Act include consideration of the likely effects of ongoing and projected changes in climate. The terms ''climate'' and ''climate change'' are defined by the Intergovernmental Panel on Climate Change (IPCC). ''Climate'' refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2013, p. 1450). The term ''climate change'' thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2013, p. 1450). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19).

We recognize that there are scientific uncertainties on many aspects of

climate change, including the role of natural variability in climate. In our listing proposal (78 FR 7874–7877), we relied both on synthesis documents (e.g., IPCC 2007; Karl *et al.* 2009) that present the consensus view of a very large number of experts on climate change from around the world, and on analyses that relate the effects of climate change directly to wolverines (Brock and Inman 2007, pers. comm.; Gonzalez *et al.* 2008, entire; Brodie and Post 2009, entire; Peacock 2011, entire; McKelvey *et al.* 2011, entire; Johnston *et al.* 2012, entire). We argued that due to lack of downscaling (Peacock 2011), failure to consider both temperature and precipitation (Brock and Inman 2007, pers. comm.; Gonzalez *et al.* 2008), limited analysis area (Johnson *et al.* 2012), and inappropriate inferences from harvest data (Brodie and Post 2010), many analyses do not represent the best available science. In our proposed listing rule, we identified McKelvey *et al.* (2011) as the best scientific information available regarding impacts of climate change to wolverine habitat because the authors incorporated both temperature and precipitation, and downscaled analyses to reflect the regional climate patterns and topography found within the range of wolverines in the contiguous United States.

While we still agree that McKelvey *et al.* (2011) is the most sophisticated analysis of impacts of climate change at a scale specific to the range of the wolverine, science panel members (Service 2014, p. 29), public comments, and recent scientific information (Potter *et al.* 2013, entire; Franklin *et al.* 2012, entire) emphasize limitations inherent in downscaled climate models and the importance of understanding the effect of climate-data spatial resolution on wolverine viability in complex terrain. Downscaling techniques improve understanding of climate at smaller, regional scales compared to Global Climate Models, but their spatial resolution may still be inadequate to describe the variability of microclimates in which organisms live (Potter *et al.* 2013, p. 2935). Franklin *et al.* (2012, pp. 478–482) show that there can be large differences between suitable habitats predicted from coarse versus fine-scale climate models, and concluded that, on average, a scale approximately twice as fine as that used in McKelvey *et al.* (2011, entire) (280 m vs. 500 m) is adequate, and that in rugged terrain even finer models (e.g., 10–30 m) may be needed to represent significant microclimates. Potter *et al.* (2014, p. 2934) propose that the ideal spatial resolution is related to organismal body size and lies between 1 and 10 times the length or height of the organism. McKelvey *et al.* (2011, p. 2895) reached similar conclusions about their own modeling efforts: ''although wolverine distribution is closely tied to persistent spring snow cover (Copeland *et al.* 2010), we do not know how fine scale changes in snow patterns within wolverine home range may affect population persistence.'' We concur; an improved understanding of how microclimatic variation alters the habitat associations of wolverines at fine spatial scales will be useful in understanding climate impacts on wolverine habitat.

Additionally, great difficulty still exists in predicting changes in precipitation with climate models, especially compared to the more confident predictions for temperature (Torbit 2014, pers. comm.). Newer modeling techniques suggest that higher elevations could maintain more snow than previously thought and possibly even receive more snow than historical records show due to climate change (Torbit 2014, pers. comm.; Ray *et al.* 2008). While these contemporary techniques have not been applied to the northern portions of the proposed wolverine DPS (78 FR 7873), and much of the high elevation wolverine range is currently unoccupied, they demonstrate that the science associated with climate models is continuing to change, highlighting the uncertainty of our conclusions in the proposed rule (78 FR 7877). This new information highlighting the importance of scale and use of modern, quantitative techniques to evaluate uncertainty in climate assessments have prompted us to re-evaluate our original conclusions in the proposed rule (78 FR 7874–7876) that wolverine habitat will decline at the predicted rates suggested in McKelvey *et al.* (2011). Modern assessment techniques that include slope, aspect, and other topographic information are now available and can be used to predict precipitation, including snowfall at finer scales that could be more aligned with existing or potential wolverine habitat (Torbit 2014, pers. comm.; Ray *et al.* 2008, pp. 17–23; Torbit 2014, pers comm). Based upon our re-evaluaton of the best scientific data available, we no longer find that the existing scientific information supports our conclusions in the proposed rule (78 FR 7874–7876) that climate change will result in a 31 percent (mid-century) to 63 percent (end of century) reduction in wolverine habitat in the foreseeable future.

Climate Effects to Wolverines

We based our proposal (78 FR 7874–7877) on the best available data at the time, which we intitially interpreted as demonstrating that wolverines require deep snow persisting through the denning period to successfully live and reproduce, and that reduction of this habitat feature would proportionally reduce wolverine habitat, or to an even greater extent if habitat reduction involved increasing fragmentation. We analyzed the effects of climate change on wolverines through three primary mechanisms: (1) Reduced snowpack and earlier spring runoff, which we argued would reduce suitable habitat for wolverine denning; (2) increase in summer temperatures beyond the physiological tolerance of wolverines; and (3) ecosystem changes due to increased temperatures, which we reasoned would move lower elevation ecosystems to higher elevations, thereby eliminating high-elevation ecosystems on which wolverines depend and increasing competitive interactions with species that currently inhabit lower elevations. These mechanisms would tend to push the narrow elevational band that wolverines use into higher elevation, and due to the conical structure of mountains, this upward shift would result in reduced overall suitable habitat for wolverines.

Deep Snow and Denning

The literature generally does not reflect any studies that tested whether wolverines have an obligate relationship with deep and/or contiguous snow cover; therefore, we convened an expert science panel to provide further guidance specifically on this issue (Service 2014, entire). Expertise included climatologists and remote sensing experts, biologists, and ecologists. Panelists strongly supported an obligate relationship between wolverines and deep snow at the scale of the den site, expressed uncertainty in the relationship between wolverines and deep snow at the scale of the home range and DPS' range, and also expressed uncertainty in the relationship between wolverines and contiguous snow at the home range and DPS range scales (Service 2014, pp. 8–13). Therefore, based on the literature (Pulliainen 1968; Copeland 1996; Magoun and Copeland 1996; Magoun and Copeland 1998; Banci 1994; Inman *et al.* 2007; Copeland *et al.* 2010), the opinion of expert panelists, and the peer reviews, it is reasonable to believe that wolverines select for den sites likely to have deep snow that will persist until some point into the spring.

The primary hypothesis put forward in the proposed listing rule (78 FR 7875) is that a loss of areas with persistent spring snow cover will result in a loss of potential wolverine den sites, or failure of den sites, negatively impacting future abundance and trend. Den sites are correlated with snow (Copeland *et al.* 2010, entire), and experts in the science panel expressed an opinion that wolverines require deep snow for den sites. However, the predictions from McKelvey *et al.* (2011) about future habitat loss rely on the Copeland model (Copeland *et al.* 2010, entire) to describe what habitat is and then to predict how much of it will be lost. The habitat described in the Copeland model includes areas that retained snow until May 15, in as few as 1 of 7 years. In other words, if an area retained snow in only 1 of 7 years, it was still included in the model describing habitat, and 97.9 percent of the sample of den sites fell within this area. That means that some proportion of those den sites fell within an area that did not retain snow each year. This brings into question the reliability of the conclusion that snow persisting until May 15 is a necessary condition for wolverine reproduction.

We are aware of no evidence that den sites are currently scarce or lacking, or that they currently limit wolverine reproduction. In other words, even if some den sites were to be lost as a result of climate change, due to the expansive size of female wolverine home ranges, it is likely that many potential additional den sites would remain available. Further, we have no information that we could use to predict at what level of reduced spring snow coverage den sites would become limiting. Inman *et al.* (2013) estimated available habitat capacity in the U.S. to be approximately 644 wolverines (95 percent CI = 506–1881), and that current population size is currently approximately half of capacity. This estimated current abundance level (322) is similar to our rough estimate of population abundance of 250–300 wolverines in our proposed listing rule. The current estimated abundance level, significantly below estimated carrying capacity for a population that is still increasing, suggests that den sites are likely not currently limiting wolverine reproduction and population abundance.

We do not appear to know at this point with any reliability what the causal relationship is between the feature of deep persistent spring snow and wolverine dens (Service 2014, pp. 10, 28–29); that is, we do not understand why wolverines appear to require deep persistent spring snow for denning. Several hypotheses exist to explain the correlation between den sites and snow, such as den structure, food refrigeration, security from predators, or a thermal buffer for kits in the den, but these hypotheses have not been tested. All of these hypotheses seem possible and worth testing, but without such biological information demonstrating the causal mechanism, it is difficult to determine beyond speculation if, and how soon, the effects of climate change (e.g., earlier snowmelt) may influence or limit availability of den sites, habitat, and ultimately wolverine abundance, trend, and viability into the future.

