From: Grizzle, Betty
To: McGowan, Conor
Subject: Re: Comment submitted re wolverine
Date: Thursday, January 12, 2017 11:37:20 AM
Attachments: Attachment from MTFWP public comment Nov 2016.pdf

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Thanks for your reply. There is much more, of course, but I am attaching part of the public comment from Montana Fish, Wildlife, and Parks (they submitted 58 attachments). It provides another perspective on climate change and range limits, small population size, etc., related to wolverine.
Betty

On Thu, Jan 12, 2017 at 7:06 AM, McGowan, Conor <cmcgowan@usgs.gov> wrote:

> Thanks,
>
> I've gotten all your emails and have been reviewing the materials. There is a lot to sift through, but I am starting to get an idea of the system and what we are faced with.
>
> Talk to you tomorrow.
>
> Conor
>
> On Wed, Jan 11, 2017 at 5:26 PM, Grizzle, Betty <betty_grizzle@fws.gov> wrote:
>
> > Conor - I assume you are receiving my earlier emails with attachments and I hope those documents have been helpful.
> > I am sending you another file (see attached), public comment submitted in November 2016 from the Wolverine Foundation, which provides their assessment of current information on wolverine abundance and distribution, among other comments.
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I. New Information Available After the February 4, 2013 Proposed Rule

A significant amount of new information on wolverines has been produced since the proposed rule was published in February 2013. Some of these pieces of information are critical to the discussion and debate of issues relative to the USFWS's decision. We urge the Service to consider all of the newly available information and the light that these pieces of information shed on FWP and other's previous comments.

Key New Pieces (Documents Attached)

Aronsson, M. and J. Persson. 2016. Mismatch between goals and the scale of actions constrains adaptive carnivore management: the case of the wolverine in Sweden. Animal Conservation DOI: 10.1111/acv.12310.

Cahill, A. E., M. E. Aiello-Lammens, M. C. Fisher-Reid, X. Hua, C. J. Karanewsky, H. Y. Ryu, G. C. Sbeglia, F. Spagnolo, J. B. Waldron, and J. J. Weins. 2014. Causes of warm-edge range limits: systematic review, proximate factors and implications for climate change. Journal of Biogeography 41:429-442. DOI:10.1111/jbi.12231

Idaho Department of Fish and Game. 2014. Management plan for the conservation of wolverines in Idaho. Idaho Department of Fish and Game, Boise, USA.

Inman, R. M., B.L. Brock, K.H. Inman, S.S. Sartorius, B.C. Aber, B. Giddings, S.L. Cain, M.L. Orme, J.A. Fredrick, B.J. Oakleaf, K.L. Alt, E. Odell, and G. Chapron. 2013. Developing Priorities for Metapopulation Conservation at the Landscape Scale: Wolverines in the Western United States. Biological Conservation 166:276–286.

Inman, R., M. Riley, Z. Walker, B. Lanka, and G. White. 2015. Distribution of Female Wolverines in Wyoming, Progress Report – August 2015. The Wolverine Initiative, Ennis, Montana, USA.

Webb, S. M., R. B. Anderson, D. L. Manzer, B. Abercrombie, B. Bildson, M. A. Scrafford, and M. S. Boyce. 2016. Distribution of female wolverines relative to snow cover, Alberta, Canada. Journal of Wildlife Management 80(8):1461-1470. DOI:10.1002/jwmg.21137.

Western Association of Fish and Wildlife Agencies. 2015. Wolverine metapopulation monitoring and connectivity in the U.S. Rocky Mountains and North Cascades. A proposal submitted to the State Wildlife Grants Competitive Grants Program, March12, 2015. 47 pp.

Western States Wolverine Working Group. 2016. Western States Wolverine Conservation Project Baseline Survey, Standard Operating Procedures for Camera-DNA Stations, Version 3.2 Sept. 30, 2016. 33 pp.

Wolverine Translocation Techniques Working Group. 2013. Restoration of wolverines: Considerations for translocation and post-release monitoring. 51 pp. Pdf available at http://www.wcsnorthamerica.org/Wildlife/Wolverine.aspx or from robert.michael.inman@gmail.com

Additional Newly Available Information (Documents Attached)

Clevanger, A. P. 2013. Mitigating highways for a ghost: Data collection challenges and implications for managing wolverines and transportation corridors. Northwest Science 87(3):257-264.

Clevenger, AP, and M Barrueto (eds.). 2014. Trans-Canada Highway Wildlife and Monitoring Research, Final Report. Part B: Research. Prepared for Parks Canada Agency, Radium Hot Springs, British Columbia. 314 pp.

Curtis, J. A., L. E. Flint, A. L. Flint, J. D. Lundquist, B. Hudgens, E. E. Boydston, and J. K. Young. 2014. Incorporating cold-air pooling into downscaled climate models increases potential refugia for snow-dependent species within the Sierra Nevada Ecoregion, CA. PLOS ONE 9(9):e106984.

Ellis, M. M., J. S. Ivan, and M. K. Schwartz. 2013. Spatially explicit power analyses for occupancy-based monitoring of wolverine in the U.S. Rocky Mountains. Conservation Biology 28(1):52-62.

Fisher, J.T., S. Bradbury, M. Wheatley, B. Anholt, L. Roy, J.P. Volpe, and L. Nolan. 2013. Wolverines on the Rocky Mountain slopes: natural heterogeneity and landscape alteration as predictors of distribution. Canadian Journal of Zoology 91: 706-716.

Gervasi, V., H. Broseth, O. Gimenez, E. B. Nilsen, J. Odden, O. Flagstad, and J. Linnell. 2016. Sharing data improves monitoring of trans-boundary populations: the case of wolverines in central Scandinavia. Wildlife Biology 22:95-106.

Heinemeyer, K. and J. R. Squires. 2013. Wolverine-Winter Recreation Research Project: Investigating the interactions between wolverines and winter recreation. 2013 Progress Report.

Inman, R.M. and M.L. Packila. 2015. Wolverine (gulo gulo) food habits in Greater Yellowstone. American Midland Naturalist 173(1):156-161.

Kersusan, D. 2014. Home range size and border patrols for Eurasian lynx and wolverines: a spatiotemporal approach assessing space use. MSc. Stockholm University. 35 pp.

Khalil, H. M. Pasanen-Mortensen, and B. Elmhagen. 2014. The relationship between wolverine and larger predators, lynx and wolf, in a historical ecosystem context. Oecologia DOI:10.1007/s00442-014-2918-6

Kortello, A. and D. Hausleitner. 2014. Abundance and distribution of wolverine in the Kootenay Region. 2013 Field Season Report: Purcell Mountains. Seepanee Ecological Consulting. 21 pp.

Koskela, A. I. Kojola, J. Aspi, and M. Hyvarinen. 2013. Effect of reproductive status on the diet composition of wolverines (Gulo gulo) in boreal forests of eastern Finland. Ann. Zool. Fennici 50:100-106.

Koskela, A., I. Kojola, J. Apsi, and H. Hyvarinen. 2013. The diet of breeding female wolverines in two areas of Finland. Acta Theriol. 58:199-204.

Koskela, A., S. Kaatinen, J. Aspi, I. Kojola, P. Helle, and S. Rytkonen. 2013. Does grey wolf presence affect habitat selection of wolverines? Ann. Zool. Fennici 50:216-224.

Koskela, A. Wolverine habitat selection, diat and conservation genetics. PhD Dissertation, Univ. of Oulu. Finland. 66 pp.

Magoun, A. J., P. Valkenburg, C. D. Long, and J. K. Long. 2013. Monitoring wolverines in northeast Oregon, January 2011 - December 2012, Final Report. 87 pp.

Magoun, A. J. In Review. Snow at the den site scale in wolverine denning habitat.

Makkonen, T. 2015. Den site characteristics of female wolverine (Gulo gulo) in Scandinavian forest landscape. MSc. University of Oulu and SLU.

McClure, M. A.J. Hansen, and R.M. Inman. 2016. Connecting models to movements: testing connectivity model predictions against empirical migration and dispersal data. Landscape Ecology DOI 10.1007/s10980-016-0347-0.

McKelvey, K.S., K.B. Aubry, N.J. Anderson, A.P. Clevenger, J.P. Copeland, K.H. 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 recolinization or range retraction and expansion? Journal of Wildlife Management 78(2):325–334.

McLellan, M. and C. Servheen. 2013. Flathead wolverine project summary report, 2009-2012. College of Forestry and Conservation, University of Montana, Missoula, MT 59815. 12 pp.

Myhr, T-M. 2015 Movement pattern of wolverine females around the den during the denning period. BSc. SLU (in Swedish).

Persson, J., G. R. Rauset, and G. Chapron. 2015. Paying for an endangered predator leads to population recovery. Conservation Letters 8(5):345-350.

Petersen, I. S. 2014. Juvenile and subadult survival in Scandinavian wolverines (Gulo gulo) in relation to sex and small rodent abundance. MS Thesis. Norwegian University of Life Sciences, As, Norway. 34 pp.

Rauset, G. R. 2013. When species' ranges meet: assessing differences in habitat selection between sympatric carnivores. Oecologia. DOI:10.1007/s00442-012-2546-y

Rauset, G.R. 2013. Life and death in wolverines, linking demography and habitat for conservation. PhD Dissertation, Grimsö Wildlife Research Station, Department of Ecology, Swedish University of Agricultural Sciences, Uppsala, Sweden. 156 pp.

Rauset, G. R., M. Low, and J. Persson. 2015. Reproductive patterns result from age-related sensitivity to resources and reproductive costs in a mammalian carnivore. Ecology 96(12):3153-3164.

