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Subject: Requested Peer Review of the Federal Register Notice (Vol. 78, No. 23 / Monday, February 4, 2013) regarding the proposed listing of wolverines as *threatened* under the Endangered Species Act and the establishment of a Nonessential Experimental Population of the North American wolverine in Colorado, Wyoming, and New Mexico

Dear Brent Esmoil,

On 19 March 2013, the U. S. Fish and Wildlife Service (USFWS) asked me to peer-review the proposed decision to list wolverine as *threatened* under the Endangered Species Act and the need to establish a Nonessential Experimental Population (NEP) of wolverines in Colorado, Wyoming and New Mexico. From 2000-2005, I studied wolverine movements and mortality patterns in south-central Montana, including the Pioneer, Flint, Anaconda, and Beaverhead Mountain Ranges. I currently serve as co-principal investigator (PI) for a study in Idaho that investigates how wolverines respond to winter recreation. I am also PI for long-term studies of Canada lynx in Northern Rocky Mountains since 1998. Therefore, I base my peer-review on experience gained from field research of wolverines in Idaho and Montana, my general experience with forest carnivores, and my knowledge of the literature.

I was impressed by how effectively the authors of the proposed rule described the most salient issues that relate to wolverine conservation and management in the contiguous United States. The proposed listing, as written, successfully described the many complex issues that relate to wolverine conservation. The author(s) in general provided a logical and transparent rationale for the proposed listing and he/she then supported the rationale with a clear presentation of the most relevant literature. The author(s) provided concise descriptions of complex scientific issues, like effective population sizes and the species' ecological requirements, in a language accessible to diverse publics. In short, my peer-review comments are limited due to the rational thought and clear writing expressed in the underlying documents.

In the request for peer-review, I was asked to consider the following 5 questions: 1) Is our description and analysis of the biology, habitat, population trends, and historic and current distribution of the species accurate? 2) Do the proposed rules provide accurate and adequate review and analysis of the factors that affecting the species? 3) Are there significant oversights, omissions or inconsistencies in our proposed rule? 4) Are the conclusions we reach logical and supported by the evidence we provide? and 5) Did we include all the necessary and pertinent



literature to support our assumptions/arguments/conclusions? Thus, I focused my comments regarding the proposed listing to these topics:

1) Is our description and analysis of the biology, habitat, population trends, and historic and current distribution of the species accurate?

The proposed listing clearly described the biology, habitat, population trends, space-use, and historic/current distribution of wolverines in the contiguous United States. The document also recognized the limited nature of some scientific understandings given that this species is rare and difficult to study. For example, the proposed listing described in detail how the distribution of wolverine denning and foraging habitat is delineated by persistent spring snow. This important relationship was well articulated as a basis for defining wolverine habitat. Snow cover was described as providing protection and shelter for wolverines with young kits in dens. Areas of spring snow cover also coincided with wolverine habitat during non-snow periods. Thus, persistent spring snow within the DPS, as described in the proposed listing, provided a useful and defensible delineation of wolverine habitat that was well supported in literature. At a broader scale, the document correctly described the current distribution of wolverines in the northern and southern Rocky Mountains, the Sierra Nevada Mountains, and the North Cascades. The document also clearly stated where ecological understandings of wolverines were limited such as the historical changes in distributions and population trajectories.

The large areas of persistent spring snow that define wolverine habitat are found in high-elevation mountainous terrain that is particularly vulnerable to climate change. In northern mountain states, McKelvey et al. (2011) predicts that wolverine habitat will contract 32 % and 63 % for 2045 and 2085, respectively. Areas in central Idaho that currently support wolverine populations may experience 43% and 78% reductions in habitat for 2045 and 2085, respectively. Thus, these predicted broad-scale reductions in wolverine habitat across the DPS population provided the necessary justification for identifying climate changes as the primary risk factor for the species. The link between climate change and the species' listing was well-documented and clearly articulated. The document also correctly stated that current wolverine populations appear to be moderately expanding as evidenced by recent long-distance dispersals of individuals to Colorado and California and a potential expanding distribution of other populations. Despite these positive trends, the author(s) provided rational support from the literature that the long-term viability of wolverines was in question from climate change due to habitat reduction and increased fragmentation of the high-elevation montane forests.

2) Do the proposed rules provide accurate and adequate review and analysis of the factors that affecting the species?