Only two studies have investigated hypotheses regarding potential limiting factors for wolverines. Persson (2005) tested the hypothesis that wolverine reproduction was affected by winter food availability. He found that provision of additional food resources to wolverines, when compared to a control group not receiving supplemental food, resulted in higher reproduction. He suggests that female wolverine reproduction is determined by their condition in winter, which is determined by past year's reproductive costs and food availability. In his comments on the proposed listing rule, Copeland (November 26, 2013, p. 2) also touched on food availability as the limiting factor as he stated his belief that wolverine densities are highly variable and tied to food availability. He points to current differences in population densities between Glacier National Park and central Idaho that he believes are most likely related to food availability. He hypothesized that Glacier Park provides a year-round higher availability of carrion and therefore higher densities of wolverines.

In summary, the pertinent question that remains is if and when a decrease in deep, persistent spring snow will limit the availability of den sites, therefore causing a population decline in the future. Available information does not yet allow us to predict if and when that may occur.

Year-Round Relationship Between Wolverine Habitat and Persistent Snow Cover

Copeland *et al.* (2010) estimated persistent spring snow cover (April 24 to May 15 in at least 1 of 7 years during the period from 2000 to 2006, Copeland *et al.* (2010, p. 235)) using MODIS satellite data, and the resulting mapped area represents their bioclimatic model describing wolverine habitat (Copeland *et al.* 2010, Figure 1). They indicated that of the total 562 dens from North America, Finland, Norway, and Sweden, 97.9 percent of den sites occurred in pixels that were snow covered through May 15 in at least 1 of the 7 years (that is, they were within the modeled habitat). Their results indicated that not all, but 95 percent of summer and 86 percent of winter telemetry locations of wolverine, were within the modeled habitat area they described as having persistent deep snow cover.

However, the location dataset relies heavily on data collected in Scandinavia and does not consider several available datasets, such as trapping locations, location records from States and provinces, and telemetry data from the eastern Canadian provinces. In their comments, the State of Idaho indicated that only 68.6 percent of Idaho's verified wolverine observations (312 of 415) were within Copeland *et al.*'s (2010) habitat model (Idaho Fish and Game Comments, November 25, 2013, p. 2). Recent publications have suggested that factors beyond those included by Copeland *et al.* (2010) such as land cover (e.g., vegetative type), topography, human footprint, and snow depth should be incorporated into predictive models to accurately describe wolverine habitat because these factors appear to also influence primary wolverine habitat use (Inman *et al.* 2013, p. 278; Fisher *et al.* 2013, p. 712). These publications appear to support the idea that wolverines generally use areas of higher elevation; steeper terrain; more snow; fewer roads; less human activity; and, generally, snow cover persisting into the spring. Note, however, that Inman *et al.* (2013, p. 278) used snow cover on April 1, not snow cover until May 15, as a variable in their best-fitting model. Lastly, Copeland himself (November 26, 2013, p. 2) stated his belief that there are other factors beyond snow that influence wolverine distribution. Taken together, the available body of literature, our peer review, the science panel (Service 2014, entire), and public comment appear to indicate that: (1) Wolverines use areas with deep snow; (2) wolverines are occasionally observed outside of the area that has snow until May 15; (3) areas were included in the Copeland *et al.* (2010) predictive habitat model that may have had May 15 snow in as little as 1 of 7 years studied; and (4) factors other than snow cover on May 15 may also influence wolverine habitat use.

McKelvey *et al.* (2011, Figure 4) suggested that wolverine habitat in the contiguous United States, which currently supports approximately 250 to 300 wolverines, is shrinking and will likely continue to shrink and become increasingly fragmented with increased

climate warming. They projected a 31 percent in habitat loss throughout the range of the DPS by the time interval centered on 2045 (2030–2059). That loss expands to 63 percent of wolverine habitat by the time interval centered on 2085 (2070 to 2099). In our proposed listing rule, we reasoned that due to the spatial needs of wolverines and the limited availability of suitable wolverine habitat in the contiguous United States, this projected habitat loss would be likely to result in a loss of wolverine numbers that is greater than the overall loss of habitat area. However, upon reconsideration of the best available information, given our uncertainty in the relationship between wolverines and snow, we conclude it is not clear that these predictions of snow loss represent an equivalent loss of habitat. That is, while it may be likely that habitat will decrease over time due to earlier snow melt, if wolverines also use areas outside of the area covered with snow until May 15, this reduction in snow cover may not equate linearly to an equivalent loss of wolverine habitat; thus, McKelvey *et al.* (2011) may overestimate the loss of wolverine habitat (Franklin *et al.* 2013, p. 481).

Furthermore, based on our own calculations, given average home range sizes of male and female wolverines, the predicted habitat remaining after 2085 (McKelvey *et al.* 2010) could support 344 (95 percent CI: 250–421) wolverines (versus the current estimate of 250–300) in the contiguous United States, with the bulk (283; 95 percent CI: 110–347) of individuals estimated in the Northern Rocky Mountains in 2070–2099. These estimates do not include possible additional occupancy of potentially important wolverine habitat in the Sierra Nevada Mountains and portions of Oregon, which were beyond the geographic scope of the McKelvey *et al.'*s (2011) analysis. In other words, even under future conditions of projected habitat loss, we estimate there would be sufficient habitat available in the United States to potentially continue supporting wolverine populations at roughly the same level of abundance as at present. Thus, even if future populations were potentially limited by available habitat for future growth, the data do not suggest that the population of wolverines in the contiguous United States would necessarily be forced into decline by loss of habitat. In addition, as discussed above, if the obligate relationship with deep snow is only at the den site and not across the overall range of a wolverine and the DPS in general, specific snow variation due to elevation and topography also calls into question the conclusion that overall snow loss across the range of the DPS will equate to a specific loss of wolverine habitat.

Our proposed listing rule also discussed the consequences of habitat patches becoming progressively isolated from each other due to climate change (78 FR 7876). We concluded that reduced connectivity to other subpopulations could increase the likelihood of subpopulations lost due to demographic stochasticity, impairing the functionality of the wolverine metapopulation in the contiguous United States. McKelvey *et al.* (2011) concluded that continued warming trends may create small and isolated populations, among which the energetic costs of traveling will be high. However, they also stated that while contiguous areas of spring snow cover are predicted to become smaller and more isolated over time, large (>2000 km^2) contiguous areas of wolverine habitat are predicted to persist within the study area throughout the 21st century for all model projections (McKelvey *et al.* 2011, pp. 2992, 2994). By the late 21st century, their dispersal modeling predicts that habitat isolation at levels associated with genetic isolation of populations becomes widespread.

Currently available information indicates that wolverines are known to travel long distances through anthropogenically altered terrain, and habitats that are otherwise unsuitable for long-term survival (Moriarty *et al.,* entire; Inman *et al.* 2009, pp. 22–28); in fact, this propensity was cited as complicating our analysis of present and past range (78 FR 7869). Wolverines are able to successfully disperse between habitats, despite the level of development that is currently taking place in the current range of the DPS (Copeland 1996, p. 80; Copeland and Yates 2006, pp. 17–36; Inman *et al.* 2007a, pp. 9–10; Pakila *et al.* 2007, pp. 105–109; Schwartz *et al.* 2009, Figures 4, 5). In recent years, individual wolverines have been documented in Colorado (2010), the Sierra Nevada range in California (2008), and the Uinta Range of Utah and Wyoming (2014), indicating some dispersal to known unoccupied range is occurring, and quite likely necessitated travel through lower elevation areas that do not retain deep snow. Although most studies document greater dispersal distances for males than females (Hornocker and Hash 1981, p. 1298; Banci 1994, pp. 117–118; Moriarty *et al.* 2009, entire; Inman *et al.* 2009, pp. 22–28; Brian 2010, p. 3; Copeland and Yates 2006, Figure 9), Vangen *et al.* (2001, p. 1644) found that both males and females are capable of long-distance dispersal. One hundred percent of males and 69 percent of females dispersed, with average dispersal distances for males of 51 ± 30km (range = 11–101 km) and 60 ± 48 km (range = 15–178 km) for females, although differences between males and females were not significant. Vangen *et al.* (2001, p. 1647) reflect on other dispersal distances reported in the literature from Idaho (two males dispersed 16 and 199 km; Copeland 1996) and Alaska (one male dispersed 378 km; Gardner 1985) and concluded that both sexes have the capacity to establish themselves far away from their natal areas, thereby ensuring recolonization and gene flow between subpopulations. Inman *et al.* (2013, p. 284), however, suggest that female long-distance dispersal is likely to be very infrequent.

Given the available body of literature, the proposed listing rule (78 FR 7864; February 4, 2013), science panel (Service 2014, entire), and peer review, it is reasonable to predict that if observed warming trends (Hamlet and Lettenmaier 1999, p. 1609; Brown 2000, p. 2347; Mote 2003, p. 3–1; Christensen *et al.* 2004, p. 347; Knowles *et al.* 2006, pp. 4548–4549) continue within the larger range of wolverine, and areas with deep snow become smaller and more isolated, connectivity and genetic exchange among wolverine populations will decrease over time. At the same time, however, as discussed above, relatively large areas of wolverine habitat are predicted to persist throughout the 21st century for all model projections, and wolverines are capable of traversing great lengths, thus ameliorating the potential negative consequences of increasing distances between areas of suitable habitat. Therefore, as discussed above, with such uncertainty in wolverine response to changes predicted association with climate modeling, we do not know if and to what extent genetic exchange will be limited and in what timeframe. Furthermore, the best available information does not indicate that climate change effects have hindered population growth and expansion, or caused any contraction of habitat at this time (Inman *et al.* 2013, p. 277).