Rauset, G. R., H. Andren, J. E. Swenson, G. Samelius, and P. Segerstrom. 2016. National Parks in northern Sweden as refuges for illegal killing of large carnivores. Conservation Letters 9(5):334-341.

Riley, M. D., M. L. Packila, R. S. Spence, and R. M. Inman. In press. Application of oxygen during medetomidine and ketamine immobilization of wolverines. Canadian Field Naturalist.

Scrafford, M. A. and M. S. Boyce. 2015. Effects of industrial development on wolverine (Gulo gulo) ecology in the boreal forest of northern Alberta. Progress Report Winter 2014/2015. 20 pp.

Shardlow, T. F. 2013. Isotopic evidence of salmon, Oncorhynchus spp., in the diet of the wolverine, Gulo gulo, on Princess Royal Island, British Columbia. Canadian Field Naturalist 127:338-342.

Stewart, F. E., N. A. Heim, A. P. Clevanger, J. Paczkowski, J. P. Volpe, and J. T. Fisher. 2016. Wolverine behavior varies spatially with anthropogenic footprint: implications for conservation and inferences about declines. Ecology and Evolution 6(5):1493-1503.

II. Climate and Wolverine Range Limits

The February 4, 2013 proposed rule determination that wolverines in the contiguous U.S. were threatened by climate change relied entirely upon peer-reviewed scientific papers (Copeland et al. 2010, McKelvey et al. 2011) that have since been examined by independent research groups and refuted by new peer-reviewed scientific papers (Aronsson and Persson 2016, Webb et al. 2016).

In both peer-reviewed cases, one in North America (Webb et al. 2016) and one in Scandinavia (Aronsson and Persson 2016), reproductive female wolverines and populations of wolverines are shown to exist outside of areas classified as suitable wolverine habitat based on the May 15 snow model of Copeland et al. (2010). This new information clearly demonstrates that the Copeland snow model cannot be used to delineate areas used or not used by wolverines. The May 15 snow model is not an accurate predictor of wolverine range limits, nor an effective proxy capable of predicting wolverine range limits. Accordingly, any subsequent analysis of predicted changes to wolverine habitat/range-limits based on the May 15 snow model (e.g., McKelvey et al. 2011) are unreliable. As the authors of both new papers note, *the wolverine may be more flexible in its distribution than previously assumed.*

These new findings are not surprising given the inherent limitations of the analytical approach and fundamental flaws in the interpretations afforded the May 15 snow model. USFWS Regional Director Noreen Walsh clearly understood these shortcomings as articulated in her May 30, 2014 memo outlining the thought process involved in the decision to retract the proposed rule. Walsh and the USFWS did not cast the McKelvey (2011) study aside improperly. Walsh and the Service simply did their due diligence in assessing the critical pieces of science for legitimacy based on scientifically sound data, assumptions, and analysis. At the conclusion of this process, the Service concluded correctly that there was far more uncertainty in the science suggesting wolverines are threatened by climate change than previously understood.

While previous information submitted to the USFWS related to this topic, including the standard peer-review of the Feb 4, 2013 proposed rule, points out numerous scientific concerns with the validity of the May 15 snow model and science used to justify the proposed rule, we briefly reiterate some of the major issues here to show how the most recent science has further clarified this topic:

1) Copeland et al. (2010) ignored fundamental flaws in its methodology despite coauthors bringing these issues to attention. As noted in Aronsson and Persson (2016), a wolverine population monitoring program that relies on tracks in the snow during spring can only occur (and locate dens) in areas where there is snow during spring. Such a program does not have the possibility of locating tracks or dens of wolverines outside areas with spring snow. The Copeland et al. (2010) paper was driven by data on wolverine den locations from Scandinavia, but these data were obtained during just such a monitoring program where tracks in snow during spring were the primary means used to locate dens. There was very little to no chance of locating dens in areas without spring snow based on methodology alone. This is a major scientific flaw in the 2010 paper. In practice, this is problematic to such a degree that Sweden must develop a new monitoring program in order to be effective in areas where wolverine populations are expanding (Aronsson and Persson 2016). This

fundamental weakness in the analytical approach of the Copeland et al. (2010) paper was noted during reviews by coauthors of the paper, but ignored by the lead authors.

2) Despite the fact that wolverines selected for areas with 5-7 out of 7 years of May 15 snow, and against areas with 1-3 out of 7 years of May 15 snow (Figure 4, Page 237 in Copeland et al. 2010), McKelvey et al. (2011) analyzed changes to wolverine habitat based on the areas encompassed by as few as 1 of 7 years of May 15 snow (see Figure 2B, Page 2887 in McKelvey et al. 2011). This choice is not scientifically justified and would result in a far more dramatic effect for changes in snow cover over time.

3) The May 15 snow model was constructed using statistical data-dredging, whereby the authors configured the first data layer (snow) to match the second (wolverine dens) as closely as possible. Once aligned as closely as possible (by using as few as 1 of 7 years at May 15, notably the next choice being zero of 7 years), the preordained conclusion (obligate denning under deep, persistent spring snow) was erroneously claimed to have been tested and then concluded to be the cause for the correlation. Data-dredging is an accepted method for generating hypotheses, but not testing them. Conversely, Copeland et al. (2010) developed a hypothesis, dredged through available information to generate a pattern supporting that hypothesis, and then claimed that the hypothesis has been scientifically tested. This process violates two fundamental tenants of scientific investigation - data-dredging to evaluate a hypothesis, and assignment of a cause to a correlation. Had the hypothesis been that places with 6 out of 7 years of spring snow would be correlated with wolverine dens, then at least one aspect of biology, the need to reproduce more than once every seven years, would have been addressed. However that was not the case. In fact, the only biology assumed to be pertinent to the investigation was the vague reasoning that “May 15 approximates the end of the denning period.” All other aspects of biology, e.g. reproductive interval, effects during the majority of months dens are used and when dens would in fact be important for thermoregulation in kits, scale of dens, physical location of dens on the landscape, etc., were ignored.

4) The ecological basis for the “obligate denning hypothesis” was misaligned with the dates used in the Copeland et al. (2010) and McKelvey et al. (2011) papers. If deep snowcover (how deep?) is necessary for thermal insulation of wolverine young, it is most vital during the early stages of denning. This occurs primarily during February and March (Inman et al. 2012a). However, the 2010 and 2011 papers were focused on May. May is the end of the denning period, a time when changes in snowcover due to climate change would be most dramatic, but a time when the need for thermal insulation for young wolverines is less critical if even critical at all. Certainly there are other features in the environment that provide adequate thermal shelter from ambient temperatures. This is in fact demonstrated by new peer-reviewed studies describing the presence of populations and dens outside of areas with May 15 snow (Aronsson and Persson 2016, Webb et al. 2016).

5) Wolverine dens in the contiguous U.S. occur at higher elevations and on north slopes (Magoun and Copeland 1996, Inman et al. 2007). The analysis by McKelvey et al. (2011) accounted for changes in

snow cover at all elevations and aspects, once again yielding an inflated effect to changes in snow cover, perhaps by as much as 75%. As noted previously in the record, Regonda et al. (2005) concluded that there was little discernible trend in decline of Snow Water Equivalent (SWE) at high elevation stations. Additional information in the record indicates that by the end of the century, 80-90% of modeled snowpack will remain at the highest elevations (USFWS 2014) where wolverine dens most typically occur in the contiguous U.S.

6) The ecological basis for the "obligate denning hypothesis" was not investigated at the appropriate scale. If wolverine range limits were defined by the existence, or not, of snow for dens, then the scale at which a den occurs is the appropriate scale to examine. Wolverine dens are relatively small, i.e., less than one hectare (100 x 100 meters). If snow for dens were the critical factor limiting wolverine distribution, then areas where one or a few hectares of snow is available for dens should be suitable for occupation by wolverines. This small scale was not used by McKelvey et al (2011).

7) The combined effect of #4, #5, and #6 above is to view this phenomenon at an inappropriate time of year, in the wrong physical locations, and at an inappropriate scale, essentially ignoring the specific biology of wolverines and yielding a far more dramatic prediction about the effect of climate change on wolverines than is realistic.

In summary, the "obligate denning hypothesis" presented in Copeland et al. (2010) was an untested hypothesis. The Copeland et al. (2010) paper made a pretense of testing this hypothesis, but rather this paper used logical and analytical methods more appropriate for hypothesis generation than for hypothesis evaluation. Despite basic scientific flaws, the 2010 paper's conclusion that wolverine range limits can be defined by May 15 snow because of an obligate need to den under "deep, persistent" spring snow cover was embraced as truth by a number of people. Further objective scrutiny of the May 15 snow cover hypothesis has suggested many flaws. And newly available information clearly demonstrates that wolverine range limits cannot be accurately defined with a model of snow cover on May 15, no matter what hypotheses might be offered as an explanation.

The following figures (Figs. 1 A-E) are conceptual diagrams of how the initial presentation and perception of climate change impacts to wolverine habitat in the Copeland et al. (2010) and McKelvey et al. (2011) papers has greatly overestimated the potential impact.

The publications and analyses that the proposed rule hinged upon were flawed and greatly overestimated the potential impacts to wolverine habitat by climate change. In the following conceptual diagrams, *blue areas* represent the *present day limits* to wolverine distribution based on a hypothesized "obligate relationship with deep persistent spring snow for denning" by Copeland et al. (2010), and *white areas* represent the *predicted future limits* to wolverine distribution based on the same hypothesis and an analysis by McKelvey et al. (2011).

