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January 26, 2024

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**Notice of Intent to Sue under the Endangered Species Act:
United States Fish and Wildlife Service's Wolverine Listing Status Rule**

Dear Secretary Haaland and Director Williams:

This letter serves as a 60 day notice of intent to sue you in your official capacities as the Secretary of the Interior and the Director of the United States Fish and Wildlife Service (“Service”). This notice is provided pursuant to the citizen suit provision of the Endangered Species Act, 16 U.S.C. § 1540(g) and the Administrative Procedure Act, 5 U.S.C § 706(2), based on the arbitrary and capricious decision to (1) list the North American Wolverine as a Contiguous United States Distinct Population Segment (“DPS”); and (2) list said DPS on the Federal List of Endangered and Threatened Wildlife.

Background

In 2008, the Service responded to a wolverine listing petition by publishing a 12-month finding. *73 FR 12929*. At that time, the Service concluded “differences between Canada and the contiguous United States do not result in significant differences in light of section 4(a)(1)(D) of the Act...” *Id at 12939*. The Service also found “existing data do not indicate that North American wolverines in the contiguous United States are ‘markedly separated’ from those in Canada and Alaska. *Id. at 12940*. Ultimately, the Service found wolverines do “not qualify as a distinct population segment” and were “not a listable entry under the Act.” *Id.* However, in 2013, the Service proposed to list the North American wolverine (*gulo luscus*) in the contiguous United States as a threatened DPS under the Endangered Species Act (“ESA”). *78 FR 7864*. The Service withdrew that proposed rule in 2014, but it was reinstated due to court order in 2016. *85 FR 64618; Defenders of Wildlife v. Jewell*, 176 F. Supp. 3d 975 (D. Mont., April 4, 2016). In October 2020, the Service again withdrew the proposed listing rule, finding that the loss of wolverine habitat due to climate change and other stressors was less significant than what was found in the 2013 proposed rule. *85 FR 64618*. The 2020 withdrawal also found that wolverines

in the contiguous United States were not distinct from wolverines in Canada, and therefore did not qualify as a DPS under the ESA. *Id.*

In response to the Service's 2020 withdrawal, conservation groups filed a lawsuit challenging the Service's decision in the District Court of Montana. *See Ctr. For Biological Diversity v. Haaland*, 2022 U.S. Dist. LEXIS 94822 (D. Mont., May 26, 2022). In 2022, the District Court granted the Service a voluntary remand to reevaluate the decision considering new scientific information. *Id.* The 2020 withdrawal was also vacated by the District Court, meaning that wolverines were again considered a species proposed for listing under the ESA. *Id.*

In 2022, the Service solicited information from western states' wolverine experts to update the 2018 Species Status Assessment (SSA) with the most recent science. From that information, the Service generated the 2023 SSA Addendum to guide the decision-making process regarding the final rule on the status of wolverines in the contiguous United States. On November 27, 2023, the Service announced the final rule to list wolverines in the contiguous United States as a "threatened" species under the ESA.

Distinct Population Segment (DPS)

The Service analyzes three elements when determining whether a species segment should be identified as a DPS: "(1) Discreteness of the population segment in relation to the remainder of the taxon; (2) the biological or ecological significance of the population segment to the taxon to which it belongs; and (3) the population segment's conservation status in relation to the Act's standards for listing..." See 88 FR 83726, 83739-83740.

The Service erred in finding wolverines in the contiguous United States to be a DPS.

In 2008, the Service, in finding wolverines in the contiguous United States were not a DPS, stated "the differences in control of exploitation between the United States and Canadian wolverine populations are not significant..." 73 FR 12929, 12939. In response to litigation, the Service reconsidered its DPS finding in 2010, concluding that United States wolverines were a DPS because "the differences in conservation status between the contiguous United States and Canada are significant...because they reveal that the existing mechanisms in Canada are sufficient to maintain wolverine, while in the United States, the existing regulatory mechanisms are not sufficient to address the biological conservation concerns." 75 FR 78030, 78039. However, in 2020, the Service found "the differences in exploitation are not significant in light of section 4(a)(1)(D) of the Act (inadequate regulatory mechanisms)." 85 FR 64618, 64628. The Service further went on to conclude "the contiguous United States wolverine represents a peripheral population at the southern extent of the North American wolverine range. Thus, we now consider the small population size of wolverines in the United States to be the natural result of habitat fragmentation and not reflective of a difference in conservation status." *Id.* at 64629.

The Service's 2020 conclusion is an accurate representation of the leading scientific literature and forces influencing wolverine viability. Under existing scientific evidence, the Canadian and United States' wolverine populations must be considered as one population. In so

doing, it is clear that wolverine populations have expanded further south into the United States, not retreated, and that listing United States' wolverines as threatened is arbitrary and capricious.