We acknowledged in our proposed listing rule (78 FR 7868; February 4, 2013), that with no systematic census across the range of the DPS in the United States, the current population level of wolverines is not known with certainty. As we stated in the proposal, our best estimate of current population abundance was based on knowledge of occupied habitat and average densities: approximately 250 to 300 wolverines in

the lower 48 States. Since the proposed listing rule was published, Inman *et al.* (2013) published an estimated available habitat capacity to be approximately 644 wolverines (95 percent CI = 506–1881), and estimated that the current population size in the contiguous United States is currently approximately half of capacity (in other words, roughly 322 individuals), and these are believed to be expanding in number and range (Aubry *et al.* 2007, p. 2151). Population growth and expansion has been documented in the North Cascades and Northern Rocky Mountains (78 FR 7881–7872), and as has been noted above, individuals have successfully dispersed to Colorado, California and Utah. This estimated current abundance level (322) is similar to our rough estimate of population abundance of 250–300 wolverines in our proposed listing rule. Accordingly, our conclusion in the proposed rule (78 FR 78049) that climate change has likely already reduced the overall areal extent and distribution of wolverine habitat seems largely speculative. While one could conjecture that dispersers to the southern portion of the DPS are occurring due to habitat loss in the northern part of the DPS, one could just as easily conclude that these dispersers are the result of an increasing population with dispersers looking to colonize largely unoccupied habitat. This consideration, coupled with the results of the Inman *et al.* (2013) publication indicating that available habitat could support a population in the United States twice as large as that at present, suggests that there is no evidence of habitat contraction at this time due to climate change.

Finally, our proposal suggested that the projected increase in summer temperatures and elimination of high-elevation ecosystems on which wolverines depend may negatively impact wolverines. We reiterate our earlier discussion of the limitations and uncertainty inherent in downscaled climate models. Available information suggests that climate changes may indeed affect wolverine habitat; however, the specific response or sensitivity of the wolverines to these current and forecasted changes is sufficiently uncertain at this time, such that we cannot reasonably project the future conservation status of the DPS based on any such changes that may occur.

Summary of Impacts of Climate Changes

There is significant evidence that the climate within the larger range of the wolverine is warming, affecting snow patterns and associated wolverine habitat. The biological response of wolverine populations to such changes, however, cannot reasonably be deduced with an acceptable degree of certainty. At this time, we do not know how the effects of climate change will impact wolverine populations for the following reasons:

(1) Wolverines are believed to be expanding both within the area currently inhabited by wolverines as well as into suitable habitat not currently occupied and/or occupied with a few individuals. Recent evidence suggests that there is suitable habitat available within the contiguous United States to support a wolverine population twice as large as that at present. Even under conditions of future reduced snowpack as a consequence of climate change, sufficient habitat will likely remain to maintain the wolverine population at the current level of abundance.

(2) There is strong support for the existence of an obligate relationship between wolverines and deep spring snow at the den site; however, available information suggests that den sites are not currently limiting wolverines, and we do not have sufficient information to predict if and when any limitation will occur in the future. Additionally, support for the obligate relationship between wolverine and deep snow at an individual wolverine's home range or the DPS' range in general is lacking. That is, we do not have sufficient information to suggest that deep snow is required by wolverines throughout their home ranges, beyond the level of the individual den site.

(3) We do not have sufficient information to understand the specific response of wolverines to future effects of changes in climate. Although we do not question that climate change is likely to alter the habitats utilized by wolverines to some degree, we have no data to inform us as to the likely biological response of wolverine populations to those habitat changes, and, most germane for the purposes of the Act, no data to reliably suggest that the anticipated changes are such that the viability of wolverine populations in the contiguous United States will be at risk.

Therefore, based on our analysis of the best available scientific information, we do not find the effects of climate change to likely place the wolverine DPS in danger of extinction in the foreseeable future and therefore meeting the definition of a threatened species under the Act.

Habitat Impacts Due to Human Use and Disturbance

Because wolverine habitat is generally inhospitable to human use and occupation and most wolverine habitat is also federally managed in ways that must consider environmental impacts, wolverines are somewhat insulated from impacts of human disturbances from industry, agriculture, infrastructure development, or recreation. Human disturbance in wolverine habitat in the contiguous United States has likely resulted in the loss of some minor amount of wolverine habitat, although this loss has not yet been quantified. Sources of human disturbance to wolverines has been speculated to include winter and summer recreation, housing and industrial development, road corridors, and extractive industry (such as logging or mining). In the contiguous United States, these human activities and developments sometimes occur within or immediately adjacent to wolverine home ranges, such as in alpine or boreal forest environments at high elevations on mountain slopes. They can also occur in a broader range of habitats that are occasionally used by wolverines during dispersal or exploratory movements—habitats that are not suitable for the establishment of home ranges and reproduction.

Little is known about the behavioral responses of individual wolverines to human presence, or about the DPS' ability to tolerate and adapt to repeated human disturbance. Some hypothesize that disturbance may reduce the wolverine's ability to complete essential life-history activities, such as foraging, breeding, maternal care, routine travel, and dispersal (Packila *et al.* 2007, pp. 105–110). However, wolverines have been documented to persist and reproduce in areas with high levels of human use and disturbance including developed alpine ski areas and areas with motorized use of snowmobiles (Heinenmeyer 2012, entire). This suggests that wolverines can survive and reproduce in areas that experience human use and disturbance. How or whether effects of disturbance extend from individuals to characteristics of subpopulations and populations, such as vital rates (e.g., reproduction, survival, emigration, and immigration) and gene flow, and ultimately to wolverine population or metapopulation persistence, remains unknown at this time.

Wolverine habitat is characterized primarily by spring snowpack, but also by the absence of human presence and development (Hornocker and Hash 1981, p. 1299; Banci 1994, p. 114; Landa

et al. 1998, p. 448; Rowland *et al.* 2003 p. 101; Copeland 1996, pp. 124–127; Krebs *et al.* 2007, pp. 2187–2190). This negative association with human presence is sometimes interpreted as active avoidance of human disturbance, but it may simply reflect the wolverine's preference for cold, snowy, and high-elevation habitat that humans avoid. In the contiguous United States, wolverine habitat is typically associated with high-elevation (e.g., 2,100 m to 2,600 m (6,888 ft to 8,528 ft)) subalpine forests that comprise the Hudsonian Life Zone (weather similar to that found in northern Canada), environments not typically used by people for housing, industry, agriculture, or transportation. However, a variety of activities associated with extractive industry, such as logging and mining, as well as recreational activities in both summer and winter are located in a small amount of occupied wolverine habitat.

For the purposes of this determination, we analyze human disturbance in four categories: (1) Dispersed recreational activities with primary impacts to wolverines through direct disturbance (e.g., snowmobiling and heli-skiing); (2) disturbance associated with permanent infrastructure, such as residential and commercial developments, mines, and campgrounds; (3) disturbance and mortality associated with transportation corridors; and (4) disturbance associated with land management activities, such as forestry or fire/fuels reduction activities. Overlap between these categories is extensive, and it is often difficult to distinguish effects of infrastructure from the dispersed activities associated with that infrastructure. However, we conclude that these categories account for most of the human activities that occur in occupied wolverine habitat.

Dispersed Recreational Activities

Dispersed recreational activities occurring in wolverine habitat include snowmobiling, heli-skiing, hiking, biking, off- and on-road motorized use, hunting, fishing, and other uses.

One study documented (in two reports) the extent that winter recreational activity spatially and temporally overlapped modeled wolverine denning habitat in the contiguous United States (Heinemeyer and Copeland 1999, pp. 1–17; Heinemeyer *et al.* 2001, pp. 1–35). This study took place in the Greater Yellowstone Area (GYA) in an area of high dispersed recreational use. The overlap of modeled wolverine denning habitat and dispersed recreational activities was extensive. Strong temporal overlap existed between snowmobile activity (February–April) and the wolverine denning period (February–May). During 2000, six of nine survey units, ranging from 3,500 to 13,600 (ha) (8,645 to 33,592 (ac)) in size, showed evidence of recent snowmobile use. Among the six survey units with snowmobile activity, the highest use covered 20 percent of the modeled denning habitat, and use ranged from 3 to 7 percent over the other survey units. Snowmobile activity was typically intensive where detected.

Three of nine survey units in this study showed evidence of skier activity (Heinemeyer and Copeland 1999, p. 10; Heinemeyer *et al.* 2001, p. 16). Among the three units with activity, skier use covered 3 to 19 percent of the survey unit. Skiers also intensively used the sites they visited. Combined skier and snowmobile use covered as much as 27 percent of potential denning habitat in one unit where no evidence of wolverine presence was detected. We conclude from this study that in some areas, high recreational use may coincide substantially with occupied wolverine habitat. The authors of the study cited above chose the study area based on its unusually high level of motorized recreational use. Although we do not have information on the overlap of wolverine and winter recreation in the remaining part of the contiguous U.S. range, it is unlikely that any of the large areas of wolverine habitat such as the southern Rocky Mountains, Northern Rocky Mountains, GYA, or North Cascades get the high levels of recreational use seen in the portion of the GYA examined in this study across the entire landscape. Rather, each of these areas has small (relative to wolverine home range size) areas of intensive recreational use (ski resorts, motorized play areas) surrounded by a landscape that is used for more dispersed recreation such as backcountry skiing or snowmobile trail use.