Figure 1-A. **One-dimensional Representation of Wolverine Habitat and Potential Climate-induced Changes as Presented by Copeland et al. (2010) and Used by McKelvey et al. (2011).** A predicted extent of present day wolverine habitat (blue area) was defined by the presence of snow through May 15 in at least 1 of 7 years by Copeland et al. (2010). The McKelvey et al. (2011) analysis of changes to the extent of wolverine habitat based on May 15 snow in 1 of 7 years predicted a 63% reduction in available habitat by the year 2100 (white area). This presentation of the wolverine's relationship with snow is a one-dimensional representation that is incongruent with wolverine biology; it occurs at a single point in time (May 15) when effects from climate change would be most dramatic; it occurs at a time when young would benefit the least from insulative properties of snow; it considers changes across all areas rather than at the elevations and aspects where denning occurs; it was not analyzed at a scale that matches the size of a wolverine den.

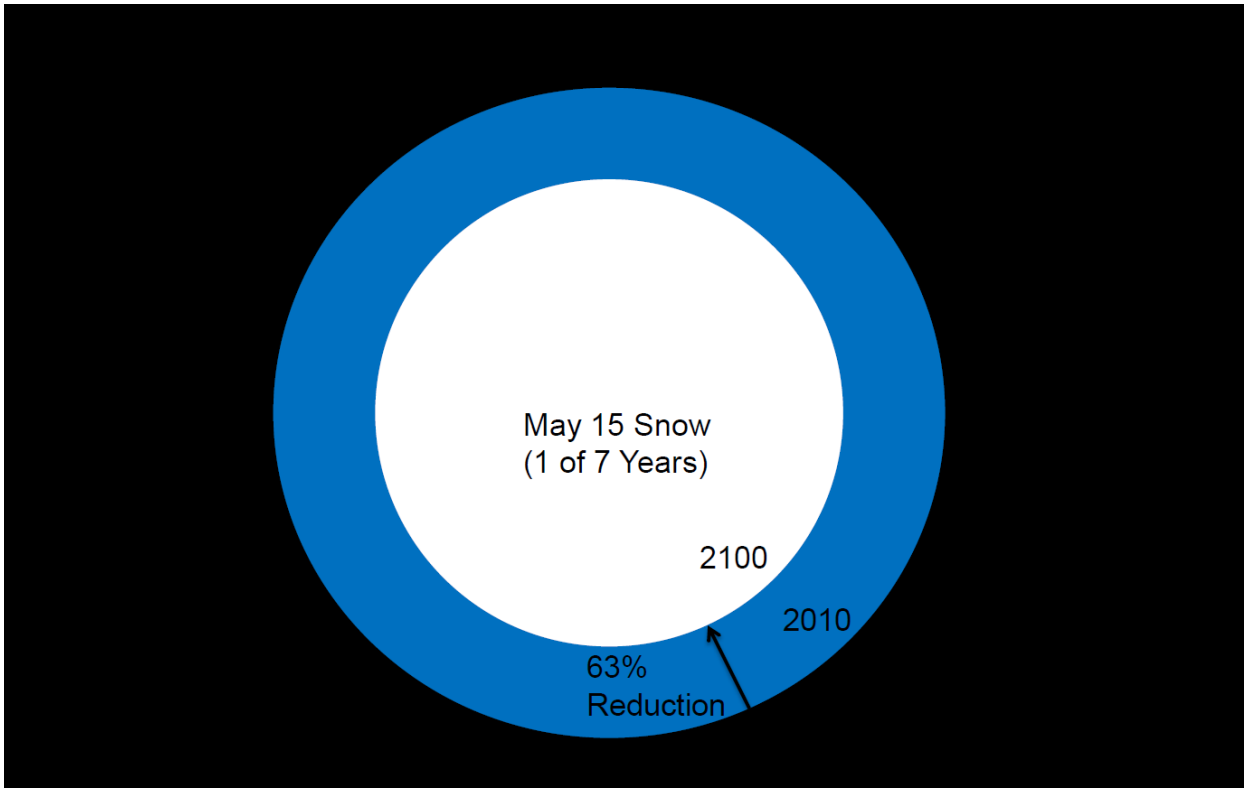


Figure 1-B. Adding Time/Season into the Consideration of Climate-induced Changes to Wolverine Habitat. Again, in this conceptual diagram, blue areas represent the present-day extent of wolverine habitat, and white areas represent the extent of habitat given climate change. Assumptions here are that wolverine habitat will be affected by climate change, and that those effects will be more prominent during late-fall/early-winter and late-winter/early-spring than they will be during mid-winter. This conceptual diagram shows how the one-dimensional, May 15 view of wolverine habitat presented by Copeland et al. (2010) and used by McKelvey et al. (2011) focused on a limited period of time, the period when impacts would be greater than at almost any other time of year.

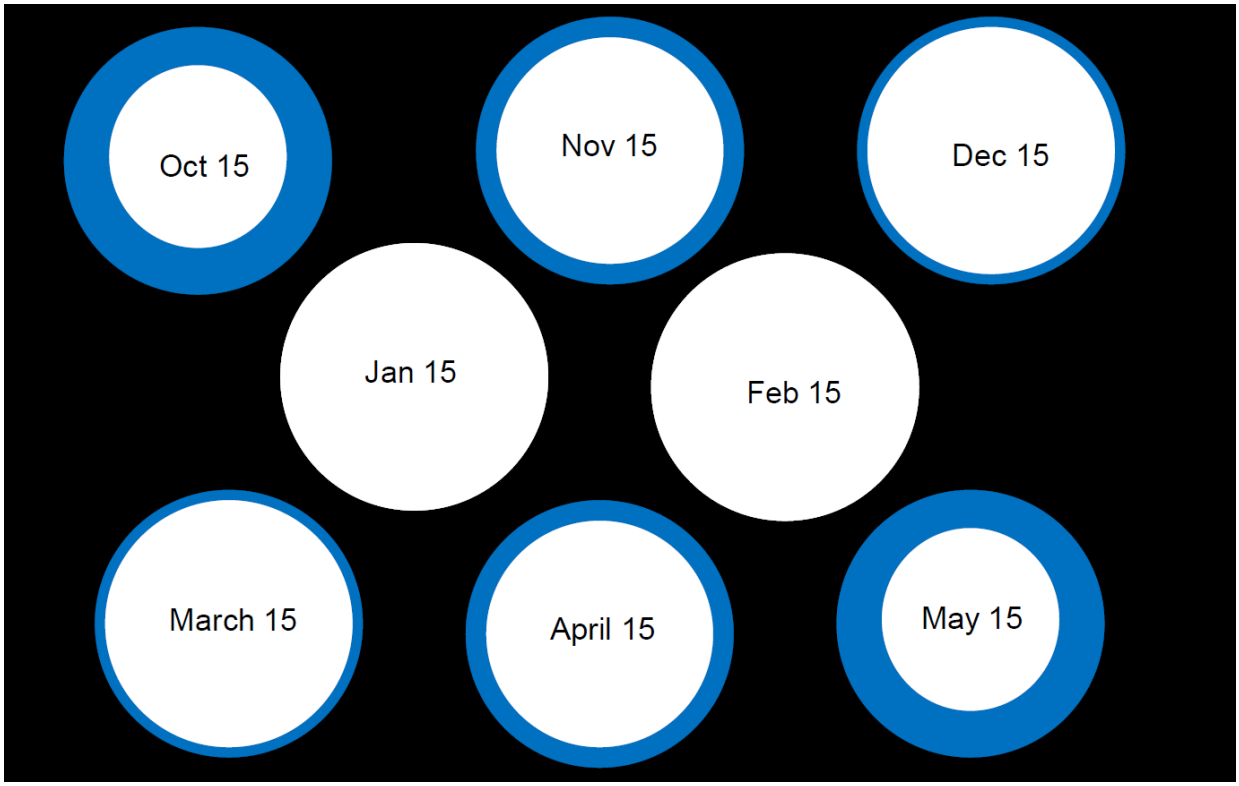


Figure 1-C. Adding Physical Location into the Consideration of Climate-induced Changes to Wolverine Habitat.

This conceptual diagram of the one-dimensional May 15 snow model shows the mismatch between the "obligate denning hypothesis" and the analysis by McKelvey et al. (2011). Wolverine dens in the contiguous U.S. occur almost exclusively on north slopes (represented here by the black 'triangle' at the top quarter of the diagram) and at higher elevations (Copeland and Magoun 1998, Inman et al. 2007). High-elevation north slopes will be the least impacted areas due to sun angle and lower ambient temperatures. Even if there were a 63% reduction, most impacts would likely occur on south slopes (lower half of diagram) and at lower elevations. The effect would be less of an impact on north slopes (depicted) at higher elevations (not depicted here). It is important to note that there is a spatial separation between the places wolverines might need snow for dens and the places impacted by climate change.