First, the Service was incorrect in asserting the “discreteness” of the population is warranted due to an international geopolitical boundary between the United States and Canada. 88 FR 83726, 83743. While trapping in British Columbia may have led to a fluctuation in the Canadian wolverine population, “there is currently a trapping moratorium in a portion of British Columbia resulting from studies showing population declines in that area related to trapping.” 88 FR 83726, 83743. The Service also notes “[i]n Canada, provincial designations for the wolverine include endangered in Labrador, and threatened in Ontario and Quebec (‘threatened’ is the equivalent to endangered in Quebec) with the remaining provincial designations ranging from no ranking to sensitive or special concern to the Vancouver Island population’s designation as imperiled. (COSEWIC 2014, p.44).” *Id.* The moratorium and various special designations underscore that Canadian provincial wildlife management agencies have been proactive and responsive to wolverine trapping impacts, rendering a DPS designation unwarranted. Thus, because Canadian management practices are adaptive and focused on wolverine viability, creating a DPS based on the Canada-United States international border is not supported by facts or science.

Second, state and provincial agencies research wolverines as a single population because the scientific and genetic data demonstrate irrefutable connectivity. In 2020, the Service, found “legal trapping effort along the U.S. Canada border does not represent a barrier to wolverine movement and dispersal along the international border.” 85 FR 64618, 64638. Canadian partners continue to conduct wolverine research and implement adaptive harvest management strategies to ensure sustainable harvest and overall wolverine conservation across provincial boundaries (BC 2022, Schepens et al. 2023). This continued research, in both Canada, the United States, and conducted collaboratively, provides current data that informs management and conservation in response to changing variables. The findings of Day et al. (in progress) and Sawaya et al. (2023) show the fluid level of genetic connectivity across international boundaries. This level of genetic connectivity is reinforced by the Service’s acknowledgement that wolverines are capable of long-distance travel in lieu of physical barriers (Inman et al. 2012, USFWS 2023, Sawaya et al 2023).

Neither wolverines in Canada or wolverines in the contiguous United States can be considered discrete. The North American population of wolverines is a single metapopulation comprised of numerous interconnected subpopulations. The United States portion of the metapopulation does not constitute a distinct population segment. As such, when properly viewing the total population, comprised of both the Canadian and United States portions, the North American wolverine clearly does not meet the definition of a DPS, and does not meet the criteria of threatened under the ESA. Concluding otherwise contradicts the bulk of the relevant scientific data and is arbitrary and capricious.

ESA Listing Factors

Additionally, the Service uses five factors to determine if listing a species is warranted under the ESA. The Service gathered information relevant to these five criteria and included it in the 2023 SSA Addendum. However, the Service relied upon inadequate scientific studies and data when analyzing the five factors. Below, the State of Montana (“State”) explains the deficiencies in the Service’s analysis and justification for listing wolverines as “threatened” under factors “A” and “E.” These inadequacies resulted in the arbitrary and capricious decision to list wolverines as “threatened” in violation of the law.

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

The Service erred in using the date of 2100 as the “foreseeable future.”

The ESA defines a “threatened species” as “any species that is likely to become an endangered species within the foreseeable future through all or a significant portion of its range.” 16 U.S.C. § 1532(20). In the present case, the Service “consider[s] 2100 to be the foreseeable future.” 88 FR 83726, 83764. The 2023 SSA Addendum, however, acknowledged wolverine biological uncertainty when analyzing how climate change will affect the species in the future. See 88 FR 83726, 83749. The Service explicitly stated that these “specific thresholds regarding snow dynamics and how changes in these factors will impact wolverines in the future at the population level remain uncertain.” *Id.* at 83750. In addition, as model projections extend into the future, uncertainty and error increase, which the Service itself acknowledges. *Id.* at 83746. Even if this uncertainty resulted in changing snowpack, the uncontroverted evidence demonstrates wolverine range is expanding. (Newby and McDougal 1964; Aubry et al. 2007; Moriarty et al. 2009; Packila et al. 2017; Lukacs et al. 2020). Thus, because wolverine range is expanding, even in the face of climate change, the Service cannot reasonably rely on uncertain impacts to justify its listing decision. Further, the Service erred in relying on the worst case scenario rational in climate models.

The Service failed to adequately consider evidence showing wolverine resiliency and adaptability to possible impacts of climate change.

The Service arbitrarily and capriciously concluded “that habitat loss as a result of climate change is the primary threat to the wolverine’s future viability in the Contiguous United States...” 88 FR 83726, 83733. In 2013, the Service noted “the best scientific and commercial information available indicated that only the projected decrease and fragmentation of wolverine habitat or range due to future climate change is a threat to the species now and in the future.” 78 FR 7864, 7880. The Service then retracted the 2013 proposed listing after gathering more information, consulting with species experts, and receiving additional public comments, finding that “while there was significant evidence that the climate within the larger range of the wolverine is changing, affecting snow patterns and associated wolverine habitat, the species response and sensitivity of wolverines to these forecasted changes involves considerable uncertainty.” (DOI 2014).

