New Mexico Chapter of The Wildlife Society

Excellence in Wildlife Stewardship Through Science and Education

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To: Field Supervisor, New Mexico Ecological Services Field Office, U.S. Fish and Wildlife Service, 2105 Osuna Dr., N.E., Albuquerque, New Mexico 87113

From: Conservation Affairs Committee, New Mexico Chapter of the Wildlife Society, 9016 Freedom Way, N.E., Albuquerque, New Mexico, 87109 bhanson5@comcast.net

Subject: Review of Draft Mexican Wolf Recovery Plan, First Revision June 2017, U.S. Fish and Wildlife Service

The Conservation Affairs Committee (CAC) appreciate the hard work of biologists within the U.S. Fish and Wildlife Service (Service) and other agencies, Federal, State and Tribal, and private groups that devote their lives to preserving species. There is no doubt that many species would be extinct if the Service did not work to conserve them. This review represents the views of the CAC of the New Mexico Chapter of the Wildlife Society. The New Mexico Chapter has over 100 members. Brian Hanson, CAC Chair, attended the July 20 and 22, 2017 informational meetings in New Mexico concerning the draft Mexican wolf recovery plan (recovery plan).

The approach for the development and execution of the recovery plan for the Mexican wolf (*Canis lupus baileyi*) is sound and we appreciate your presentation of source material that was used to explain your rationale. The draft recovery plan was presented as well as a biological report that included three documents; a biological report, a minimum viability population computer analysis and a habitat analysis. All of those reports can be found at: https://www.fws.gov/southwest/es/mexicanwolf/pdf/20170628_DftMexiWolfRevRecPlan_Public%20Comment.pdf. The modeling of the existing population parameters, such as the minimum viability analysis, should increase the validity of the output. Setting minimum population targets with this data is a first step, but constraining the overall population to specific areas and restricting populations to minimum sizes has its problems, as discussed below.

Endangered species should be part of the ecosystem and we appreciate recovery actions to return the Mexican wolf to the wild. Predators are a vital part of the natural landscape. Many studies have documented adverse effects upon ecosystems that can be caused by removal of predators (attachment 1) and studies conducted after the reintroduction of predators have demonstrated the benefits of predators (attachment 1). We suggest the recovery plan briefly address the ecological benefits of predators.

Our specific comments concerning the draft recovery plan follow.

**Page 9** - The downlisting recovery criteria in the recovery plan (pages 9, 10, 26) is confusing. First, it lists a population target for the U.S. population of 320 wolves or 370 wolves for the population in Mexico. The plan later states 150 wolves in both the U.S. and Mexico would be a sufficient alternative, assuming both populations are demonstrating positive growth. A small population size of 150 is not justified by the computer model. The addition of the words "positive growth" does not add confidence since any growth, even extremely low growth could satisfy this requirement. We suggest criteria for downlisting based on the two populations both containing at least 150 individuals be removed. The actual numbers for recovery criteria could be improved as discussed below.

**Page 9** - The downlisting and delisting criteria (page 9, 10, 26) seems to be low targets, 320 wolves for the U.S. and 170 wolves for Mexico since suitable habitat could support as many as 5,106 wolves between the two recovery areas; 2,708 wolves in the U.S. and 2,398 wolves in Mexico (Martinez-Meyer et al. 2017). A more detailed discussion is found below on page 28 review comments and in the MVP examples.

**Page 23** - The draft plan states "… New Mexico, Arizona and the Mexican government will determine the timing, location and circumstances of releases of wolves into the wild within their respective states …". This statement is risky since the New Mexico Department of Game and Fish (NMDGF) is not actively supporting recovery at the current time. We encourage the Service to work with the NMDGF to gain their support. We are optimistic that given the NMDGF involvement with the recovery planning workshops, they will fully engage with Mexican wolf recovery after the completion of the recovery plan.

**Page 24** - The primary causes of known Mexican wolf mortalities are shootings and vehicle collisions. We suggest the recovery plan address this by suggesting actions that reduce human-caused mortality.