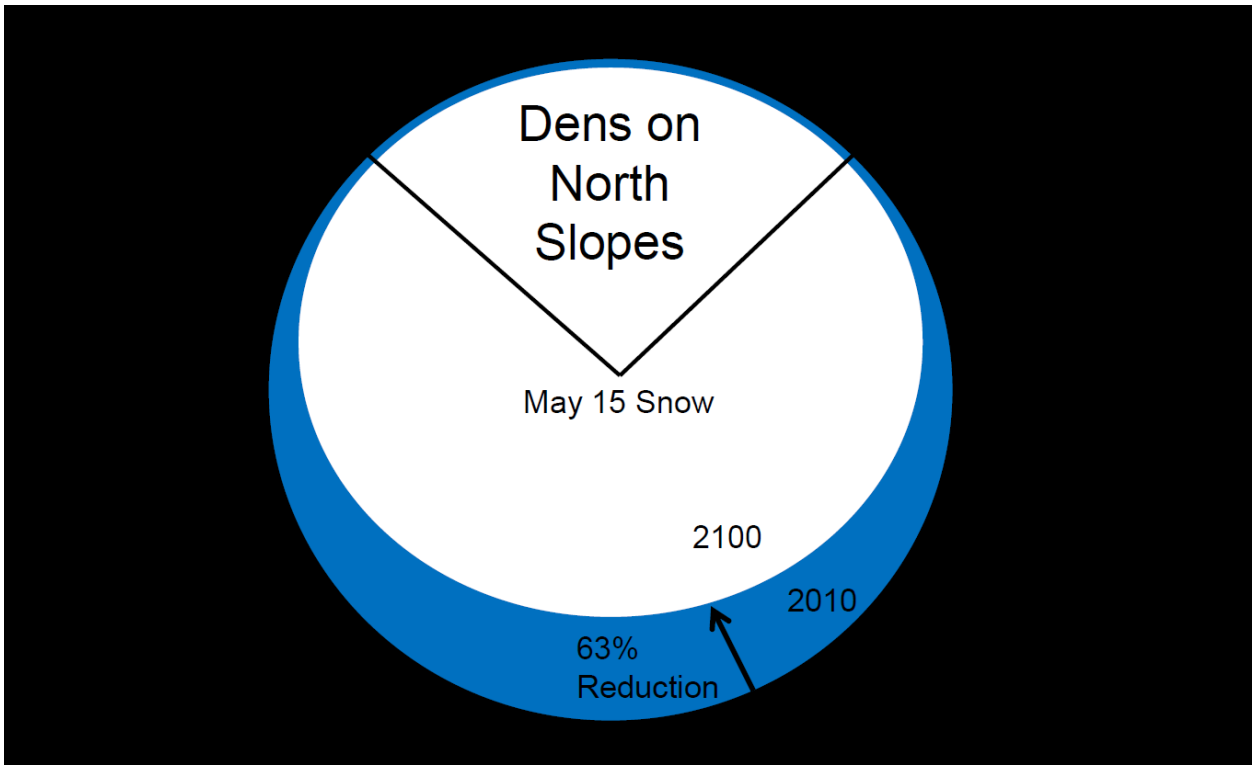


Figure 1-D. Adding Wolverine Denning Chronology along with Combining the Time/Season and Physical Location Considerations of Climate-induced Changes to Wolverine Habitat. This conceptual diagram once again shows the degree to which a one-dimensional model of May 15 snow is not matched with wolverine biology. May 15 is one of the points in time when climate change would be most likely to impact the presence of snow, but wolverine dens are used primarily during February, March, and April, and dens are located on north slopes at high elevations (represented by the black 'triangles'). By focusing on a limited period of time (May 15), a time when young wolverines are far less in need of the thermal insulation that snow could afford, and ignoring the fact that most dens occur at higher elevations on north slopes where any effects would be less prominent, the May 15 analysis exaggerates the potential effect on wolverines.

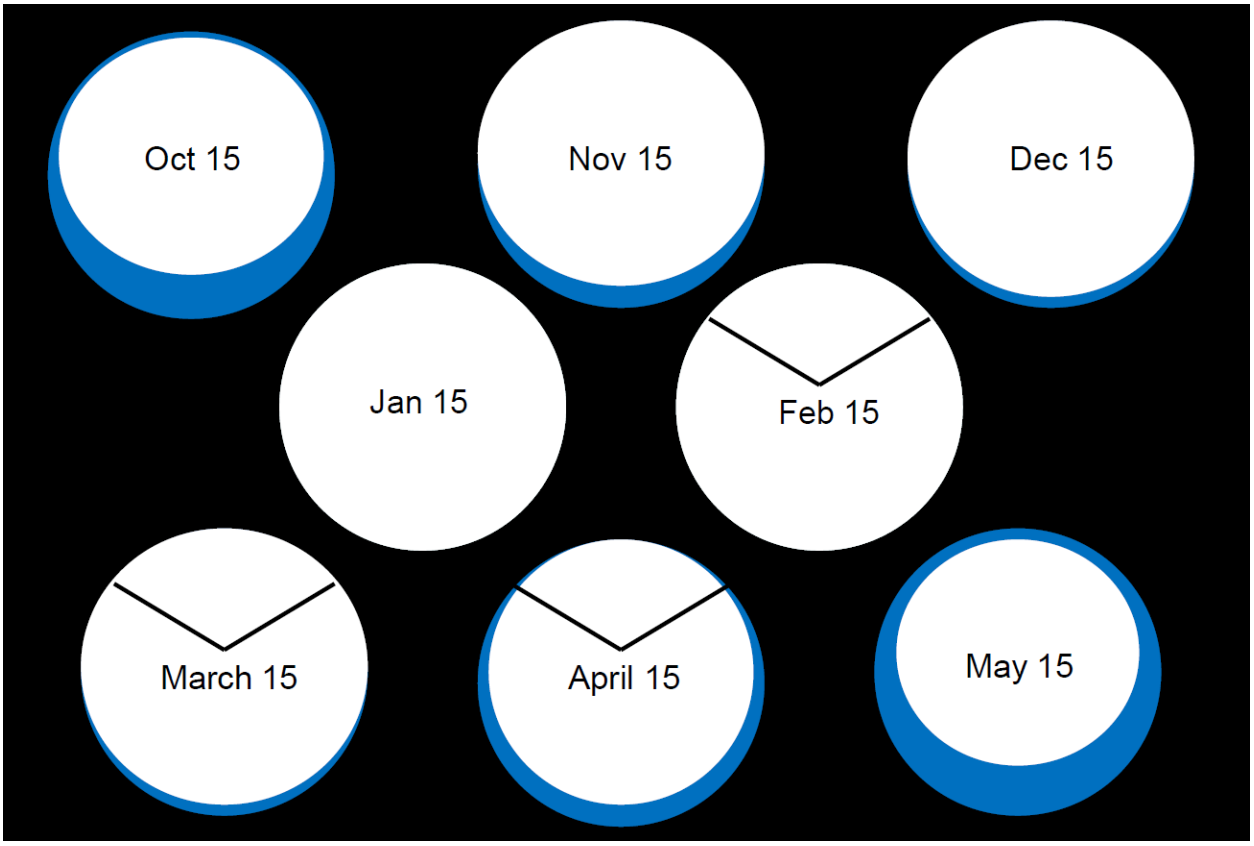
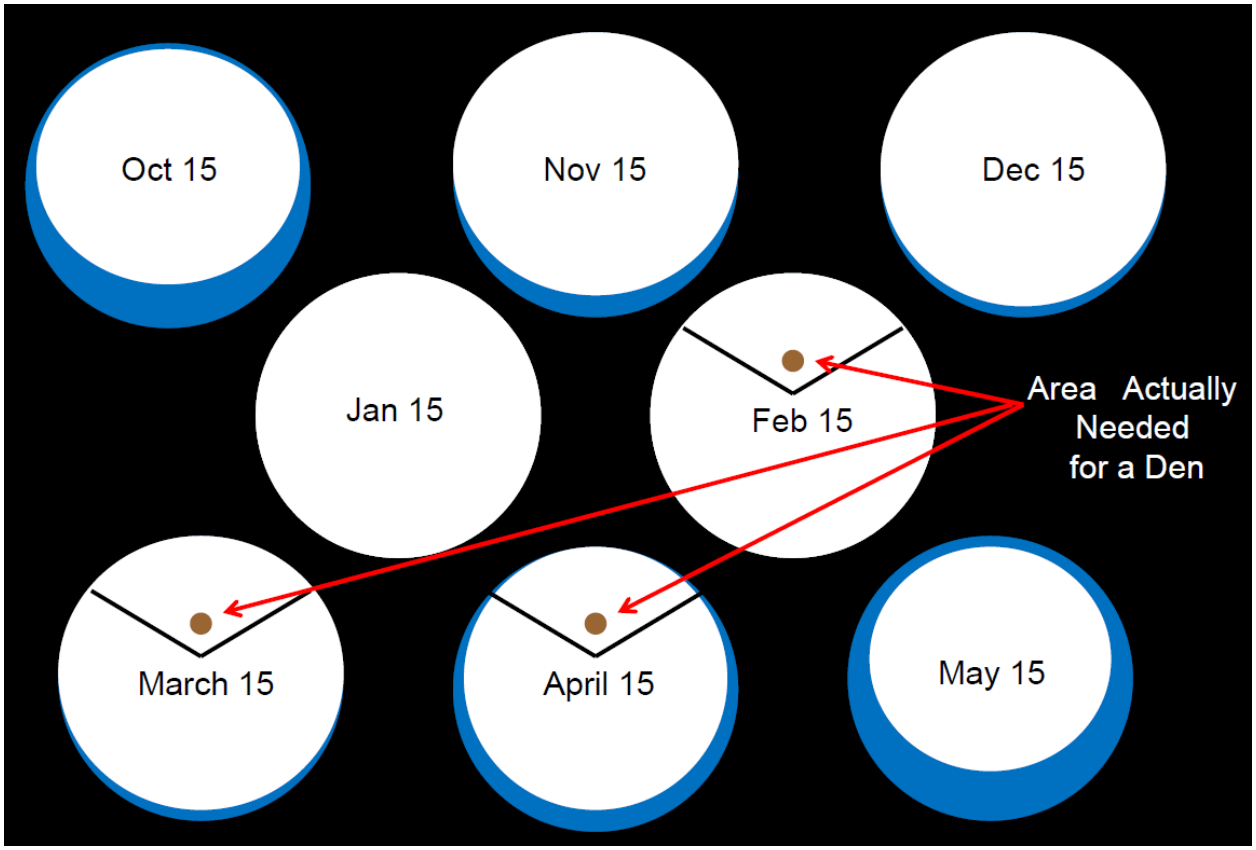


Figure 1-E. Adding the Consideration of Scale (Den Size). The exaggerated effect theorized with a one-dimensional May 15 snow model is further magnified when considering the scale or physical size of a wolverine den. Dens are small (less than a hectare).