The Service continues to use the possible effects of climate change as the primary argument and justification for listing wolverines, despite considerable biological uncertainty of these projected effects, and new evidence demonstrating snowpack's minimal relationship to wolverine population and denning capability. In 2023, the Service was presented with scientific data demonstrating wolverine adaptability to reduced snowpack. Persson et al. (2023). The Service received this study after the 2023 SSA Addendum had been written and acknowledged that this publication would be considered in the final rule determination. *88 FR 83726, 83737*. Persson et al. provides a robust sample size ($n = 1,589$) of wolverine reproductive events across Scandinavia, and directly refutes the argument that climate change will have a detrimental, population-level effect on wolverines across the DPS. In short, Persson et al. (2023) found that wolverine distribution expanded and that reproductive events increased 20 times in areas lacking spring snow cover.

The primary argument the Service uses for listing is how a lack of snow, due to climate change, will negatively affect wolverines; however, the Service inadequately considered the potential for wolverines to adapt and thrive under a changing environment, as demonstrated by the best scientific evidence available. The Service itself has noted that “[w]e have attempted to clarify when referring to data collected from 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.” *79 FR 47522, 47525*. Remarkably, the Service chose to ignore the best evidence, determining: “[i]n the contiguous United States, there is no evidence that wolverines have denned in areas without persistent spring snow.” *88 FR 83726, 83748*. By dismissing the best evidence, and its conclusion that snowpack reduction would degrade wolverine populations, the Service's underlying conclusion to create a DPS and list wolverines is error. Given this, and the Service's dogged reliance on the assumption that a warming climate will lessen available denning habitat, the Service's climate change rationale is arbitrary and capricious.

Additionally, Perrson et. al (2023) refutes Copeland et al.'s (2010) conclusion that wolverine range limits cannot be accurately defined without snow cover. The amount of snow needed for a den is very small, is found on north slopes at high elevations, and is most important during February, March, and April (Heeres 2020, Persson et al. 2023, USFWS 2023). None of these factors are considered by an analysis that focuses on the extent of snow cover in late spring, in one out of seven years (Copeland et al. (2010). Similarly, the May 15 snow model analyzed by McKelvey et al. (2011) does not match the time of year, the physical location on the landscape, or the actual size of a den; rather it exaggerates the potential impact from climate change by focusing on a point in time that is most likely to show change.

The Service acknowledges that projected temperatures will not impact snowpack at higher elevations, which is primarily where wolverines den (USFWS 2023). However, the Service generalizes inferences from climate model projections without fully considering the body of literature showing a minimal influence of climate change on wolverine denning locations and overall occupancy. Barsugli et al. (2020) used projections of mountain snowpack loss for wolverine denning including the effects of elevation, slope, and aspect. This study follows a similar design to that of Copeland et al. (2010) but considered more than twice as many years (at least 14 out of 16 years) given the year-to-year variability in snowpack. This model also

has a focus on April 15 snowpack, and notes that the effects of warming on snow loss at different elevations can be offset by an increase in precipitation (Barsugli et al. 2020). There was only moderate change (<30%) to snowpack at 2,000 meters and almost no change above 2,200 meters when projecting out through the year 2070. In addition, Heeres (2020) found no influence of temperature on wolverines shifting den locations in alpine habitat. Wolverine denning in Glacier National Park, Montana has been characterized as occurring at an average elevation of 1,890 meters (range: 1,805-1,999 meters), on 9° slopes (range: 5-22°), within a variable range of aspects, and within an average snow depth of 2.6 meters (range: 2.4–3.4 meters; Yates et al. 2017). When wolverines use snow dens, studies show they require a minimum snow depth of 1 meter, Jokinen et al. 2019). Thus, even using the Service’s 50-year modeling that predicts a ~30% decrease in snowpack, wolverine denning capabilities would not be impacted due to selectivity for den locations at high elevations. The Service acknowledges this, noting that areas comprising historical denning locations are predicted to have smaller snowpack decreases, meaning the one-meter threshold will be maintained across the wolverine’s range.

Multiple studies have also corroborated that wolverine denning ability was not significantly impacted by snowpack reduction (Yates et al. 2017, Barsugli et al. 2020, Persson et al. 2023). Most importantly, Barsugli et al. (2020) points out that the study did not address whether den site availability is a limiting factor for wolverine populations or whether other effects of climate change (such as loss of lower elevation snow and subsequent ecology disturbance) will be significant stressors.