Although we can demonstrate that recreational use of wolverine habitat is heavy in some areas, we do not have any information to suggest that these activities have negative effects on wolverines. No assessments of anthropogenic disturbance on wolverine den fidelity, food provisioning, or offspring survival have been conducted. Disturbance from foot and snowmobile traffic associated with historical wolverine control activities (Pulliainen 1968, p. 343), and field research activities, have been purported to cause maternal females to abandon natal dens and relocate kits to maternal dens (Myrberget 1968, p. 115; Magoun and Copeland 1998, p. 1316; Inman *et al.* 2007c, p. 71). However, this behavior appears to be rare, even under intense disturbance associated with capture of family groups at the den site (Persson *et al.* 2006, p. 76), and other causes of den abandonment may have acted in these cases. Preliminary results from an ongoing study on the potential impacts of winter recreation on wolverines in central Idaho indicate that wolverines are present and reproducing in this area in spite of heavy recreational use, including a developed ski area; dispersed winter and summer recreation; and dispersed snowmobile use (Heinemeyer *et al.* 2012, entire). The security of the den and the surrounding foraging areas (i.e., protection from predation by carnivores) is an important aspect of den site selection. Abandonment of natal and maternal dens may be a preemptive strategy that females use in the absence of predators (i.e., females may abandon dens without external stimuli), as this may confer an advantage to females if prolonged use of the same den makes that den more evident to predators. Evidence for effects to wolverines from den abandonment due to human disturbance is lacking. The best scientific information available does not substantiate dispersed recreational activities as a threat to wolverine.

Most roads in wolverine habitat are low-traffic volume dirt or gravel roads used for local access. Larger, high-volume roads are dealt with below in the section ''Transportation Corridors.'' At both a site-specific and landscape scale, wolverine natal dens were located particularly distant from public (greater than 7.5 km (4.6 mi)) and private (greater than 3 km (1.9 mi)) roads (May 2007, pp. 14–31). Placement of dens away from public roads (and away from associated human-caused mortality) was also a positive influence on successful reproduction. It is not known if the detected correlation is due to the influence of the roads, but we find it unlikely that wolverines avoid the type of low-use forest roads that generally occur in wolverine habitat. Other types of high-use roads are rare in wolverine habitat and are not likely to affect a significant amount of wolverine habitat (see ''Transportation Corridors'' section, below).

Infrastructure Development

Infrastructure includes all residential, industrial, and governmental developments, such as buildings, houses, oil and gas wells, and ski areas. Infrastructure development on private lands in the Rocky Mountain West has been rapidly increasing in recent years

and is expected to continue as people move to this area for its natural amenities (Hansen *et al.* 2002, p. 151). Infrastructure development may affect wildlife directly by eliminating habitats, or indirectly, by displacing animals from suitable habitats near developments.

Wolverine home ranges generally do not occur near human settlements, and this separation is largely due to differential habitat selection by wolverines and humans (May *et al.* 2006, pp. 289–292; Copeland *et al.* 2007, p. 2211). In one study, wolverines did not strongly avoid developed habitat within their home ranges (May *et al* 2006, p. 289). Wolverines may respond positively to human activity and developments that are a source of food. They scavenge food at dumps in and adjacent to urban areas, at trapper cabins, and at mines (LeResche and Hinman 1973 as cited in Banci 1994 p. 115; Banci 1994, p. 99). Based on the best available science, we conclude that wolverines do not avoid human development of the types that occur within suitable wolverine habitat.

There is no evidence that wolverine dispersal is affected by infrastructure development. Linkage zones are places where animals can find food, shelter, and security while moving across the landscape between suitable habitats. Wolverines prefer to travel in habitat that is most similar to habitat they use for home-range establishment, i.e., alpine habitats that maintain snow cover well into the spring (Schwartz *et al.* 2009, p. 3227). Wolverines may move large distances in an attempt to establish new home ranges, but the probability of making such movements decreases with increased distance between suitable habitat patches, and the degree to which the characteristics of the habitat to be traversed diverge from preferred habitat in terms of climatic conditions (Copeland *et al.* 2010, entire; Schwartz *et al.* 2009, p. 3230).

The level of development in these linkage areas that wolverines can tolerate is unknown, but it appears that the current landscape does allow wolverine dispersal (Schwartz *et al.* 2009, Figures 4, 5; Moriarty *et al.* 2009, entire; Inman *et al.* 2009, pp. 22–28). For example, wolverine populations in the northern Rocky Mountains appear to be connected to each other at the present time through dispersal routes that correspond to habitat suitability (Schwartz *et al.* 2009, Figures 4, 5).),

Wolverines are capable of long-distance movements through variable and anthropogenically altered terrain, crossing numerous transportation corridors (Moriarty *et al.* 2009, entire; Inman *et al.* 2009, pp. 22–28). Wolverines are able to successfully disperse between habitats, despite the level of development that is currently taking place in the current range of the DPS (Copeland 1996, p. 80; Copeland and Yates 2006, pp. 17–36; Inman *et al.* 2007a, pp. 9–10; Pakila *et al.* 2007, pp. 105–109; Schwartz *et al.* 2009, Figures 4, 5). Dispersal between populations is needed to avoid further reduction in genetic diversity; however, there is no evidence that human development and associated activities are preventing wolverine movements between suitable habitat patches. Rather, wolverine movement rates are limited by suitable habitat and proximity of suitable habitat patches, not the characteristics of the intervening unsuitable habitat (Schwartz *et al.* p. 3230).

Transportation Corridors

Transportation corridors are places where transportation infrastructure and other forms of related infrastructure are concentrated together. Examples include interstate highways and high-volume secondary highways. These types of highway corridors often include railroads; retail, industrial, and residential development; and electrical and other types of energy transmission infrastructure. Transportation corridors may affect wolverines if located in wolverine habitat or between habitat patches. If located in wolverine habitat, transportation corridors result in direct loss of habitat. Direct mortality due to collisions with vehicles is also possible (Packila *et al.* 2007, Table 1).

The Trans Canada Highway at Kicking Horse Pass in southern British Columbia, an important travel corridor over the Continental Divide, has a negative effect on wolverine movement (Austin 1998, p. 30). Wolverines partially avoided areas within 100 m (328 ft) of the highway, and preferred to use distant sites (greater than 1,100 m (3,608 ft)). Wolverines that approached the highway to cross repeatedly retreated, and successful crossing occurred in only half of the attempts (Austin 1998, p. 30). Highway-related mortality was not documented in the study. Where wolverines did successfully cross, they used the narrowest portions of the highway right-of-way. A railway with minimal human activity, adjacent to the highway, had little effect on wolverine movements. Wolverines did not avoid, and even preferred, compacted, lightly used ski trails in the area. The extent to which avoidance of the highway may have affected wolverine vital rates or life history was not measured.

In the tri-State area of Idaho, Montana, and Wyoming, most documented crossings of Federal or State highways were done by subadult wolverines making exploratory or dispersal movements (ranges of resident adults typically do not contain major roads) (Packila *et al.* 2007, p. 105). Roads in the study area, typically two-lane highways or roads with less improvement, were not absolute barriers to wolverine movement. The individual wolverine that moved to Colorado from Wyoming in 2008 successfully crossed Interstate 80 in southern Wyoming (Inman *et al.* 2008, Figure 6). Wolverines in Norway successfully cross deep valleys that contain light human developments such as railway lines, settlements, and roads (Landa *et al.* 1998, p. 454). Wolverines in central Idaho avoided portions of a study area that contained roads, although this was possibly an artifact of unequal distribution of roads that occurred at low elevations and peripheral to the study site (Copeland *et al.* 2007, p. 2211). Wolverines frequently used un-maintained roads for traveling during the winter, and did not avoid trails used infrequently by people or active campgrounds during the summer (Copeland *et al.* 2007, p. 2211).

At both a site-specific and landscape scale, wolverine natal dens were located particularly distant from public (greater than 7.5 km (4.6 mi)) and private (greater than 3 km (1.9 mi)) roads (May 2007, pp. 14–31). Placement of dens away from public roads (and away from associated human-caused mortality) was a positive influence on successful reproduction (May 2007, pp. 14–31). Predictive, broad-scale habitat models, developed using historical records of wolverine occurrence, indicated that roads were negatively associated with wolverine occurrence (Rowland *et al.* 2003, p. 101). Although wolverines appear to avoid transportation corridors in their daily movements, studies of the few areas where transportation corridors are located in wolverine habitat leads us to conclude that the effects are most likely local in scale. There are no studies that address potential effects of transportation corridors in linkage areas (i.e., outside of wolverine habitat). In the few documented long-distance movements by wolverines, the animals successfully crossed transportation corridors (Inman *et al.* 2009, Fig. 6). The available evidence indicates that dispersing wolverines can successfully cross transportation corridors.