**Page 25** - We support a 4(d) rule that provides appropriate management where ever Mexican wolves are found once the species is downlisted to threatened. This could be very useful in areas inside and outside of the current recovery area.

**Page 27** – In the document a resilient population is defined as "… to be one that is able to maintain approximately a 90% likelihood of persistence over a 100-year period". A commonly accepted definition of a minimum viable population is "a 99% probability of persistence for 40 generations" (Reed et al. 2002). Does your definition encompass this definition? Given that the recovery plan indicates 4.5 years as the generation time for a Mexican wolf, it seems that the definition of resilience could be modified to be at least a 180 year period per Reed et al. 2002.

**Page 28** - The draft plan specifies the primary components of the recovery strategy include expanding the geographic distribution of the Mexican wolf. The addition of a recovery area in Mexico should help. Allowing the expansion of populations into lands with private owners supportive of wolf recovery in the U.S. could also help. Additionally, the population should be allowed to expand outside of the recovery area. Suitable habitat in the U.S. may occur in southern California, northern Arizona, northern New Mexico and west Texas (Leonard et al. 2005, Hendricks et al. 2015, 2016) since those areas historically supported wolves (*Canis lupus sp.*).

**Page 28** - Limiting populations to a goal of 320 in the U.S. and 170 in Mexico results in a total population of 490 wolves. This may not be large enough. Studies elsewhere have set minimum viable populations (MVP) for wolves (*Canis lupus*) at 1,403 adults (Reed et al. 2002). Even this population may be low. When the above MVP was corrected to 40 generations, it resulted in a MVP of 6,332 wolves (Reed et al. 2002). Reed et al. (2002) found that a doubling of study duration increased the estimated MVP by approximately 67%. This effect could mean that the present MVP model numbers may be too low. Applying the 67% to the modeled population goal of 490, results in a total population of 818 (490 x 1.67) wolves or a target in the U.S. of 534 and in Mexico 284. The historic population of the Mexican wolf (*Canis lupus baileyi*) in the recovery area could have been in the thousands (U.S. Fish and Wildlife Service 2017). A detailed discussion of MVPs is explored below.

**Page 28** – Population estimates for Mexican wolves in the recovery area were obtained from recent habitat analysis using several methods proposed by various authors found in Tables 13 and 14 (Martinez-Meyer et al. 2017). Using the home range-based estimate, the Mexican wolf carrying capacity ranged from 184 to 243 wolves in the U.S. and 405 to 953 in Mexico. Therefore, the total population size for both areas ranged from 589 to 1,196 wolves. Using four other estimation techniques, the carrying capacity ranged from 1,343 to 2,708 wolves in the U.S. and 687 to 2,398 wolves in Mexico. The combined total for the U.S. and Mexico recovery areas ranged from 2,030 to 5,106 wolves. Assuming that an MVP of 490 is adequate to prevent extinction does not seem wise when studies of other wolf populations and Mexican wolf populations suggest a higher number.

**Page 28** - If 380 wolves is a target to reduce predation on livestock and wild ungulates and avoid associated erosion of public support for reintroduction, the recovery plan or biological report/population viability analysis should document the science behind how 380 was identified as an upper bound on the U.S. population size. Even if justified by concerns over livestock predation and impacts on societal support for the recovery program, this number should not unilaterally limit the size to which the U.S. population is allowed to grow. Livestock interactions should be dealt with on a case by case basis or by formal agreements and regulations (e.g. page 31 of the recovery plan). Livestock predation should be minimized to reduce the largest cause of Mexican wolf mortalities, shootings.

**Page 33** - Because the population numbers in the downlisting and delisting criteria may be too low, the evaluation of the recovery strategy should also be scrutinized concerning wolf numbers.

**Page 33** - We appreciate the population model was developed using information gathered from the recovery area. Since the recovery criteria are heavily based on that model, we suggest a requirement for an updated model for the 5-year and 10-year status review. To improve the model, we suggest monitoring continue and new data be added to refine the model parameters. By including this requirement, the plan will be flexible enough so that the recovery plan will not have to be revised.