The Service makes many compelling and data driven arguments throughout the 2014 Federal Register (DOI 2013) that reinforce the arguments against listing the State makes now. The Service acknowledged that at the time, McKelvey et al. (2010) was the most robust model predicting the impact of climate change on wolverine habitat and distribution. *See 79 FR 47522*. The Service estimated that the predicted habitat remaining after 2085 (McKelvey et al. 2010) could support 344 wolverines in the contiguous United States with the bulk of those being in the Northern Rocky Mountains in 2070-2099. *Id. at 47536*. Additionally, based on McKelvey’s findings, the Service concluded that even under future conditions of projected habitat loss, there would be sufficient habitat available in the United States to continue supporting wolverine populations at roughly the same level of abundance as at present, which was an estimated 250 to 300 wolverines with an available habitat capacity of 644 wolverines (DOI 2013, Inman et al. 2013). *Id. at 47534*. This was again stated in the 2023 SSA Addendum and continues to be recognized. *88 FR 83726, 83741*.

Additionally, McKelvey et al. (2011) estimated that the area of persistent spring snow cover in the western United States and southeastern British Columbia could shrink by up to 63% by 2070-2099. A more recent study in the southern Canadian Rocky Mountains now estimates a loss of 44% of persistent spring snow cover between 2020 and 2080 (Schepens et al. 2023). Updating science is showing a reduced estimated loss of persistent snow. The Service was comfortable with retracting the proposed listing rule in 2014 when estimates were higher than they are now. In 2014, the Service acknowledged that the data does not suggest that the population of wolverines in the contiguous United States would be forced into decline by loss of

habitat, and conversely provided evidence showing that available habitat could support a population in the United States twice as large as the 2014 population estimate (DOI 2014). This argument continues to be supported by the most current research, with additional evidence regarding wolverines' plasticity to any projected habitat changes from global warming.

In summary, many recent studies have investigated the effects of climate change on the predicted loss of snowpack (McKelvey et al. 2011, Barsugli et al. 2020, Glass et al. 2022), although few have investigated the adaptive behavior of wolverine den site selection on a changing landscape. Wolverines have been found to use locally available denning structures in lowland habitats, despite a lack of deep snow and persistent spring snow cover (Jokinen et al. 2019, Persson et al. 2023). This adaptive behavior suggests that wolverines are more flexible in their distribution than previously assumed (Webb et al. 2016, Jokinen et al. 2019). These studies are not relying on projections, but provide direct evidence to the level of behavioral plasticity that wolverines have to a changing climate. The Service did not adequately ascertain the resiliency and adaptability of the wolverine when juxtaposed with future climate models, therefore rendering their central reliance on the possible negative impacts of climate change arbitrary and capricious.

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

The Service relied on a scientifically flawed study when determining the effective genetic population size.

The Service uses the genetic effective population size estimate of 35 (Schwartz et al. 2009) to argue that wolverines in the Northern Rockies are at high genetic risk. Importantly, the estimate from Schwartz et al. (2009) violated several key methodological assumptions; namely, it combined individuals across multiple cohorts, it combined individuals from multiple generations, and it used samples from an open system (as opposed to an isolated population). Numerous simulation studies have attempted to clarify the potential consequences of violating these assumptions on estimates of the genetic effective population size. These methodological issues have a similar genetic effect – individuals from different areas, cohorts, and generations can be genetically different from one another, and when combined in a single sample, they “enhance” the genetic signal for small population size. In turn, the methodological issues described above have the same quantitative effect on a given estimate – they bias the estimate low (e.g., see Waples and England 2011, Neel et al. 2013, Waples et al. 2014, Waples 2023). Thus, the Service’s conclusion on genetic population was arbitrary and capricious due to its reliance on flawed, outdated science.

Despite the methodological issues noted, Schwartz et al. 2009 can (in certain situations) provide a reasonable estimate of the *local* genetic effective population in the generation prior to the sample in hand (Ryman et al. 2019). However, when genetic connectivity is present, and gene flow is occurring, the estimate of the *local* effective population size (in the previous generation) is highly incongruous with the “true” metapopulation genetic effective population size that dictates the rate of genetic drift, loss of genetic variation, and accumulation of inbreeding within local populations and range-wide. In species where genetic connectivity is

present, but some genetic/demographic structure exists, like wolverines, the estimate of the local genetic effective population size is far lower than the true metapopulation effective size that governs the loss of genetic variation and the accumulation of inbreeding. In other words, the estimate of the genetic effective population size in Schwartz et al. (2009) is not the parameter of interest for conservation status and trend, and can be orders of magnitude lower than the true genetic effective population size of interest (see Ryman et al. 2019). These results stem from the effects of gene flow on long-term maintenance of genetic variation; small amounts of gene flow (one-migrant per generation) can impede or entirely eliminate the loss of genetic variation (Mills and Allendorf 1996), even when local population sizes are small.