Land Management

Few effects to wolverines from land management actions such as grazing,

timber harvest, and prescribed fire have been documented. Wolverines in British Columbia used recently logged areas in the summer and moose winter ranges for foraging (Krebs *et al.* 2007, pp. 2189–2190). Males did not appear to be influenced strongly by the presence of roadless areas (Krebs *et al.* 2007, pp. 2189–2190). In Idaho, wolverines used recently burned areas despite the loss of canopy cover (Copeland 1996, p. 124).

Intensive management activities such as timber harvest and prescribed fire do occur in wolverine habitat; however, for the most part, wolverine habitat tends to be located at high elevations and in rugged topography that is unsuitable for intensive timber management. Much of wolverine habitat is managed by the U.S. Forest Service or other Federal agencies and is protected from some practices or activities such as residential development. In addition, much of wolverine habitat within the contiguous United States is already in a management status such as wilderness or national park that provides some protection from management, industrial, and recreational activities. Wolverines are not thought to be dependent on specific vegetation or habitat features that might be manipulated by land management activities, nor is there evidence to suggest that land management activities are a threat to the conservation of the DPS.

Summary of Factor A

At this time, we do not have sufficient information to make a reliable prediction about how wolverines are likely to respond to the effects of climate change. Wolverines have recently expanded in the North Cascades and the northern Rocky Mountains from sources in Canada, and are continuing to expand into suitable habitat not currently occupied and/or occupied by a few individuals, including into Colorado, California, Wyoming, and Utah. New information estimated that current population size is approximately half of capacity (Inman *et al.* 2013), confirming that continued population growth and expansion is possible and even likely (Aubry *et al.* 2007, p. 2151).

There is strong support for the existence of an obligate relationship between wolverines and deep spring snow at the den site. However, available information suggests that availability of den sites is not currently limiting wolverines, and we do not have sufficient information to predict if and when this will occur in the future. Furthermore, the importance of the relationship between wolverines and snow at the broader home-range and DPS-range scales is uncertain. That is, whether deep snow is required by wolverines outside of their needs at the scale of the individual den site is not certain.

There is significant evidence that the climate within the range of the wolverine is warming, which will likely impact both snowfall and snow persistence. However, at this time, we do not have the sufficient resolution of predictive climate models nor sufficient certainty in those models and the results from them to make reasonably certain conclusions about the specific response or sensitivity of wolverines to predicted changes in amount and persistence of snowfall. Human activities, including dispersed recreation activities, infrastructure, and the presence of transportation corridors, occur in occupied wolverine habitat. However, the alpine and subalpine habitats preferred by wolverine typically receive little human use relative to lower elevation habitats. The majority of wolverine habitat (over 90 percent) occurs within U.S. Forest Service and National Park Service lands that are subject to activities, but usually not direct habitat loss to infrastructure development. The best available science leads us to determine that human activities and developments do not pose a current threat to wolverines in the contiguous United States.

Wolverines coexist with some modification of their environment, as wilderness characteristics such as complete lack of motorized use or any permanent human presence are likely not critical for maintenance of populations. It is clear that wolverines coexist with some level of human disturbance and habitat modification.

We know of no examples where human activities such as dispersed recreation have occurred at a scale that could render a large enough area unsuitable so that a wolverine home range would be likely to be rendered unsuitable or unproductive. Given the large size of home ranges used by wolverine, most human activities affect such a small portion that negative effects to individuals are unlikely. These activities do not occur at a scale that is likely to have population-level effects to wolverine.

Little scientific or commercial information exists regarding effects to wolverines from development or human disturbances associated with them. What little information does exist suggests that wolverines can adjust to moderate habitat modification, infrastructure development, and human disturbance. In addition, large amounts of wolverine habitat are protected from human disturbances and development, either legally through wilderness and National Park designation, or by being located at remote and high-elevation sites. Therefore, wolverines are afforded a relatively high degree of protection from the effects of human activities by the nature of their habitat. Wolverines are known to successfully disperse long distances between habitats through human-dominated landscapes and across transportation corridors. The current level of residential, industrial, and transportation development in the western United States does not appear to have precluded the long-distance dispersal movements that wolverines require for maintenance of genetic diversity. We do not have information to suggest that future levels of residential, industrial, and transportation development would be a significant conservation concern for the DPS.

In summary, we do not have the sufficient information to make a reliable prediction about how wolverines are likely to respond to impacts to habitat that may result from climate change and whether such habitat changes will pose a threat in the future. Additionally, the best available scientific and commercial information does not indicate that other potential stressors such as land management, recreation, infrastructure development, and transportation corridors pose a threat to the DPS.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Over much of recent history, trapping has been a primary cause of wolverine mortality (Banci 1994, p. 108; Krebs *et al.* 2004, p. 497; Lofroth and Ott 2007, pp. 2196–2197; Squires *et al.* 2007, p. 2217). Unregulated trapping is believed to have played a role in the historical decline of wolverines in North America in the late 1800s and early 1900s (Hash 1987, p. 580). Wolverines are especially vulnerable to targeted trapping and predator reduction campaigns due to their habit of ranging widely in search of carrion, bringing them into frequent contact with poison baits and traps (Copeland 1996, p. 78; Inman *et al.* 2007a, pp. 4–10; Packila *et al.* 2007, p. 105; Squires *et al.* 2007, p. 2219).

A study in British Columbia determined that, under a regulated trapping regime, trapping mortality in 15 of 71 wolverine population units was unsustainable, and that populations in those unsustainable population units were dependent on immigration from neighboring populations or untrapped refugia (Lofroth and Ott 2007, pp. 2197–2198). Similarly, in southwestern Montana, legal trapping in isolated

mountain ranges accounted for 64 percent of documented mortality and reduced the local wolverine subpopulation (Squires *et al.* 2007, pp. 2218–2219). The observed harvest levels, which included two pregnant females in a small mountain range, could have significant negative effects on a small subpopulation (Squires *et al.* 2007, p. 2219). Harvest refugia, such as jurisdictions with closed seasons, national parks, and large wilderness areas, are important to wolverine persistence on the landscape because they can serve as sources of surplus individuals to bolster trapped populations (Squires *et al.* 2007, p. 2219; Krebs and Ott 2004, p. 500). Due to their large space requirements, wolverine population refuges must be large enough to provide protection from harvest mortality, and complete protection is only available for wolverines whose entire home range occurs within protected areas. Glacier National Park, though an important refuge for a relatively robust population of wolverines, was still vulnerable to trapping because most resident wolverines' home ranges extended into large areas outside the park (Squires *et al.* 2007, p. 2219). It is likely that the larger scale refuges provided by the States of Idaho and Wyoming (which do not permit wolverine trapping) provide wolverine habitat that is fully protected from legal harvest in Montana; however, wolverines with home ranges that partially overlap Montana and dispersers that move into Montana would be vulnerable to harvest. Due to the restrictive, low level of harvest now allowed by Montana, the number of affected wolverines would be correspondingly small.

Despite the impacts of trapping on wolverines in the past, trapping is no longer a risk factor within most of the wolverine's range in the contiguous United States. Montana is the only State where wolverine trapping is still legal. Before 2004, average wolverine harvest was 10.5 wolverines per year. Due to preliminary results of the study reported in Squires *et al.* (2007, pp. 2213–2220), the Montana Department of Fish, Wildlife, and Parks adopted new regulations for the 2004–2005 trapping season that divided the State into three units, with the goal of spreading the harvest more equitably throughout the State.

For the 2008–2009 trapping season, the Montana Department of Fish, Wildlife, and Parks adjusted its wolverine trapping regulations again to further increase the geographic control on harvest to prevent concentrated trapping in any single area, and to completely stop trapping in isolated mountain ranges where small populations are most vulnerable (Montana Department of Fish Wildlife and Parks 2010, pp. 8–11). Their new regulations spread harvest across three geographic units (the Northern Continental Divide area, the Greater Yellowstone area, and the Bitterroot Mountains), and established a Statewide limit of five wolverines. From 2008 until 2012 wolverine take averaged 3 wolverines annually (Montana Department of Fish Wildlife and Parks 2010, pp. 8–11; Brian Giddings 2012, pers. comm.), with reduced harvest being due to season closure rather than lack of wolverines. The size of the wolverine population subjected to trapping in this area is not known precisely but is likely not more than about 300 animals in states of Montana, Idaho, and Wyoming combined (Inman et al. 2013). On November 30, 2012, a district court judge granted a temporary restraining order that blocked the opening of Montana's wolverine trapping season (Case No. BDV–2012–868). That restraining order remains in place and the season remains closed.

The Montana Department of Fish, Wildlife, and Parks conduct yearly furbearer monitoring using track surveys. These surveys involve snowmobiling along transect routes under good tracking conditions and visually identifying all carnivore tracks encountered. The protocol does not use verification methods such as DNA collection or camera stations to confirm identifications. Consequently, misidentifications are likely to occur. Given the relative rarity of wolverines and the relative abundance of other species with which they may be confused, such as bobcats (*Lynx rufus*), Canada lynx (*Lynx canadensis*), and mountain lions (*Felis concolor*), lack of certainty of identifications of tracks makes it highly likely that the rare species is overrepresented in unverified tracking records (McKelvey *et al.* 2008, entire). The Montana Department of Fish, Wildlife, and Parks wolverine track survey information does not meet our standard for reliability, and we have not relied on this information in this analysis.