Overall, 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. None of these factors is considered by an analysis that focuses on the extent of snow cover on May 15 in one out of seven years. 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.

III. Small Population Size and Genetics

Montana Fish Wildlife and Parks (MFWP 2013b, Pages 12-14) and others have addressed these concerns sufficiently in previous comments. Please review these comments and questions.

We note here a few important items:

Wolverine population size is likely at a similar capacity to what is was historically in much of the contiguous U.S., and wolverines continue to expand into new areas such as Colorado and California (Moriarty et al. 2009, Inman et al. 2009). Conservation efforts to assist population expansion into additional areas of historical distribution are hampered primarily by the possibility of wolverines becoming listed as a threatened species.

Effective population size estimates were not derived from a complete sample of occupied habitats in the contiguous U.S. and did not include any samples from Canada (See Figure below from Schwartz et al. 2009). Given this limited sampling, the estimate of 35 is similar to what would be expected given population capacities (Schwartz et al. 2009, Inman et al. 2013). There is no reason to believe that the effective population size from the sampled area is less than it would have been historically or can be now. Furthermore, an effective population size estimate of 35 from within only half the occupied habitat in the contiguous U.S. suggests that an estimate of 70 may be more likely and that the interbreeding population may be closer to 700. This would indicate connectivity and interchange with Canada, which is supported by the return of wolverines from historical lows from Canada (Newby and Wright 1955, Newby and McDougal 1964, Aubry et al. 2007) and the long distance dispersal capabilities of wolverines (Magoun 1985, Gardner 1986, Copeland 1996, Vangen et al. 2001, Flagstad et al. 2004, Inman et al. 2009, Inman et al. 2012b). Including samples from Canada would likely serve to increase estimates of effective population size even further.

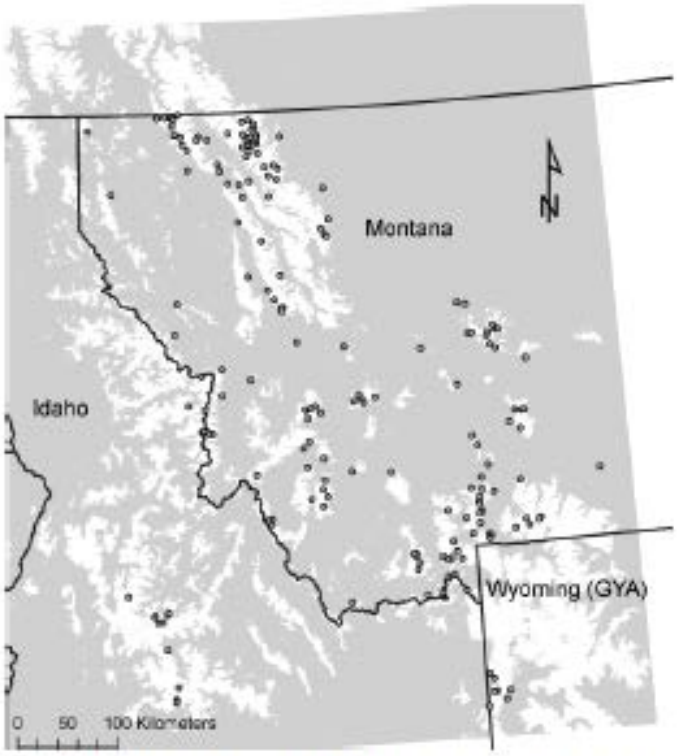


FIG. 1. Map of the northern U.S. Rockies. The white areas are locations of the spring snow cover bioclimatic envelope (J. P. Copeland et al., *unpublished manuscript*), whereas the gray areas do not have spring snow cover. Circles are locations of samples collected between 1989 and 2006. GYA stands for the Greater Yellowstone Area.

IV. Distinct Population Segment

As mentioned in our letter and comments of May 6, 2013, we disagree that wolverines in Montana and the lower 48 states are a distinct and separate population from those in neighboring Canada. As we said then "…we disagree that it [the NRM population] is distinct from the connected Canadian population, which was likely the source of recolonization of the NRM and is the source of continued interchange of wolverines between Canada and the United States." As in 2013, this is still the case in 2016. There is no barrier isolating wolverines in the United States from those in Canada. 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.

Moreover, it is important to note that wolverines in Canada are managed according to the best and latest scientific principles of wildlife management, which is counter to the assertion in the proposed rule that there is a division of the control of exploitation and conservation status of the wolverine between Canada and the U.S.

V. Ongoing Wolverine Conservation: Collaboration Across the Western US

Montana FWP has been actively engaged in managing wolverines for decades, and began implementing management at a multi-state, landscape scale nearly a decade ago, in 2008. Since that time, and with help from other agencies and conservation organizations, a multi-state, landscape-scale conservation strategy for wolverines has been developed and implementation has begun. These activities are officially sanctioned by the Western Association of Fish and Wildlife Agencies ("WAFWA") and acted upon by WAFWA's Wildlife Chiefs wolverine subcommittee. These ongoing activities, described below, are very similar to the goals of the USFWS's 2013 Draft Recovery Outline (USFWS 2013, Page 8), and in some cases go above and beyond those goals. As such, there is an active, funded, region-wide wolverine conservation program that contains most, if not all, and some additional components of any recovery plan that could be created.

Early Management in Montana Resulted in Range Reoccupation and Important Population Data

The vast majority of information available on wolverines in the contiguous U.S. from the early 1900s through 2000 comes from Montana. Montana Furbearer Biologist Fletcher Newby collected data that provided some of the earliest documentation on wolverine recovery from historical lows as the species returned into the contiguous U.S. (Newby and Wright 1955, Newby and McDougal 1964). Montana's Furbearer Biologist Howard Hash was instrumental in initiating and carrying out the first radio-telemetry study of wolverines on the planet, which occurred in northwest Montana (Hornocker and Hash 1981).

Despite wolverine recovery and expansion across western Montana occurring during an era when there were no limitations on taking wolverines, FWP gave the wolverine status as a furbearer during 1978. Although this change from an unregulated predator to a classified furbearer has been portrayed by some (see Chadwick 2010, Page 120) as an aggressive and insensitive management approach, the Department was in fact taking a step toward a more conservative approach because furbearer status allowed the department to established a limited time during which a wolverine could be taken along with individual limits to the number that could be taken.

While critics argue that allowing any take of wolverines at that time was unwarranted, it is important to consider the fact that the allowed take was accompanied by a requirement to provide FWP with several types of data that were the only data available on wolverines for several decades. These data included harvest locations that were critical for understanding historical patterns of distribution (Aubry et al. 2007); genetic samples critical for understanding recovery patterns and current population structure (Cegelski et al. 2006, Schwartz et al. 2009), and reproductive data critical for understanding the species biology at the edge of its range and differences within Montana (Anderson and Aune 2008). These harvest-based samples were also critical pieces used to investigate effective population size (Schwartz et al. 2009) and habitat relationships (Aubry et al. 2007, Schwartz et al. 2009, Copeland et al. 2010, Inman et al. 2013). Comparable data do not exist from other areas that did not allow any wolverine harvest. Data derived from a limited season on wolverine were also used annually by the Department to assess the impacts of harvest through sex ratios, age-structure of the population, and distribution of harvest across the state.

Wolverines recovered from historical lows at the turn of the century to their former range within Montana during a 40-year period with little to no regulation on take whatsoever (~1930-1970). Since that time, regulations have been more conservative.

Initiation of Landscape-level Management Nearly a Decade Ago

FWP has a long history of responding to newly available information on wolverines to adjust its management accordingly, whether from data collected during mandatory check-in, from research derived from these samples, or from telemetry studies. In recent years, this included a deliberate attempt to manage wolverines at a multi-state, landscape scale.