For the reasons outlined above, the estimate from Schwartz et al. (2009) should be interpreted very carefully, and it is critical to recognize that the estimate is almost certainly misleading about the evolutionary trajectory of wolverines in the Northern Rockies, United States. Existing empirical work, simulation work, and underlying theory predict that the estimate is biased low, perhaps by a very substantial margin (up to orders of magnitude). Critically, the 50/500 (or 100/1000) rule that the Service invokes in the 2023 SSA Addendum is focused on risks of inbreeding and loss of genetic variation. For wolverines, given obvious genetic connectivity throughout the Northern Rockies (and beyond), the only appropriate estimate for the genetic effective population size – as it pertains to loss of genetic variation and risk of inbreeding depression – is the (global) metapopulation effective size.

At present, there are no estimates for the broader metapopulation genetic effective population size of wolverines in the Northern Rocky Mountains, but it is unquestionably substantially higher than 35. Lastly, if the estimates from Schwartz are used (and the critically important issues above are acknowledged and addressed), it should be noted that the point estimates for the effective population size in Schwartz et al. (2009) were slightly increasing over time between 1989-2006. No estimates have been conducted since that time, which is notable, given that harvest (trapping) was discontinued in the continental United States in 2013. The Service's overreliance on Schwartz et al. (2009) was arbitrary and capricious, especially when alternative studies are more relevant to the Northern Rockies' wolverine population (Sawaya et al. 2023, Day et al. In Progress).

The Service erroneously concluded that wolverine gene flow is extremely limited.

Recent, large-scale genetic efforts demonstrate that wolverines in western North America display a pattern of genetic isolation by distance (Sawaya et al. 2023, Day et al. In Progress). This results in relatively weak genetic structure among geographically proximate wolverines, and larger (but still relatively weak; see Wright 1978, Frankham et al. 2002) genetic differentiation among wolverines separated by thousands of kilometers. In short, genetic isolation by distance is expected and typical of most organisms on earth (i.e., is the null hypothesis). Nevertheless, the Service interprets this genetic structure as problematic for the conservation of wolverines. See 88 FR 83726. The important question(s) as it pertains to ESA listing is not whether genetic differentiation exists in the range of wolverines, but whether there is: (1) evolutionarily

meaningful differentiation suggesting that wolverines in the proposed DPS are indeed “distinct”, (2) whether there is a lack of functional genetic connectivity that would influence maintenance of genetic variation and risk of inbreeding depression; and (3) if there is a clear lack of connectivity, is that because of human actions/activity, and if so, are there ways to mitigate that circumstance? The Service did not consider or answer these questions in the 2023 SSA Addendum, even following direct feedback from state partners, resulting in an arbitrary and capricious conclusion that genetic flow is a limiting factor on the wolverine population.

A variety of data sources demonstrate that wolverines in Montana are not genetically *distinct*. First, the genetic differentiation between wolverines in the Northern Rockies, and those in southern Canada (Columbia Mountains and Canadian Rockies) is very weak ($F_{ST} < 0.021$), suggesting high gene flow between wolverines in Canada and those in the United States (Sawaya et al. 2023). Along these lines, wolverines in the Northern Rockies, United States, do not appear to harbor much, if any, genetic variation not found elsewhere in the species range (Sawaya et al. 2023). These results are consistent with the history of the wolverine population in the Northern Rockies (McKelvey et al. 2014), and radio-telemetry studies, both of which demonstrate substantial genetic and demographic exchange across very large distances. Clearly, wolverines in the Northern Rockies are not evolutionarily distinct from those elsewhere in North America.

The results described in the paragraph above also emphasize that there is clear genetic connectivity linking wolverines in the Northern Rocky Mountains, United States with those in Canada. The low genetic differentiation observed between wolverines in the Northern Rocky Mountains, United States and those in Canada ($F_{ST} < 0.021$) is typical of populations that are exchanging many effective migrants per generation (~10 or more). Consistent with this result, Sawaya et al. (2023) detected at least six recent (first-generation) migrants between Canada into the Northern Rockies, United States (i.e., north and south of Highway 3) in their genetic data-set. These results are further supported by radio-telemetry which demonstrates wolverines have functioning genetic and demographic connectivity throughout the Rocky Mountain region (United States and Canada; Cegelski et al. 2006, Carroll 2019). Unfortunately, the Service misinterprets results from Sawaya et al. (2023) to conclude that gene flow is extremely limited, a grievous misunderstanding of the data. *See 88 FR 83726*. Instead, the results show very clearly that there is genetic connectivity throughout the Northern Rocky Mountains, and the previous interpretation – that wolverines can be considered a larger population/metapopulation over much of western North America – has been reinforced with large-scale genetic sampling, not diminished.