<u>Minimum Viable Population calculation examples</u>
Different studies have proposed MVP for various vertebrates, including wolves. Reed et al. (2002) found minimum population sizes ranging from 2,000 to 5,500 in 6 studies. Reed et al. (2002) calculated a mean MVP of 7,316 individuals for 102 vertebrate species. He recommends "… conservation programs, for wild populations, need to be designed to conserve habitat capable of supporting approximately 7,000 adult vertebrates in order to ensure long-term persistence". Flather et al. (2011) stated that long-term persistence requires greater than or equal to 5,000 adult individuals. Flather et al. (2011) calculated a *Canis lupus* MVP corrected to 40 generations as suggested by Reed et al. (2002). Reed et al. (2002) found that computer runs of short data sets (less than 40 generations) consistently underestimated the MVP. Flather et al. (2011) calculations from at least 4 references, resulted in a range from 248 to 6,332 adult *Canis lupus* wolves. In summary, vertebrate MVPs ranged from 2,000 to 7, 316 individuals and *Canis lupus* MVPs ranged from 248 to 6,332 adults. The previous examples do not specifically address the Mexican Wolf (*Canis lupus baileyi*) but indicate a MVP for wolf species (*Canis lupus*) may require thousands of individuals for a minimum population.

<u>Mexican wolf population targets for recovery</u>
Even though there are many higher population targets as described above, it seems reasonable and prudent to attach more weight to the model that Miller (2017) used since 1) it uses data from the recovery area, 2) it was developed with reliable input from many professionals and 3) the information, the computer model, and expertise is current, year 2017. One concern is the short data set, 18 years (years 1998 through 2015 for modeling). According to the biological report (U.S. Fish and Wildlife Service 2017), the Mexican wolf life span is about 4.5 years (4 to 5 years). To calculate the number of generations the data represents, 18 years divided by 4.5 years, results in 4.0 generations for extant data. Since most MVP calculations suggest modeling

40 generations, we suggest the model output be corrected based on Reed et al. (2002). Reed et al. (2002) found that when field survey duration doubled, MVPs increased by 67%. Therefore, we recommend the predicted MVPs be increased from 490 total individuals, to a total population of 818 (490 x 1.67) wolves. This would translate to a target in the U.S. of 534 and in Mexico 284.

Although genetic diversity can be improved in the wild population by introduction of captive wolves, connecting recovery areas by ensuing wolf travel corridors would contribute to long term recovery. In addition to genetic benefits, learned behavior in one area could benefit the population in other areas. This is needed between the 2 populations (U.S. and Mexico) and within each population area. If barriers to movement can not be removed at specific sites, the Service should consider physically moving wild individuals across barriers. Ultimate recovery should allow the entire wild population to occupy suitable habitat where ever it is found in the subspecies' historic range and other suitable habitat areas.

The draft recovery plan relies heavily upon a MVP computer model. Should recovery be based upon the minimum viable population? Should population targets be based on minimum populations to prevent extinction? If these targets are correct, then Mexican wolves will still be subject to future extinction since we are keeping their numbers close to the minimum necessary. The Service should ensure that populations are well above the minimum and strive to let a wild population establish itself.

Thank you for your recovery actions for the Mexican wolf.

Brian Hanson

Brian Hanson
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Attachment 1 – Ecological Value of Predators

A paragraph in a letter to the New Mexico Department of Game and Fish from the New Mexico Chapter of the Wildlife Society, November 21, 2015.