The importance of doing so became apparent when the first GPS collar put on a wolverine revealed an amazing capacity for dispersal, and other data on large home range size, extensive movements, territoriality, and naturally low densities became available. In response, Montana made significant changes to its management strategy (MFWP 2008). These changes included eliminating wolverine harvest within approximately 40% of wolverine habitat within the state, i.e., from within the Central Insular Management Unit (Fig. 2, WMU 4). This CIMU contains the smaller island mountain ranges of the state where local population capacities would be lower, and it is situated between the largest blocks of wolverine habitat. This management change was undertaken to achieve more successful reproduction within the CIMU, and more successful dispersal and genetic interchange among the large blocks of habitat. Notably, these large blocks of habitat extended into neighboring states and provinces – the

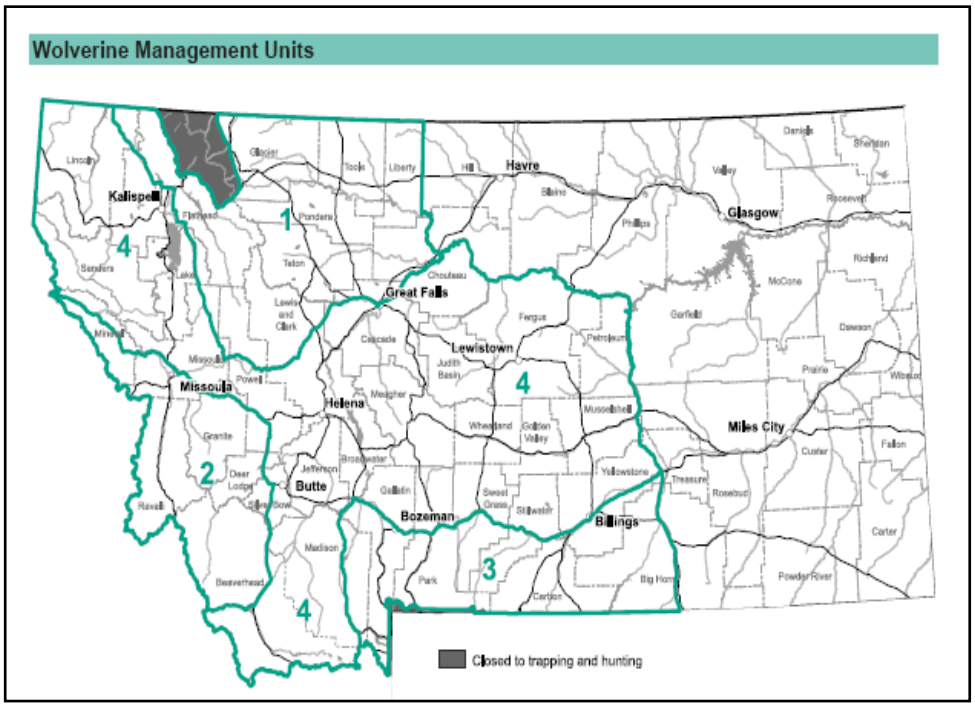


Figure 2. Wolverine Management Units in Montana, 2008. WMU 4, The Central Insular Mountains, was closed to wolverine harvest to protect sub-populations in smaller mountain ranges and to facilitate landscape-level gene flow among the major ecosystems of the northern U.S. Rockies.

Greater Yellowstone Ecosystem, the Salmon-Selway Ecosystem, and the Northern Continental Divide Ecosystem. At the same time, wolverine quotas were reduced to less than half of what they had been for the last 30+ years despite no indications that previous management had deleterious effects on wolverines in Montana. Thus during 2008 Montana began implementing a multi-state, landscape-level approach to wolverine management.

The Western States Wolverine Conservation Program

By 2009 it had become apparent that significant amounts of wolverine habitat that had been historically occupied remained unoccupied at present and could be of significant conservation benefit to the species in the contiguous U.S. The largest areas were in Colorado and California. The 2008 photograph of a wolverine in California was the first record in that state in nearly a century (Moriarty et al. 2009). And the documented dispersal of a male wolverine to Colorado, which was the first verified record of the species in that state in nearly a century (Inman et al. 2009), provided further impetus for a collaborative, multi-state, landscape-scale approach to wolverine conservation in the contiguous U.S. Montana FWP responded with an official Fish and Wildlife Commission action that would allow Montana's harvest quota (max of 5 at that time) to be used for live-capture of wolverines for transplant efforts into unoccupied historical range. This was the second step Montana made toward a collaborative landscape-scale approach to wolverine management.

After four multi-agency wolverine workshops (2007-2012) focused on identifying and implementing collaborative multi-state strategies for conserving wolverines, a formal publication including coauthors from four state wildlife agencies, the USFS, NPS, USFWS and two NGOs outlined wolverine conservation priorities at the multi-state scale (Inman et al. 2013). Population-level priorities included 1) Connectivity, 2) Restorations, and 3) Monitoring. These recommendations formed the basis for much of the USFWS's Draft Recovery Outline (2013). With priorities identified, WAFWA formed a Wolverine Subcommittee, and the Western States Wolverine Working Group met in February 2015 to identify agreed upon conservation priorities for wolverines and to commit personnel and develop funding to actively initiate the program. A brief summary of the collaborative project that was identified is provided here and available in its entirety (Western Association of Fish and Wildlife Agencies 2015, Western States Wolverine Working Group 2016).

> ***Brief Project Summary:***
> *The southernmost extant population of wolverines in North America occurs in small, semi-isolated subpopulations in the Rocky Mountains of Montana, Idaho, and northwest Wyoming; the north Cascade Range of Washington; and the Wallowa Mountains of Oregon. Maintaining wolverine distribution in suitable habitat and connectivity at the metapopulation, multi-state scale are critical for ensuring wolverine persistence over the long term. Montana, Wyoming, Idaho, and Washington herein propose a collaborative multi-state monitoring effort that is intended to advance wolverine conservation across the species range within the contiguous United States. This project includes maintaining landscape connectivity among occupied wolverine habitats, assessing the feasibility to assist with expansion of wolverine distribution with translocation, developing and implementing a*

collaborative multi-state monitoring plan to provide baseline information on distribution, genetic characteristics, and factors influencing the presence of wolverines. The project will also engage key partners at multiple levels to prioritize habitat conservation, population connectivity, and management activities. This proposal addresses needs identified as priority actions in State Wildlife Action Plans (SWAPs) from all four states.

Overall Goal:
Advance wolverine conservation across the northwestern U.S.

Primary Objectives:
1. *Maintain landscape connectivity among occupied, core wolverine habitats of the northern U.S. Rockies and north Cascades.*
2. *Develop and implement a collaborative multi-state monitoring plan to assess distribution, occupancy, and genetic characteristics of the metapopulation.*
3. *Develop policies that address the socio-political needs for assisting wolverine population expansion with translocation and establish protocols for testing wolverine translocation methods.*
4. *Engage key partners at multiple levels to prioritize habitat conservation, population connectivity, and management activities.*

Four collaborative projects, which represent sequential and parallel actions at the metapopulation scale, will be implemented to achieve these objectives:
Project 1: Model connectivity to focus and prioritize habitat conservation delivery.
Project 2: Further the translocation of wolverines as a conservation tool.
Project 3: Develop a coordinated multi-state monitoring strategy.
Project 4: Define current baseline distribution and genetics of wolverine across WA, ID, MT, and WY

Project Activities & Outcomes:

Activity 1. Define baseline wolverine distribution and genetics across MT, ID, WY, and WA.

Action 1.1: Implement multi-state monitoring in WY during winter 2015/16 and MT, ID, WA during winter 2016/17 to establish baseline metrics. This activity will allow us to quantify baseline distribution of wolverines across the four-state area with a snapshot in-time approach using non-invasive genetic and photo collection techniques at baited camera stations. It is also designed to be compatible with future efforts to assess changes in occupancy and genetics over time. Details of the finalized field protocol being used across the 4-state area are attached. Project partners communicated within and among agencies to gain cooperation and give ownership to local field offices and personnel who will be directly or indirectly involved in the surveys this winter. Numerous meetings were held to discuss logistics of the upcoming surveys and insure local awareness. The USFS completed its minimum tools analysis for use of remote cameras in designated wilderness areas. In some areas, intensive coordination efforts have been used to develop agency and NGO

partner teams that will conduct wolverine surveys. In other areas field crews have been hired and are currently beginning to deploy wolverine survey stations. We also developed a volunteer protocol to encourage interested public to survey additional cells for wolverine presence.

Action 1.2: Utilize survey results to identify areas where wolverine translocation can improve occupancy of suitable habitats, total population size, and genetic diversity. This action can only be taken after completion of the survey effort that will occur this winter.

Action 1.3: Assess and revise monitoring design. This action can only be taken after completion of the survey effort that will occur this winter.

Activity 2. Model Connectivity to Focus and Prioritize Habitat Conservation Delivery

Action 2.1: Develop ecological and human land-use forecasts. Our overall approach for projecting land use change into the future across the study area involves quantifying past change, testing hypotheses on drivers, using the results to update a land use change simulation model, and projecting change under various future scenarios with the model. We have selected 1100 1 km2 samples across the study area under a stratified random design based on hypothesized predictors of land use change: urban/rural status, economic type, infrastructure and development, climate, and natural amenities. We are now quantifying land use change during 1990 to 2015 in these samples through aerial imagery interpretation and analysis of remote sensing data sets. Thus, the land use change work is proceeding on schedule.

Action 2.2: Model wolverine habitat at 2015, 2030, and 2050. A group of advisors for the implementation of this action has been developed and will meet in Bozeman, MT during November. This analytical design team includes Justin Gude and Dr. Robert Inman of Montana Fish Wildlife and Parks, Dr. Scott Bergen of Idaho Fish and Game, Dr. Mike Schwartz and Dr. John Squires of the USFS Rocky Mountain Research Station, Dr. Paul Lukacs of the University of Montana, and Dr. Hansen and Kathleen Carroll of Montana State University. This action (modeling) can only be completed after development of the human and land use forecasts and a final analytical design.

Action 2.3: Prioritize areas from connectivity conservation. This action can only be taken after completion of the habitat modeling efforts.

Action 2.4: Deliver GIS layers of priority connectivity areas to land trusts and agencies. This action can only be taken after completion of the prioritization efforts.

Action 2.5: Develop wolverine-friendly transportation plans. This action can only be taken after completion of the prioritization efforts.

Activity 3. Further the Translocation of Wolverines as a Conservation Tool

Action 3.1: Explore options to establish regulatory certainty for states that reintroduce wolverine. After several preliminary discussions, WAFWA has invited the U.S. Fish & Wildlife Service to its winter

meeting to discuss policy options that will facilitate reintroductions of species that may be candidates for listing as threatened or endangered.

Action 3.2: Develop a project-specific study plan for translocation in the Rocky Mountains. This activity is targeted for summer 2017 after the distribution-wide survey effort.