Finally, landscape genetic analyses have yet to identify a clear barrier to wolverine gene flow across the Rocky Mountains (Day et al. In Progress). While human development is correlated (negatively) with genetic connectivity, human development also is highest in the poorest wolverine habitat, almost assuring a negative correlation. More importantly, there do appear to be numerous paths of functional genetic connectivity in the Rocky Mountains, United States, largely occurring through areas of high-elevation forest cover. Last, it should be noted that if gene flow were to decrease, which there is no evidence of to date, assisted translocation to facilitate gene flow (e.g., Bell et al. 2019) is a viable and cost-effective management option for

wolverines in Montana and beyond. In other words, while there is no empirical evidence to suggest translocations are needed or warranted for wolverines at this time, they could be used if and when conditions suggest they may be beneficial (i.e., effective management tools are in place to address any problems if they were to occur).

Conclusion

The Service acknowledges “wolverines in the contiguous United States are not currently in danger of extinction throughout their range.” 88 FR 83726, 83764. Yet, in their decision to list, the Service notes “[t]he main threat to wolverines is the effect of climate change on spring snow.” *Id.* In reaching this conclusion, the Service has neglected to fully consider the breadth of evidence regarding wolverine adaptability to climate change, recreation, and genetic connectivity. The Service speculates on the impact factors A and E will have on the perpetuation of wolverines, while acknowledging the high levels of uncertainty among the factors. In short, the final rule will not protect wolverines, as there is a dearth of evidence supporting the species’ viability is threatened today or will be threatened by climate change impacts in the future.

The Service also acted arbitrary and capriciously in their determination that the wolverine in the contiguous United States constitutes a DPS. In departing from its 2020 finding that wolverines were not a DPS, the Service, while acknowledging the trapping moratorium in southern British Columbia, failed to account for studies conducted by the various Canadian Provincial Governments in guiding their regulations and official status of wolverines.

Wolverines do not meet the definition of threatened or endangered under the ESA, now or in the foreseeable future, and are not warranted for listing in the contiguous United States. The Service’s final rule to list wolverines in the contiguous United States is a violation of the ESA and the factors for species listing. If the violations of the ESA as described above are not cured within 60 days, MFWP intends to file suit for declaratory and injunctive relief, as well as attorney and expert witness fees and costs.

Sincerely,



Sarah Clerget
Chief Legal Counsel
Montana Fish, Wildlife and Parks

Literature Cited

- Aubry, K. B., K. S. McKelvey, and J. P. Copeland. 2007. Distribution and broad scale habitat relations of the wolverine in the contiguous United States. *Journal of Wildlife Management* 71:2147–2158.
- Barsugli, J. J., A. J. Ray, B. Livneh, C. F. Dewes, A. Heldmyer, I. Rangwala, J. M. Guinotte, and S. Torbit. Projections of mountain snowpack loss for wolverine denning elevations in the Rocky Mountains. *Earths Future* 8(10): 2020EF001537.
- Bell, D. A., Z. L. Robinson, W. C. Funk, S. W. Fitzpatrick, F. W. Allendorf, D. A. Tallmon, and A. R. Whiteley. 2019. The exciting potential and remaining uncertainties of genetic rescue. *Trends in Ecology and Evolution* 34:1070–1079.
- British Columbia. 2022. 2022-2024 Hunting & Trapping Regulations Synopsis. Province of British Columbia, British Columbia, Canada.
- Carroll, K. A. 2019. Wolverine habitat quality, connectivity, and prioritization at the landscape scale. Dissertation, Montana State University, Bozeman, Montana, USA.
- Cegelski, C. C., L. Waits, N. J. Anderson, O. Flagstad, C. Strobeck, and C. J. Kyle. 2006. Genetic diversity and population structure of wolverine (*Gulo gulo*) populations at the southern edge of their current distribution in North America with implications for genetic viability. *Conservation Genetics* 7:197–211.
- Copeland, J. P., J. M. Peek, C. R. Groves, W. E. Melquist, K. S. McKelvey, G. W. McDaniel, C. D. Long, and C. E. Harris. 2007. Seasonal habitat associations of the wolverine in central Idaho. *Journal of Wildlife Management* 71:2201–2212.
- Copeland, J. P., K. S. McKelvey, K. B. Aubry, A. Landa, J. Persson, R. M. Inman, J. Krebs, E. Lofroth, H. Golden, J. R. Squires, A. Magoun, M. K. Schwartz, J. Wilmot, C. L. Copeland, R. E. Yates, I. Kojola, and R. May. 2010. The bioclimatic envelope of the wolverine (*Gulo gulo*): do climatic constraints limit its geographic distribution? *Canadian Journal of Zoology* 88:233-246.
- Day, C. C., E. L. Landguth, Z. A. Holden, M. A. Sawaya, J. R. Akins, R. B. Anderson, K. B. Aubry, N. Bjornlie, A. P. Clevenger, J. P. Copeland, C. Davis, J. T. Fisher, A. Forshner, J. A. Gude, D. Hausleitner, N. A. Heim, K. S. Heinemeyer, K. Hersey, A. Hubbs, ..., and R. D. Weir. In Progress. Wolverine genetic connectivity across western North America.
- Department of the Interior. 2014. 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. *Federal register* 79(156):47522-47545.