Montana wolverine populations have rebounded from historic lows in the early 1900s while at the same time being subjected to regulated trapping (Aubry *et al.* 2007, p. 2151; Montana Department of Fish, Wildlife, and Parks 2007, p. 1). In fact, much of the wolverine expansion that we have described above took place under less restrictive (i.e., higher harvest levels) harvest regulations than are in place today. The extent to which wolverine population growth has occurred in Montana as a result of within-Montana population growth, versus population growth attributable to surrounding States where wolverines are not trapped (i.e., population growth driven by the entire metapopulation versus just the portion of the metapopulation found in Montana), is unknown.

We reviewed the current levels of incidental trapping (i.e., capture in traps set for species other than wolverine) and impacts on wolverines. In the 2008–2009 trapping season, two wolverines were incidentally killed in traps set for other species in Beaverhead and Granite Counties, Montana (Montana Fish, Wildlife, and Parks 2010, p. 2). These two mortalities occurred within the portion of southwestern Montana that is currently closed to legal wolverine trapping to ensure that wolverines are not unsustainably harvested in this area of small, relatively isolated mountain ranges. More recently, a wolverine was trapped incidentally and released unharmed in December 2013, and another was incidentally killed in January 2014 by a trap set for other species (Giddings 2014, pers. comm.). Idaho Department of Fish and Game records show that since 1965, 14 wolverines have been incidentally trapped during the Idaho furbearer season, equating to an average of 0.29 wolverines incidentally trapped annually. Eight of these incidental catches were released alive, and 6 resulted in confirmed mortality. This count includes 4 wolverines incidentally trapped during the 2013–2014 furbearer season (3 released alive; 1 mortality) (Idaho Department of Fish and Game 2014, p. 26). The U.S. Department of Agriculture's Wildlife Services trapped three wolverines (one each in 2004, 2005, and 2010) incidental to trapping wolves involved in livestock depredations. One of these sustained severe injuries and was euthanized. The other two were released without visible injury. Another wolverine was trapped in Wyoming in 2006 outside of the expected range for wolverine (Lanka 2014, pers. comm.). This animal was released unharmed (Inman 2012, pers. comm.). The three documented mortalities are possibly locally significant for wolverines in these areas because local populations in each of the mountain ranges are small and relatively isolated from nearby source populations.

Summary of Factor B

Legal wolverine harvest occurs in one state, Montana, within the range of the DPS. The extent to which this harvest

affects populations occurring outside of Montana is unknown. However, the State of Montana contains much of the habitat and wolverines that exist in the current range of the DPS, and regulates trapping to reduce the impact of harvest on wolverine populations. Incidental harvest also occurs within the range of the DPS; however, the level of mortality from incidental trapping appears to be low.

The current known level of incidental trapping mortality is low. We note that it is unknown whether or not increased trapping of wolves associated with wolf trapping regulations recently approved by the States of Idaho and Montana would be likely to result in increased incidental trapping of wolverines. Idaho began its wolf trapping program in the winter of 2011–2012, and Montana began theirs in the winter of 2012–2013. These wolf trapping activities are relatively new in the DPS area, and we do not yet have reliable information on the level of incidental take of wolverines that may result from them.

Based on the best scientific and commercial information available, we conclude that trapping, including known rates of incidental trapping in Montana and Idaho, result in a small number of wolverine mortalities each year and that this level of mortality by itself is not a threat to the wolverine DPS.

Factor C. Disease or Predation

No information is currently available on the potential effects of disease on wild wolverine populations. Wolverines are sometimes killed by wolves (*Canis lupus*), black bears (*Ursus americanus*), and mountain lions (Burkholder 1962, p. 264; Hornocker and Hash 1981, p. 1296; Copeland 1996, pp. 44–46; Inman *et al.* 2007d, p. 89). In addition, wolverine reproductive dens are likely subject to predation, although so few dens have been discovered in the contiguous U.S. that determining the intensity of this predation is not possible.

Summary of Factor C

We have no information to suggest that wolverine mortality from predation and disease is above natural or sustainable levels. The best scientific and commercial information available indicates that disease or predation is not a threat to the DPS now or likely to become so in the future.

Factor D. Inadequacy of Existing Regulatory Mechanisms

Our interpretation of the Act for assessing regulatory mechanisms under Factor D is to evaluate the inadequacy of existing regulatory mechanisms in the context of how they address the threats identified for the DPS or its habitat under Factors A, B, C, or E. Based on the conclusion that effects related to climate change are not a threat, and the fact that other threats cited in the proposed rule were considered threats only in light of the effects of climate change, we have determined that there are no threats to the wolverine under any of the factors. There were two areas, however, where regulatory mechanisms contributed to our conclusion that risk factors were not threats: Regulations under the Wilderness Act and trapping regulations in Montana.

The Wilderness Act

The U.S. Forest Service and National Park Service both manage lands designated as wilderness areas under the Wilderness Act of 1964 (16 U.S.C. 1131–1136). Within these areas, the Wilderness Act states the following: (1) New or temporary roads cannot be built; (2) there can be no use of motor vehicles, motorized equipment, or motorboats; (3) there can be no landing of aircraft; (4) there can be no other form of mechanical transport; and (5) no structure or installation may be built. A large amount of suitable wolverine habitat, about 28 percent for the States of Montana, Idaho, and Wyoming, occurs within Federal wilderness areas in the United States (Inman, 2007b, pers. comm.). As such, a large proportion of existing wolverine habitat is protected from direct loss or degradation by the prohibitions of the Wilderness Act.

Wilderness areas provide protection to wolverines by making access to wolverine habitats difficult, especially in winter. Wolverine habitats are characterized by deep snow and cold conditions in the winter time. Access to these areas is restricted to non-motorized users. This makes it extremely difficult to pursue trapping activities in wilderness that may purposefully target wolverines or incidentally capture them.

Montana Trapping Regulations

Before 2004, the Montana Department of Fish, Wildlife, and Parks regulated wolverine harvest through the licensing of trappers, a bag limit of one wolverine per year per trapper, and no Statewide limit. Under this management, average wolverine harvest was 10.5 wolverines per year. Due to preliminary results of the study reported in Squires *et al.* (2007, pp. 2213–2220), Montana Department of Fish, Wildlife, and Parks adopted new regulations for the 2004–2005 trapping season that divided the State into three units with the goal of spreading the harvest more equitably among available habitat. In 2008, Montana Department of Fish, Wildlife, and Parks further refined their regulations to prohibit trapping in isolated mountain ranges, and reduced the overall Statewide harvest to five wolverines with a Statewide female harvest limit of three. Due to a court-issued restraining order issued in November 2012, the Montana trapping season on wolverines was blocked and remains closed. Under Factor B, above, we concluded that trapping, including known rates of incidental trapping in Montana and other parts of the DPS, is not a threat to the wolverine DPS.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Small Population Size

Population ecologists use the concept of a population's ''effective'' size as a measure of the proportion of the actual population that contributes to future generations (for a review of effective population size, see Schwartz *et al.* 1998, entire). In a population where all of the individuals contribute offspring equally, effective population size would equal true population size, referred to as the population census size. For populations where contribution to the next generations is often unequal, effective population size will be smaller than the census size. The smaller the effective population size, the more reproduction in each generation is dominated by a few individuals in each generation. For wolverines it is likely that individuals occupying high-quality home ranges are better able to reproduce. Therefore, mature males and females that are successful at acquiring and defending a territory may dominate reproduction. Another contributing factor that reduces effective population size is the tendency in wolverines for a few males to monopolize the reproduction of several females, reducing reproductive opportunities for other males. Although this monopolization is a natural feature of wolverine life-history strategy, it can lead to lower effective population size and reduce population viability by reducing genetic diversity. The effective population is not static; members of the effective population in one year may lose this status in the following year and possibly regain it again later depending on their reproductive success. When members of the effective population are lost, it is likely that their territories are quickly filled by younger individuals

who may not have been able to secure a productive territory previously.

Effective population size is important because it determines rates of loss of genetic variation and the rate of inbreeding. Populations with small effective population sizes show reductions in population growth rates and increases in extinction probabilities when genetic diversity is low enough to lead to inbreeding depression (Leberg 1990, p. 194; Jimenez *et al.* 1994, pp. 272–273; Newman and Pilson 1997, p. 360; Saccheri *et al.* 1998, p. 492; Reed and Bryant 2000, p. 11; Schwartz and Mills 2005, p. 419; Hogg *et al.* 2006, pp. 1495, 1498; Allendorf and Luikart 2007, pp. 338–342). Franklin (1980, as cited in Allendorf and Luikart 2007, p. 359) proposed an empirically based rule suggesting that for short-term (a few generations) maintenance of genetic diversity, effective population size should not be less than 50. For long-term (hundreds of generations) maintenance of genetic diversity, effective population size should not be less than 500 individuals (for appropriate use of this rule and its limitations see Allendorf and Luikart 2007, pp. 359–360); others propose that even higher numbers are required. Each wolverine subpopulation within the contiguous United States would need an estimated 400 breeding pairs, or 1 to 2 effective migrants per generation to meet this threshold (Cegelski *et al.* 2006, p. 209). Long-term connectivity to the reservoir of genetic resources in the Canadian population of wolverines will likely be required for the long-term genetic health of the DPS (Traill *et al.* 2010, p. 32; Allendorf and Luikart 2007, pp. 359–360). Since the proposed rule published (February 4, 2013), Inman *et al.* (2013) published an estimated available habitat capacity to be approximately 644 wolverines (95 percent CI = 506–1881) and estimated that current population size is currently approximately half of capacity. Given the life history of wolverines that includes high inequality of reproductive success and a metapopulation of semi-isolated subpopulations, effective population sizes would likely never reach even 100 individuals at full habitat occupancy, as this would suggest a census population of over 1,000. In this case, population connectivity exchange with the larger Canadian/Alaskan population would likely be required for long-term genetic health of the DPS.