Progress Update:

At present, over $1.5 Million has been committed to implementation of the above goal and objectives. Funding from partners includes:

National Fish and Wildlife Foundation	*$385,000*
Wyoming Game and Fish	*$337,000*
U.S. Fish and Wildlife Service	
Competitive SWG	*$200,000*
GNLCC	*$150,000*
Montana Fish Wildlife and Parks	*$160,000*
Idaho Fish and Game	*$81,000*
National Park Service	*$72,000*
Washington Fish and Wildlife	*$60,000*
Montana State University	*$50,000*
U.S. Forest Service	*$35,000*
The Wolverine Initiative	*$10,000*
Total	*$1,540,000*

October 2016: The project, "Wolverine Metapopulation Monitoring and Connectivity in the U.S. Rocky Mountains and North Cascades," has made significant progress toward project administration and all three wolverine conservation goals: 1) Monitoring, 2) Connectivity, and 3) Restorations. Numerous necessary project administration tasks have been completed, including finalization of contracts with University partners, allocation of funding among partners, and contracts between WAFWA (grants administrator for the project) and agencies hiring personnel involved in the project. Significant work has been accomplished in preparation for the main thrust of the winter 2016-2017 survey of wolverine distribution and genetics across the species current range in the western U.S., including hiring of field personnel and acquisition of project supplies. Kathleen Carroll has been hired as the PhD student at Dr. Hansen's lab at Montana State University who will lead the Connectivity analysis. WAFWA has invited the U.S. Fish & Wildlife Service to its winter meeting to discuss policy options that will facilitate reintroductions of species that may be candidates for listing as threatened or endangered. Overall the project is on track as planned.

In the 2013 Draft Recovery Outline, the USFWS states, "Because we are unable to address the primary threat of climate change directly, wolverine recovery will be a matter of ensuring that the DPS is resilient to the changes that we expect to occur." ***We emphasize here that those efforts are well underway***.

VI. Other Information Relevant to Wolverine Conservation in Montana

Montana employs a standardized ranking system to denote global (range-wide) and state status. Species are assigned numeric ranks ranging from 1 (highest risk, greatest concern) to 5 (demonstrably secure), reflecting the relative degree of risk to the species' viability, based upon available information. Wolverines are classified globally as G4, meaning they are "Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining." Within Montana they are classified as S3, meaning they are "Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas."

Wolverine are also listed as Species of Concern in Montana. Species of Concern are native taxa that are at-risk due to declining population trends, threats to their habitats, restricted distribution, and/or other factors. Designation as a Montana Species of Concern or Potential Species of Concern is based on the Montana Status Rank, and is not a statutory or regulatory classification. Rather, these designations provide information that helps resource managers make proactive decisions regarding species conservation and data collection priorities.

Existing regulatory mechanisms

Protections in State Law and Fish, Wildlife and Parks Regulations and Policies – Regulations protecting Montana's wildlife are found in both state statute and in rules and regulations promulgated by the Montana Fish and Wildlife Commission. FWP, acting through the Commission, is the public trust steward of the state's wildlife, including wolverines. Its powers and duties to discharge this public trust are codified in law (MCA 87-1-201, attached) and its commitment to its stewardship responsibilities is found in a number of places including both its mission statement and strategic plan:

> Mission Statement: *Montana Fish, Wildlife & Parks, through its employees and citizen Commission, provides for the stewardship of the fish, wildlife, parks and recreational resources of Montana while contributing to the quality of life for present and future generations. (Montana Fish, Wildlife & Parks. 2008 P 1. and 2015a p 4)*
>
> Strategic Plan: *Montana Fish, Wildlife & Parks will provide the leadership necessary to create a commitment in the hearts and minds of people to ensure that, in our second century, and in partnership with many others, we will sustain our diverse fish, wildlife and parks resources and the quality recreational opportunities that are essential to a high quality of life for Montanans and our guests (Montana Fish, Wildlife & Parks 2008, P 1).*

Montana's 2015 Vision and Guide 2016-2026 also speaks to FWP using the best information available in natural resource management when it mentions that one of the eight core values guiding the department is to, "Use Science. We use the best biological and social sciences to inform and make management decisions." (Montana Fish, Wildlife & Parks. 2015a p 4.)

Trapping – Furbearer trapping in Montana is highly regulated with season dates and harvest limits set by the Fish and Wildlife Commission. In addition to protections for wolverines in the various laws in state

statute Title 87, specific regulations governing their legal harvest are found in FWP's Furbearer and Trapping Regulations (attached). Currently there is no trapping season for wolverine in Montana, nor has there been since 2013. The portion of the current regulations pertaining to wolverine reads as follows:

> **WOLVERINE – 0 QUOTA - NO HARVEST**
> There is no trapping or harvest of wolverine allowed at this time.
> **Incidental Take** – Trappers who accidentally capture a furbearer when the season is closed or trapper limit is met must notify a designated Fish, Wildlife & Parks employee residing in the trapping district where the animal was taken within 24 hours to arrange collection of the animal if the animal cannot be released uninjured. It is unlawful for any person to retain possession of an incidentally taken furbearer as per Montana law.

Wolverine management has evolved over the years as the field of wildlife management has evolved and in response to increased public attention to wolverines. Prior to 1978 wolverine were considered a predator and/or a non-game animal and there was no limit on trapping. A Montana Fish and Game Commission "Wolverine Annual Rule" in 1978 (attached) set the trapping limit at one wolverine per person per year. That same rule also shows Montana's decades-old dedication to sound wildlife management using the latest and best information when it says:

> "The Department of Fish and Game participating in investigations on wolverine, a species of nongame wildlife, finds it necessary to promulgate the following rule as provided in Section 26-1804 and 26-1807, in order to develop biological and ecological data to determine management measures necessary for the wolverines' continued ability to sustain themselves successfully."

Harvest regulations continued at one per person per year through 2003. The annual harvest from 1994 to 2003 averaged 11 per year and ranged from 4 to 15 (Montana Fish, Wildlife and Parks 2013a, attached). In 2004 FWP established 3 Wolverine Management Units (WMUs) with harvest quotas in each that totaled 12 combined to better manage the species. The quota was reduced to 10 in 2007. In 2008 four newly-defined WMUs were established for more effective management and the combined harvest was reduced to 5. The new WMUs allowed trapping in three areas of the best wolverine habitat while no trapping was allowed in areas between them. This continued until 2013 when the quota was reduced to zero. There has been no wolverine season in Montana since 2013. As pointed out in our letter of May 6, 2013 (attached), "FWP has been responsive to new science and information about wolverines and has modified regulations in recent years to be even more restrictive so that wolverines are conservatively managed on a landscape scale with a focus on dispersal."

Consideration of this history is important to note because during the entire 20th and the early 21st centuries, which included 78 years of unregulated trapping followed by 25 years of regulations more liberal than the last 9 years when trapping was allowed, wolverines persisted, thrived, and either reoccupied or continued to occupy all areas of suitable habitat in the state. There was no contraction of

wolverine range or elimination of wolverines from occupied habitat during years when there were 10 to 15 wolverines harvested every year in Montana.

As mentioned in our May 6, 2013 letter, incidental take by trapping across North America is insignificant and not a threat to the existence of wolverines. In the three trapping seasons since wolverine trapping was discontinued in Montana in 2013 there have been three animals incidentally trapped, an average of one per year. Overall, the number of wolverines killed or injured incidental to other trapping activities is very low relative to the population and trapping effort.

Habitat Plans and Conservation Efforts

FWP has made great effort toward conserving wildlife habitat, which aids in the conservation of wolverine. Wolverine are categorized as a Species of Greatest Conservation Need in Montana's State Wildlife Action Plan, and this designation has helped direct funding for on-the-ground actions such as fee title acquisitions and conservation easements. Other programs such as the Crucial Areas Planning System (CAPS) have been put in place to help guide future developments that can impact wolverine habitat.

State Planning for Wildlife Conservation – Montana has implemented two broad-reaching efforts that guide large-scale planning to benefit wildlife, including wolverine: the State Wildlife Action Plan (SWAP) and Crucial Areas Planning System (CAPS).

SWAP – A major guiding document for wildlife conservation is Montana's State Wildlife Action Plan (SWAP). The plan is available online at http://fwp.mt.gov/fishAndWildlife/conservationInAction/swap2015Plan.html and attached here (MFWP 2015b). The first Action Plan, called the Comprehensive Fish and Wildlife Conservation Strategy, was approved by the U.S. Fish and Wildlife Service in 2006. It was updated and revised in 2015 and is now officially called the State Wildlife Action Plan. It identifies habitat community types, Focal Areas, and species in Montana that warrant conservation attention. The plan is not meant to be an FWP-only plan, but a plan to guide conservation throughout Montana by any agency, NGO or whoever has an interest in strategic application of conservation actions. It is intended as a plan that guides and facilitates real and measurable conservation on the ground.

The SWAP identifies 128 Species of Greatest Conservation Need (SGCN), including wolverine. In addition to identifying species, their associated habitats are prioritized as Community Types of Greatest Conservation Need (CTGCN). Current impacts, future threats, and conservation actions are identified for these areas and are intended to be implemented across an entire community to get "the biggest bang for the buck." To further pinpoint areas of greatest conservation need, Focal Areas were identified. FWP staff identified these Focal Areas to guide attention to specific geographical areas that are in greatest need of conservation and to help focus conservation efforts in an increasingly inadequate funding environment. To prioritize need and associated actions relative to threats, both the Community Types and the Focal Areas have been put into Tiers, with Tier I being those with the highest priority.