- Eckert, C. G., K. E. Samis, and S. C. Lougheed. 2008. Genetic variation across species' geographical ranges: the central–marginal hypothesis and beyond. *Molecular Ecology* 17:1170–1188.
- Excoffier L, M. Foll, and R. J. Petit. 2009. Genetic consequences of range expansions. *Annual Reviews in Ecology, Evolution, and Systematics* 40:481 – 501.
- Frankham, R., D. A. Briscoe, and J. D. Ballou, *Introduction to Conservation Genetics* (Cambridge University Press, 2002).
- Frey, S., J.P. Volpe, N.A. Heim, J. Paczkowski, and J.T. Fisher. 2020. Move to nocturnality not a universal trend in carnivore species on disturbed landscapes. *Oikos* 129:1128–1140.
- Glass, T. W., A. J. Magoun, M. D. Robards, and K. Kielland. 2022. Wolverines (*Gulo gulo*) in the Arctic: revisiting distribution and identifying research and conservation priorities amid rapid environmental change. *Polar Biology* 45:1465-1482.
- Heeres, R. 2020. Den shifting behaviour of female wolverines (*Gulo gulo*) in northern Sweden. Master's thesis. Swedish University of Agricultural Sciences, Grismo Wildlife Research Station.
- Heinemeyer, K and J.R. Squires. 2014. Wolverine – Winter recreation research project: Investigating the interactions between wolverines and winter recreation, 2014 Progress Report. 18 pp.
- Heinemeyer, K., J. Squires, M. Hebblewhite, J. J. O'Keefe, J. D. Holbrook, and J. Copeland. 2019. Wolverines in winter: indirect habitat loss and functional responses to backcountry recreation. *Ecosphere* 10:e02611.
- Hoffmann A.A., and M. W. Blows. 1994. Species borders: ecological and evolutionary perspectives. *Trends in Ecology & Evolution* 9:223–227.
- Inman, R. M., M. L. Packila, K. H. Inman, A. J. McCue, G. C. White, J. Persson, B. C. Aber, M. L. Orme, K. L. Alt, S. L. Cain, J. A. Fredrick, B. J. Oakleaf, and S. S. Sartorius. 2012. Spatial ecology of wolverines at the southern periphery of distribution. *The Journal of Wildlife Management* 76:778-792.
- Jokinen, M. F., S. M. Webb, D. L. Manzer, and R. B. Anderson. 2019. Characteristics of wolverine (*Gulo gulo*) dens in lowland boreal borest of north-central Alberta. *The Canadian Field-Naturalist* 133:1-15.
- Lukacs, P. M., D. E. Mack, R. Inman, J. A. Gude, J. S. Ivan, R. P. Lanka, J. C. Lewis, R. A. Long, R. Sallabanks, Z. Walker, S. Courville, S. Jackson, R. Kahn, M. K. Schwartz, S. C. Torbit, J. S. Waller, K. Carroll. 2020. Wolverine occupancy, spatial distribution, and monitoring design. *The Journal of Wildlife Management* 85:841-851.

- Makkonen, T. 2015. Den site characteristics of female wolverine (*Gulo gulo*) in scandinavian forest landscape. University of Oulu, Oulu, Finland.
- McKelvey, K. S., J. P. Copeland, M. K. Schwartz, J. S. Littell, K. B. Aubry, J. R. Squires, S. A. Parks, M. M. Elsner, and G. S. Mauger. 2011. Climate change predicted to shift wolverine distributions, connectivity, and dispersal corridors. *Ecological Applications* 21:2882-2897.
- McKelvey, K. S., K. B. Aubry, N. J. Anderson, A. P. Clevenger, J. P. Copeland, K. S. Heinemeyer, R. M. Inman, J. R. Squires, J. S. Waller, K. L. Pilgrim, and M. K. Schwartz. 2014. Recovery of wolverines in the Western United States: Recent Extirpation and Recolonization or Range Retraction and Expansion? *Journal of Wildlife Management* 78:325-334.
- Mikle, N., T. A. Graves, R. Kovach, K. C. Kendall, and A. C. Macleod. 2016. Demographic mechanisms underpinning genetic assimilation of remnant groups of a large carnivore. *Proceedings of the Royal Society of London B* 283:20161467.
- Mills L. S., and F. W. Allendorf. 1996. The one-migrant-per-generation rule in conservation and management. *Conservation Biology* 6:1509–1518.
- Montana Fish, Wildlife and Parks. 2023. Trapping and hunting regulations. Helena, Montana, USA.
- Moriarty, K. M., W. J. Zielinski, A. G. Gonzales, T. E. Dawson, K. M. Boatner, C. A. Wilson, F. V. Schlexer, K. L. Pilgrim, J. P. Copeland, and M. K. Schwartz. 2009. Wolverine confirmation in California after nearly a century: native or long-distance immigrant? *Northwest Science* 83:154–162.
- Newby, F. E., and J. J. McDougal. 1964. Range extension of the wolverine in Montana. *Journal of Mammalogy* 45:485–486.
- Neel, M. C., K. S. McKelvey, N. Ryman, M. W. Lloyd, R. Short Bull, F. W. Allendorf, M. K. Schwartz, and R. S. Waples. 2013. Estimation of effective population size in continuously distributed populations: There goes the neighborhood. *Heredity* 111:189–199.
- Packila, M. L., M. D. Riley, R. S. Spence, and R. M. Inman. 2017. Long distance wolverine dispersal from Wyoming to historic range in Colorado. *Northwest Science* 94:399–407.
- Persson, J., A. Ordiz, A. Ladle, H. Andren, and M. Aronsson. 2023. Recolonization following past persecution questions the importance of persistent snow cover as a range limiting factor for wolverines. *Global Change Biology* 00:1-14.
- Ryman, N., L. Laikre, and O. Hössjer. 2019. Do estimates of contemporary effective population size tell us what we want to know? *Molecular Ecology* 28:1904–1918.