Wolverine effective population size in the northern Rocky Mountains, which is the largest extant population in the contiguous United States, is low and is below what is thought necessary for short-term maintenance of genetic diversity. Estimates for effective population size for wolverines in the northern Rocky Mountains averaged 35 (credible limits = 28–52) (Schwartz *et al.* 2009, p. 3226). This study excluded the small population from the Crazy and Belt Mountains (hereafter ''CrazyBelts'') as they may be an isolated population, which could bias the estimate using the methods of Tallmon *et al.* (2007, entire). Measures of the effective population sizes of the other populations in the contiguous United States have not been completed, but given their small census sizes, their effective sizes are expected to be smaller than for the northern Rocky Mountains population. Thus, wolverine effective population sizes are very low. To date, no adverse effects of the lower genetic diversity of the contiguous U.S. DPS of wolverines have been documented. Therefore, we conclude that effective population size estimates for wolverines do not suggest that small population size is currently a threat to the DPS, but they do suggest that populations are low enough that they could be vulnerable to loss of genetic diversity in the future.

Wolverines in the contiguous United States are thought to be derived from a recent recolonization event after they were extirpated from the area in the early 20th century (Aubry *et al.* 2007, Table 1). Consequently, wolverine populations in the contiguous United States have reduced genetic diversity relative to larger Canadian populations as a result of founder effects or inbreeding (Schwartz *et al.* 2009, pp. 3228–3230). Wolverine effective population size in the northern Rocky Mountains was estimated to be 35 (Schwartz *et al.* 2009, p. 3226) and is below what is thought to be adequate for short-term maintenance of genetic diversity. Loss of genetic diversity can lead to inbreeding depression and is associated with increased risk of extinction (Allendorf and Luikart 2007, pp. 338–343). Small effective population sizes are caused by small actual population size (census size), or by other factors that limit the genetic contribution of portions of the population, such as polygamous mating systems. Populations may increase their effective size by increasing census size or by the regular exchange of genetic material with other populations through interpopulation mating.

The concern with the low effective population size was highlighted in a recent analysis that determined that, without immigration from other wolverine populations, at least 400 breeding pairs would be necessary to sustain the long-term genetic viability of the northern Rocky Mountains wolverine population (Cegelski *et al.* 2006, p. 197). However, the entire population is likely only 250 to 300 (Inman 2010b, pers. comm.), with a substantial number of these being unsuccessful breeders or nonbreeding subadults (i.e., part of the census population, but not part of the effective population).

Genetic studies demonstrate the essential role that genetic exchange plays in maintaining genetic diversity in small wolverine populations. Genetic drift has already occurred in subpopulations of the contiguous United States: Wolverines here contained 3 of 13 haplotypes found in Canadian populations (Kyle and Strobeck 2001, p. 343; Cegelski *et al.* 2003, pp. 2914–2915; Cegelski *et al.* 2006, p. 208; Schwartz *et al.* 2007, p. 2176; Schwartz *et al.* 2009, p. 3229). The haplotypes found in these subpopulations were a subset of those in the larger Canadian population, indicating that genetic drift had caused a loss of genetic diversity. One study found that a single haplotype dominated the northern Rocky Mountain wolverine population, with 71 of 73 wolverines sampled expressing that haplotype (Schwartz *et al.* 2007, p. 2176). The reduced number of haplotypes indicates not only that genetic drift has occurred but also some level of genetic separation; if these populations were freely interbreeding, they would share more haplotypes (Schwartz *et al.* 2009, p. 3229). The reduction of haplotypes is likely a result of the fragmented nature of wolverine habitat in the United States and is consistent with an emerging pattern of reduced genetic variation at the southern edge of the range documented in a suite of boreal forest carnivores (Schwartz *et al.* 2007, p. 2177). However, as mentioned above, no adverse effects of the lower genetic diversity of the contiguous U.S. DPS of wolverines have been documented.

Immigration of wolverines from Canada is not likely to bolster the genetic diversity of wolverines in the contiguous United States. There is an apparent lack of connectivity between wolverine populations in Canada and the United States based on genetic data (Schwartz *et al.* 2009, pp. 3228–3230). The apparent loss of connectivity between wolverines in the northern Rocky Mountains and Canada prevents the influx of genetic material needed to maintain or increase the genetic diversity in the contiguous United States. The continued loss of genetic diversity may lead to inbreeding depression, potentially reducing the DPS ability to persist through reduced

reproductive output or reduced survival. Currently, the cause for this lack of connectivity is uncertain. Wolverine habitat appears to be well-connected across the border region (Copeland *et al.* 2010, Figure 2), and there are few manmade obstructions such as transportation corridors or alpine developments. However, this lack of genetically detectable connectivity may be related to harvest management in southern Canada.

Summary of Factor E

Small population size and resulting inbreeding depression are potential, though as-yet undocumented, threats to wolverines in the contiguous United States. There is good evidence that genetic diversity is lower in wolverines in the DPS than it is in the more contiguous habitat in Canada and Alaska. The significance of this lower genetic diversity to wolverine conservation is unknown. We do not discount the possibility that loss of genetic diversity could be negatively affecting wolverines now and could continue to do so in the future. It is important to point out, however, that wolverine populations in the DPS area are thought to be the result of colonization events that have occurred since the 1930s. Such recent colonizations by relatively few individuals and subsequent population growth are likely to have resulted in founder effects, which could contribute to low genetic diversity. The effect of small population sizes and low genetic diversity may become more significant if populations become smaller and more isolated.

Based on the best scientific and commercial information available we conclude that demographic stochasticity and loss of genetic diversity due to small effective population sizes is not a threat to the wolverine DPS. In the proposed listing rule, we concluded that demographic stochasticity and loss of genetic diversity due to small effective population sizes were threats to wolverines only when considered cumulatively with habitat loss due to climate change. Since we no longer find that habitat loss due to climate change is a threat to the wolverine DPS, we also no longer find that demographic stochasticity and loss of genetic diversity due to small effective population sizes are threats when considered cumulatively with habitat loss due to climate change.

Synergistic Interactions Between Threat Factors

A species may be affected by more than one factor in combination. Within the preceding review of the five threat factors, we discussed potential threats that may have interrelated impacts on wolverines. Our analysis did not find any significant effects to wolverines. However, we recognize that multiple stressors acting in combination have greater potential to affect wolverines than each source alone. Thus, we consider how the combination of these stressors may affect wolverines.

In our proposed listing rule (74 FR 7885–7886), we identified stressors that became threats to wolverines when operating in concert with the effects of climate change. Those secondary threats included genetic and demographic effects of small population size and the effects of harvest, both intentional permitted trapping and incidental trapping as non-target species. Given new information highlighting the uncertainty of how the effects of climate change will impact the wolverine DPS, we did not identify the effects of climate change as posing a risk of extinction to the DPS, and, at this time, we therefore conclude that the identified secondary factors do not rise to the level of a threat to the DPS when considered in combination with the effects of climate change. We are uncertain of how wolverines will respond to the effects of climate change on their habitat and the resulting population persistence, and do not conclude that demographic stochasticity and loss of genetic diversity due to small population size will be realized. Regarding harvest, we do not find the limited legal harvest currently occurring in Montana (≤ 5 animals per year) to be a threat as the population appears to have continued to increase while sustaining this level of legal take. Regarding incidental take associated with legal harvest activities, we also do not find it rises to the level of a threat to the DPS because documented incidental take is extremely low and wolverines have seemingly increased with this potential mortality source in existence. Wolverine populations have been expanding in the DPS area since the early 20th century, when they were likely at or near zero (Aubry *et al.* 2007, p. 2151). Given this ongoing expansion in the DPS area and the lack of identified threats, we do not find any combination of factors to be a threat at this time.

Determination

As required by the Act, we considered the five factors in assessing whether the wolverine meets the definition of an endangered or a threatened species. We examined the best scientific and commercial information available regarding the present and future threats faced by the DPS. Based on our review of the best available scientific and commercial information, we find that the current and future factors affecting the wolverine are not of sufficient imminence, intensity, or magnitude to indicate that the wolverine is in danger of extinction (endangered), or likely to become endangered within the foreseeable future (threatened), throughout all or a significant portion of its range. Therefore, the wolverine DPS does not meet the definition of an endangered or a threatened species, and we are withdrawing the proposed rule to list the wolverine as a threatened species. Our rationale for this determination is outlined below.