Wolverine and their habitat figure repeatedly in the SWAP. It is listed as a Species of Greatest Conservation Need, and its habitats are identified in seven different Community Types, all Tier I, and in all the Focal Areas, again Tier I, within those Community Types. Montana Fish, Wildlife and Parks identified wolverine and wolverine habitat as a conservation priority in the state's 2005 State Wildlife Action Plans as well as all subsequent plans. To date, the state agency and its partners have invested tens of millions of dollars to permanently protect over 765,117 acres of habitat within wolverine range. These lands are important wildlife habitat that was previously unprotected but are now being managed by FWP with an emphasis on habitat conservation and improvement.

The plan also identifies specific impacts and threats to habitat and outlines a number of associated actions to take to address those threats (see pages 59-64 of the plan). Broad actions that address general threats to all community types fall under the headings of *Collaboration and Outreach, Habitat Protection and Planning and Review*, and under each heading are a number of actions. Specific identified threats include *Habitat Fragmentation, Pollution/contamination of Resources, Land management, Wind Energy, Recreation, Climate Change, Land Use Change*, and *Invasive Species*. Under each identified threat there are a list of examples of how that threat is manifested (e.g., under Habitat Fragmentation there are Housing/subdivision development and Loss of connectivity among others) followed by several actions to take to address those threats.

CAPS – In addition to SWAP, Montana has also developed a Crucial Areas Planning System (CAPS), available online at: http://fwp.mt.gov/fishAndWildlife/conservationInAction/ crucialAreas.html and a summary of the system is attached. In 2008 FWP took the lead in conducting a statewide Crucial Areas Assessment. The Assessment evaluated fish, wildlife and recreational resources in Montana to identify crucial areas and fish and wildlife corridors. The Assessment is part of a larger conservation effort that recognizes the importance of landscape scale management of species and habitats by fish and wildlife agencies. The result, in part, is a Web-based Crucial Areas Planning System (CAPS), an FWP mapping application aimed at future planning for a variety of development and conservation purposes so fish, wildlife, and recreational resources can be considered earlier. The assessment has:

- Created digital GIS-layer maps depicting important species and habitat information.
- Assessed risks to fish, wildlife, and their habitats.
- Created management guidelines and examples for residential development, energy development, and transportation projects.
- Developed partnerships with government, industry, county planners and non- government organizations to develop implementation strategies and facilitate integration of CAPS into their planning processes.

Local, regional, and statewide decision makers, developers, and FWP staff understand that it's important to have easy access to practical tools and information early in the planning process. With this objective in mind, CAPS:

- Provides an easy-to-use and understandable way to help plan for development, conserve land, and protect the character and quality of life of Montana's communities;
- Help developers know up front where to expect greater expense and potential mitigation costs and issues; and
- Help make smarter development choices and pass on to future generations the quality of life Montanans enjoy today.

Land Protection

Montana Fish, Wildlife and Parks has been active in conserving important wildlife habitat, including that of wolverine. To date FWP has protected 765,117 acres within the range of wolverine in western Montana (Table 1, Fig. 3). This includes both fee title properties such as Fishing Access Sites, State Parks, and Wildlife Management Areas, and those protected by conservation easement.

Table 1. Properties and acres conserved by Montana Fish, Wildlife and Parks by fee title or conservation easement within the range of wolverine in Montana.

Fee Title or Conservation Easement Purchase Dates	Properties	
	Number	Acres
Entire project before 2000	270	122,940
Original purchase before 2000 with additions since	47	275,238
Entire project after 2000	108	369,142
Total	425	767,320

Although one might reasonably question the value of Fishing Access Sites and other low elevation habitats to wolverine, it is important to remember that wolverine are not alpine obligates and are known to use habitat at all elevations. Such habitats are essential to dispersing wolverine. A few recent examples illustrate the point. A radio-instrumented wolverine that dispersed from Wyoming to Colorado in 2009 traveled across hundreds of miles of low-elevation sagebrush grasslands and other habitat not typically associated with wolverines (Inman et al. 2009). In August 2011 a wolverine was observed and photographed by FWP biologist Chris Hammond in a cottonwood tree at the Big Creek Campground in the North Fork of the Flathead River, a valley-bottom site at about 3,300 feet elevation (Fig. 4). In March of 2016 a wolverine was seen and photographed in a stubble field west of Havre, more than 125 miles from the Rocky Mountain Front, (Helena Independent Record, March 8, 2016). In September 2016 Chris Fay of Helena, Montana watched a wolverine for several minutes near the mouth of Sheep Creek near the Missouri River about 8 miles southwest of Cascade, elevation about 3,400 feet (John Vore, FWP, Pers. Comm.). As the foregoing illustrates, all habitats within the general range of wolverine is important.

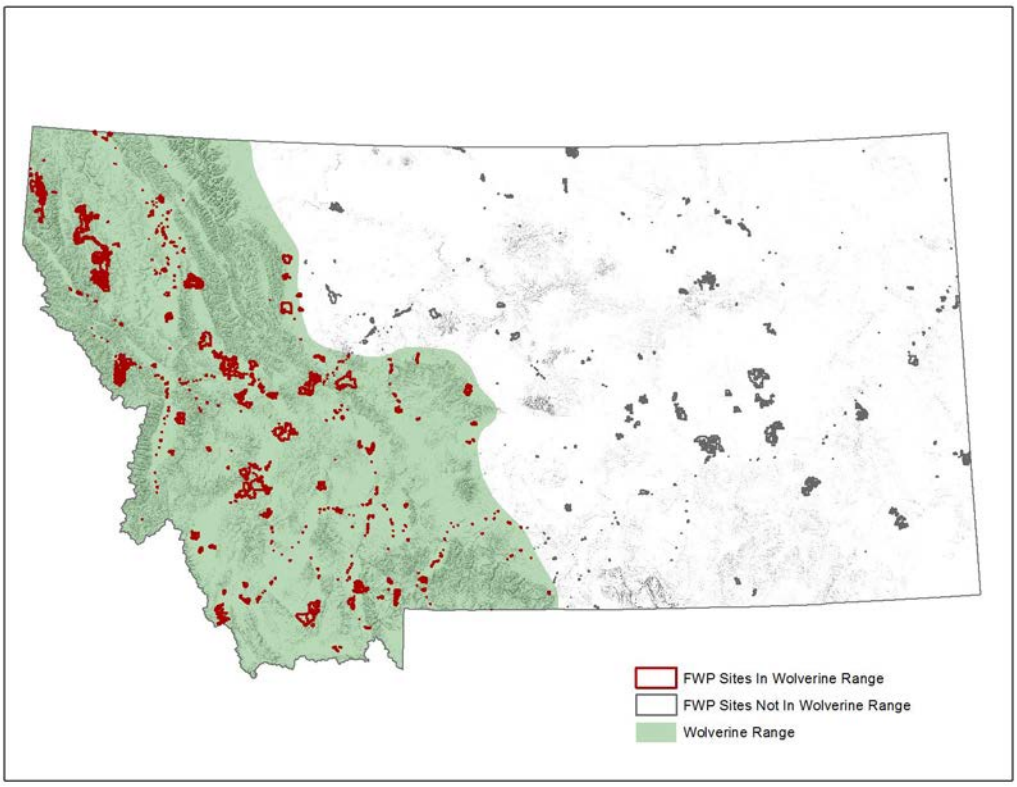


Figure 3. Four hundred twenty five properties totaling 767,320 acres conserved by Montana Fish, Wildlife and Parks by fee title or conservation easement within the range of wolverine in Montana.

Nearly half (369,142 acres or 48% of the total) of the land conserved by FWP has been through projects initiated and completed since 2000 such as the 142,015 acre Thompson/Fisher conservation easement. Additionally, 47 properties that had been conserved prior to 2000 have been supplemented, such as the Beartooth Wildlife Management Area. Originally purchased in 1970 it was enlarged most recently in 2014 by adding 2,840 acres, bringing the total of that property to 35,174 acres.

Habitat conservation is an active and ongoing effort in Montana. New projects are being pursued all the time. Very recent or current projects include Specimen Creek (730 acres), Haskill Basin (3,020 acres), Trumbull Creek (7,150 acres), and Whitefish Watershed (15,334 acres) that will protect an

Figure 4. A wolverine using valley bottom cottonwood habitat in the North Fork of the Flathead River, September 2011. Photo by Chris Hammond, FWP.

additional 26,234 acres of wolverine habitat in Montana.

In addition to FWP, other agencies and organizations are active in habitat conservation through ongoing management or habitat protection through fee title acquisition or conservation easements. Together and often working in concert with each other and FWP, these agencies and organizations have protected hundreds of thousands of acres of habitat within the range of wolverines in Montana. Federal and state agencies include the U. S. Forest Service, the Bureau of Land Management and the Montana Department of Natural Resources. Non-government organizations include, but are not limited to, The Rocky Mountain Elk Foundation, The Nature Conservancy, the Wildlife Conservation Society, and at least nine local land trusts (Table 2).

Table 2. Local organizations actively conserving habitat in western Montana.

Name	Town
Prickly Pear Land Trust	Helena
Gallatin Valley Land Trust	Bozeman
The Trust for Public Land	Bozeman
Flathead Land Trust	Kalispell
Montana Land Reliance	Helena
Five Valleys Land Trust	Missoula
Bitter Root Land Trust	Hamilton
The Conservation Fund	Missoula

FWP, through its planning efforts, policy direction, conservation actions, habitat protection, expenditure of money and staff time, and effective and enforced regulations has demonstrated its dedication to and successful management of the state's wildlife, including wolverine.

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