- Sawaya, M., A. Clevenger, R. Long, J. Akins, R. Anderson, K. Aubry, M. Barreuto, N. Bjornlie, J. Copeland, C. Davis, J. Fisher, A. Forshner, J. Gude, D. Hausleitner, N. Heim, K. Heinemeyer, K. Hersey, A. Hubbs, B. Inman, S. Jackson, A. Kportello, D. Lacroix, L. Larson, J. Lewis, D. Lockman, M. Lucid, A. Magoun, K. McKelvey, M. McLellan, K. Moriarty, C. Mosby, G. Mowat, C. G. Nietvelt, K. Paul, K. Pilgrim, C. Raley, M. Schwartz, M. Scrafford, J. Squires, S. Tomson, Z. Walker, J. Waller, and R. Weir. 2023. Transboundary wolverine gene flow and metapopulation connectivity in western North America. Draft report. 29 pp.
- Schepens, G., K. Pigeon, A. Loosen, A. Forshner, and A. L. Jacob. 2023. Synthesis of habitat models for management of wolverine (*Gulo gulo*): Identifying key habitat and snow refugia in the Columbia and Rocky Mountains, Canada. *Global Ecology and Conservation* 46:1-14.
- Schwartz, M. K., J. P. Copeland, N. J. Anderson, J. R. Squires, and R. M. Inman. 2009. Wolverine gene flow across a narrow climatic niche. *Ecology* 90:3222–3232.
- Slatkin M, and L. Excoffier. 2012. Serial founder effects during range expansion: a spatial analog of genetic drift. *Genetics* 191:171 – 181.
- Solomon, S., G. K. Plattner, R. Knutti, and P. Friedlingstein. 2009. Irreversible climate change due to carbon dioxide emissions. *Proceedings of the National Academy of Sciences* 106:1704–1709.
- Thurman, L. L., B. A. Stein, E. A. Beever, W. Foden, S. R. Geange, N. Green, J. E. Gross, D. J. Lawrence, O. LeDee, J. D. Olden, L. M. Thompson, and B. E. Young. 2020. Persist in place or shift in space? Evaluating the adaptive capacity of species to climate change. *Frontiers in Ecology and the Environment* 18:520–528.
- USFWS (U.S. Fish and Wildlife Service). 2023. Species Status Assessment Addendum for the North American Wolverine (*Gulo gulo luscus*). September 2023. U.S. Fish and Wildlife Service, Pacific Region, Portland, OR.
- Waples, R. S., T. Antao, and G. Luikart. 2014. Effects of overlapping generations on linkage disequilibrium estimates of effective population size. *Genetics* 197:769–780.
- Waples, R. S., and P. R. England. 2011. Estimating contemporary effective population size based on linkage disequilibrium in the face of migration. *Genetics* 189:633–644.
- Wright, S. 1978. *Evolution and the Genetics of Populations. Vol 4. Variability within and among natural populations.* University of Chicago Press, Chicago.

Webb, S. M., R. Anderson, D. Manzer, B. Abercrombie, B. Bildson, M. Scrafford, and M. S. Boyce. 2016. Distribution of female wolverines relative to snow cover, Alberta, Canada. *Journal of Wildlife Management* 80:1461-1470.

Yates, R. E., J. P. Copeland, and J. R. Squires. 2017. Wolverine reproductive den habitat in Glacier National Park, Montana. *Intermountain Journal of Sciences* 23:95.