The proposed listing correctly stated that incidental take of wolverine by legal trapping of other species appeared to be infrequent, but difficult to quantify. It was logical to assume that incidental harvest was potentially a negative factor affecting wolverine populations, but the biological importance of this additive mortality and the necessity of a Special 4(d) rule depend on the amount and extent of incidental take. Therefore, the Special 4(d) rule that governs

incidental take was based on opinion without additional research and range-wide population monitoring. It is unknown if recent wolf control programs at high elevations will impact extant wolverine populations. Predator-reduction programs could impact wolverine populations as evidenced by the species' historical changes in distribution, but the probability of this happening depends on the methods, scale, and intensity of these management actions.

3) Are there significant oversights, omissions or inconsistencies in our proposed rule?

The proposed listing and 4(d) rule was generally complete with few oversights or inconsistencies. However, the suggestion that wolverines were unaffected by winter recreation was somewhat overstated. As mentioned previously, I serve as a co-PI for the Idaho wolverine-winter recreation study that was initiated in 2010. This study is a collaborative effort with state, federal and industry partners. The goal of the research is to investigate how wolverines respond to winter recreation in terms of their movements and spatial-use. We also document wolverine reproduction in recreated landscapes to the extent possible given the species' naturally low reproductive rates. We have collared wolverines and have monitored recreation for four seasons and this research is currently ongoing. Given that wolverines occur naturally at low densities and have large spatial-use areas, it is difficult to obtain an adequate sample size of wolverines to quantify recreation interactions. Therefore, we study small groups of wolverines in several study "nodes" that are widely distributed across the species' distribution in Idaho. This is a slow but necessary process in order for us to acquire the necessary number of study animals to research recreation effects. Our understandings of wolverine-recreation interactions are very preliminary at this time. However, based on preliminary data, wolverines appear to tolerate high levels of motorized and non-motorized winter recreation within their home-range. In other words, the presence of motorized and non-motorized winter recreation does not preclude wolverines from including impacted areas into their home ranges; this notion was correctly reported in the proposed listing. However, the report stated that "the best scientific information available does not substantiate dispersed recreational activities as a threat to wolverine." This statement may or may not be true based on our subsequent analyses of wolverine-recreation interactions. We presented preliminary results at the 2013 Wildlife Society Meeting in Portland, Oregon, that indicate wolverines appear to travel more consistently and at higher rates during "high" volume recreation days on weekends compared to "low" recreation days during mid-week. This suggests that wolverines in highly recreated environments may experience greater energetic costs compared to individuals in low-recreation zones. The extent that this relationship may affect wolverine demography is unknown. We do know that wolverine reproductive potential can be increased with supplemental feeding (Persson 2005). Therefore, it is logical to conclude that increased energetic cost associated with high-intensity recreation may reduce reproductive potential. This uncertainty was not adequately reflected in the listing proposal.

4) Are the conclusions we reach logical and supported by the evidence we provide?

In general, the primary conclusion that wolverine listing was warranted due to climate change was consistent with the cited scientific literature. The author(s) also provided support for other conclusions presented in the document with the most appropriate scientific studies. The

conclusions regarding winter recreation were somewhat overstated (see above) given the preliminary nature of these data.

5) Did we include all the necessary and pertinent literature to support our assumptions/arguments/conclusions?

The author(s) of both the proposed listing and NEP documents used the necessary and pertinent literature to support assumptions/arguments/conclusions.

Comments Regarding the Nonessential Experimental Population Status of Reintroduced Wolverines

Given that climate change was considered the basic premise for proposed federal listing, it follows that agencies have few options to facilitate species recovery. However, the USFWS' proposal to limit protections under the Act by granting NEP status for reintroduced populations may be a significant management action for this species' conservation. The author(s) provided a clear rationale for granting NEP status to wolverines released in Colorado. Potential wolverine habitat in Colorado is extensive and tends to be high in elevation. Thus, reintroduced populations of wolverines in Colorado may partially escape the effects of climate change. It is unlikely that wolverine reintroduction could gain necessary public and governmental support without NEP status as stated in the ruling. The proposed boundaries for the NEP are defensible given current distributions of extant populations. Predator control in Colorado is highly regulated and the NEP areas in Wyoming and New Mexico are relatively small in spatial extent. Therefore, I agreed with the logic provided (p7898) that a proposed special 4(d) rule regulating incidental take was unnecessary for the 10(j) area.

I hope you find these comments helpful and that your questions were adequately addressed. Please contact me if you need additional information or clarification. Thank you.

Sincerely,

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