Our proposed rule to list the wolverine as a threatened species identified one primary threat to the wolverine (effects of climate change on habitat) and other threats as secondary, only rising to the level of a threat to the extent that they may work in concert with climate change impacts to affect the status of the DPS. The reduction of persistent spring snow due to climate change was cited as the specific threat. The degree to which wolverine populations will be impacted by a change in the amount or extent of deep snow limiting the availability of year round habitat and den sites is the fundamental question that informs whether the DPS is likely to become an endangered species in the foreseeable future. Our original conclusion was that such a change in climate would in fact cause habitat loss, den site loss, and ultimately population impacts leading to the wolverine being likely to become an endangered species within the foreseeable future. After further consideration, and with input from peer review, public comments, and the expert panel workshop, we no longer conclude that impacts from climate change pose a risk of extinction to the wolverine DPS for the following reasons:

(1) Considering all of the information we have received and summarized, we have evidence that wolverines are expanding both within the area currently inhabited by wolverines as well as into suitable habitat not currently occupied and/or occupied with a few individuals. Recent evidence suggests that there is suitable habitat available within the contiguous United States to support a wolverine population twice as large as that at present. Even under conditions of future reduced snowpack as a consequence of climate change, sufficient habitat will likely remain to maintin the wolverine population at the current level of abundance.

(2) There is strong support for the existence of an obligate relationship between wolverines and deep spring snow at the den site; however, available information suggests that den sites are not currently limiting wolverines, and we do not have sufficient information to predict if and when any limitation will occur in the future. Additionally, support for the obligate relationship between wolverine and deep snow at an individual wolverine's home range or the DPS' range in general is lacking. That is, we do not have evidence to suggest that deep snow is required by wolverines throughout their home ranges, beyond the level of the individual den site.

(3) There is significant evidence that the climate within the larger range of the wolverine is warming, which will no doubt have impacts on both snowfall and snow persistence. However, at this time, we do not have sufficient resolution of predictive climate models nor sufficient certainty in those models and the results from them to understand the specific response or sensitivity of wolverines to predicted changes in the amount and persistence of snowfall at the scale of specific wolverine den sites. Uncertainties in the models, the effects that could occur, and the potential associated responses in the species include the following:

a. McKelvey *et al.* (2011) is the most sophisticated analysis of the impacts of climate change at a scale specific to wolverine; however, the scale is not fine enough to deal with the site specific characteristics of wolverine dens.

b. Wolverine dens typically occur at high elevation and on north-facing slopes. The conclusion of habitat loss for wolverines based on loss of spring snow was based on analysis of snow at the overall range of wolverine and did not scale down to areas specifically selected by wolverines for den locations.

c. There is uncertainty in the ability of the models to predict both snowfall amounts and/or persistence in areas most important for critical wolverine life stages (i.e., denning).

d. Although snow cover may be reduced in the future, due to the expansive home ranges of female wolverines and availability of multiple potential den sites, there is no evidence to suggest that den sites for wolverines will become a limiting factor in the foreseeable future.

e. It is possible that, in response to the effects of climate change, subpopulations may become increasingly isolated from each other in the future. However, wolverines are known to regularly move long distances through unsuitable habitat, suggesting that individuals will likely be able to maintain connectivity between occupied areas.

While we understand the basis of the predictions in the McKelvey *et al.* (2011) model, for the reasons outlined in our analysis under Factor A, we do not accept that a loss of snow across the range of the wolverine will result in a commensurate reduction in suitable wolverine habitat. Furthermore, due to the uncertainty of climate models, and the fact that we do not have the fine-scale modeling available to make accurate predictions about the continued availability of den sites, in our best professional judgment, we no longer agree with the conclusion about wolverine habitat loss that formed the basis of the proposed rule. Although climate change effects are expected to result in the loss of some wolverine habitat, we have no data to inform us as to whether or how these projected effects may affect the viability of wolverine populations. Our most recent review of the best available information indicates that even in the face of the effects of climate change, sufficient habitat will likely remain to support wolverines in the contiguous U.S. at numbers at the very least roughly equal to those estimated to exist today. Thus, even under future projected environmental conditions, we do not have data to suggest that wolverine populations in the contiguous United States are likely to experience significant declines, such that they are likely to become in danger of extinction within the foreseeable future. Accordingly, we no longer find that listing the wolverine DPS as a threatened species is warranted. We hereby withdraw the proposed rule to list the wolverine DPS as a threatened species under the Act (78 FR 7864; February 4, 2013), and find that the DPS is not warranted for listing as endangered or threatened. Accordingly, we also withdraw the associated proposed rule under section 4(d) of the Act contained in the proposed listing rule (78 FR 7864; February 4, 2013) and withdraw the proposed nonessential population designation for the southern Rocky Mountains States (78 FR 7890; February 4, 2013).

We will continue to monitor the status of the DPS and evaluate any other information we receive. Additional information will continue to be accepted on all aspects of the DPS. If at any time data indicate that the protective status under the Act should be provided or if there are new threats or increasing stressors that rise to the level of a threat, we can initiate listing procedures, including, if appropriate, emergency listing pursuant to section 4(b)(7) of the Act.

Significant Portion of the Range

Under the Act and our implementing regulations, a species may warrant listing if it is an endangered or a threatened species throughout all or a significant portion of its range. The Act defines ''endangered species'' as any species which is ''in danger of extinction throughout all or a significant portion of its range,'' and ''threatened species'' as any species which is ''likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' The term ''species'' includes ''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.'' We published a final policy interpretating the phrase ''Significant Portion of its Range'' (SPR) (79 FR 37578). The final policy states that (1) if a species is found to be an endangered or a threatened species throughout a significant portion of its range, the entire species is listed as an endangered or a threatened species, respectively, and the Act's protections apply to all individuals of the species wherever found; (2) a portion of the range of a species is ''significant'' if the species is not currently an endangered or a threatened species throughout all of its range, but the portion's contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range; (3) the range of a species is considered to be the general geographical area within which that species can be found at the time FWS or NMFS makes any particular status determination; and (4) if a vertebrate species is an endangered or a threatened species throughout an SPR, and the population in that significant portion is a valid DPS, we will list the DPS rather than the entire taxonomic species or subspecies.

The SPR policy is applied to all status determinations, including analyses for the purposes of making listing, delisting, and reclassification determinations. The procedure for analyzing whether any portion is an SPR is similar, regardless of the type of status determination we are making. The first step in our analysis of the status of a species is to determine its status throughout all of its range. If we determine that the species is in danger of extinction, or likely to become so in

the foreseeable future, throughout all of its range, we list the species as an endangered (or threatened) species and no SPR analysis will be required. If the species is neither an endangered nor a threatened species throughout all of its range, we determine whether the species is an endangered or a threatened species throughout a significant portion of its range. If it is, we list the species as an endangered or a threatened species, respectively; if it is not, we conclude that listing the species is not warranted.

When we conduct an SPR analysis, we first identify any portions of the species' range that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be significant and either an endangered or a threatened species. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that (1) the portions may be significant and (2) the species may be in danger of extinction in those portions or likely to become so within the foreseeable future. We emphasize that answering these questions in the affirmative is not a determination that the species is an endangered or a threatened species throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required. In practice, a key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are affecting it uniformly throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats apply only to portions of the range that clearly do not meet the biologically based definition of ''significant'' (i.e., the loss of that portion clearly would not be expected to increase the vulnerability to extinction of the entire species), those portions will not warrant further consideration.

If we identify any portions that may be both (1) significant and (2) endangered or threatened, we engage in a more detailed analysis to determine whether these standards are indeed met. The identification of an SPR does not create a presumption, prejudgment, or other determination as to whether the species in that identified SPR is an endangered or a threatened species. We must go through a separate analysis to determine whether the species is an endangered or a threatened species in the SPR. To determine whether a species is an endangered or a threatened species throughout an SPR, we will use the same standards and methodology that we use to determine if a species is an endangered or a threatened species throughout its range.

Depending on the biology of the species, its range, and the threats it faces, it may be more efficient to address the ''significant'' question first, or the status question first. Thus, if we determine that a portion of the range is not ''significant,'' we do not need to determine whether the species is an endangered or a threatened species there; if we determine that the species is not an endangered or a threatened species in a portion of its range, we do not need to determine if that portion is ''significant.''

We evaluated the current range of the distinct population segment of the North American wolverine to determine if there is any apparent geographic concentration of potential threats for the DPS. We examined potential threats due to human use and disturbance of habitat, trapping, and effects of climate change. We found no concentration of threats that suggests that the DPS of North American wolverine may be in danger of extinction in a portion of its range. We found no portions of the range where potential threats are significantly concentrated or substantially greater than in other portions of the range. Therefore, no portion of the range of the DPS of North American wolverine warrants further consideration of possible endangered or threatened species status under the Act.

References Cited

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

Authors

The primary authors of this final rule are the staff members of the Montana Ecological Services Field Office and the Idaho Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authority

The authority for this action is the Endangered Species Act of 1979, as amended (16 U.S.C. 1531 *et seq.*).

Dated: August 4, 2014.

Daniel M. Ashe,

Director, U.S. Fish and Wildlife Service.

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