The presence of predators, such as the Mexican wolf, is an integral part of the ecosystem. Predators are essential to natural ecosystems (Ripple *et al.* 2001; and Jedrzejewski *et al.* 2002). Recent research shows extensive cascading effects of the disappearance of large apex consumers (Estes *et al.* 2011; Jedrzejewski *et al.* 2002). Loss of apex consumers can impact processes such as biogeochemical cycles, invasion by exotic species, carbon sequestration, and the dynamics of disease (Estes *et al.* 2011). A study of five National Parks in western United States concluded that the absence of predators resulted in major impacts to woody plant communities as a result of increased ungulate populations (Beschta and Ripple 2009). When predation is removed in the natural environment, herbivore populations increase, diseases may increase and biodiversity may be diminished (Berger 1999). In the Greater Yellowstone Ecosystem, lack of predators resulted in the alteration of riparian structure and density and the reduction of avian neotropical migrants in willow communities (Berger *et al.* 2001). When wolves were reintroduced into Yellowstone National Park, aspens, willow and cottonwood browse species began recovery (Beschta and Ripple 2009). Both in Yellowstone National Park and the upper Gallatin Range of southwestern Montana, willow (Ripple and Beschta 2004) and aspen (Ripple and Beschta 2007) are recovering following the reintroduction of wolves. In one study in Banff National Park in Canada, beaver and birds benefited from improvements in local vegetation that resulted from predator activity of wolves that recolonized the park in 1986 (Hebblewhite *et al.* 2005). Ripple and Beschta (2004) state "…wolf recovery may represent a management option for helping to restore riparian plant communities and conserve biodiversity."

**References**

Berger, J., P. Stacy, L. Bellis and M. Johnson. 2001. A mammalian predator-prey imbalance: grizzly bear and wolf extinction affect avian neotropical migrants. Ecological Applications 11(4): 947-960.

Berger, J. 1999. Anthropogenic extinction of top carnivores and interspecific animal behavior: implications of the rapid decoupling of a web involving wolves, bears, moose and ravens. Proceedings of the Royal Society of London 266: 2261-2267.

Beschta, R. and W. Ripple. 2009. Large predators and trophic cascades in terrestrial ecosystems of the western United States. Biological Conservation, 142: 2401-2414. www.elsevier.com/locate/biocon.

Estes, J., J. Terborgh, J. Brashares, M. Power, J. Berger, W. Bond, S. Carpenter, T. Essington, R. Holt, J. Jackson, R. Marquis, L. Oksanen, T.Oksanen, R. Paine, E.Pikitch, W.Ripple, S. Sandin, M. Scheffer, T. Schoener, J. Shurin, A. Sinclair, M. Soulé, R. Virtanen, and D. Wardle. July 2011. Trophic downgrading of planet earth. Science vol. 333; 301-306. www.sciencemag.org.

Flather, C. and G. Hayward, S Beissinger and P. Stephens. June 2011. Minimum viable populations: is there a "magic number" for conservation practices? U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, Colo. Trends in Ecology and Evolution, June 2011, vol. 26, No. 6, pages 307-316. 19 pp.

Hebblewhite, M., C. White, C. Nietvelt, J. Mckenzie, T. Hurd, J. Fryxell, S. Bayley, and P. Paquet. 2005. Human activity mediates a trophic cascade caused by wolves. Ecology 86(8) 2135-2144. http://scholarworks.umt.edu/biosci_pubs/288.

Hendricks, S. A., P. Charruau, J. P. Pollinger, R. Callas, P. Figura, and R. K. Wayne. 2015. Polyphyletic ancestry of historic gray wolves inhabiting U.S. Pacific states. Conservation Genetics 16:759–764.

Hendricks, S. A., P. R. Sesink Clee, R. J. Harrigan, J. P. Pollinger, A. H. Freedman, R. Callas, P. J. Figurae, and R. K. Wayne. 2016. Re-defining historical geographic range in species with sparse records: Implications for the Mexican wolf reintroduction program. Biological Conservation 194:48–57.

Jedrzejewski, W., K. Schmidf, J. Theuerkauf, B. Jedrzejewski, N. Selva, K. Sub, and L. Szymura. 2002. Kill rates and predation by wolves on ungulate populations in Bialowieza primeval forest (Poland). Ecology 83:1341-1356.

Leonard, J. A., C. Vilá , and R. K. Wayne. 2005. Legacy lost: genetic variability and population size of extirpated US grey wolves (Canis lupus). Molecular Ecology 14:9-17.

Martínez-Meyer, E. González-Bernal, J. Velasco, T. Swetnam, Z. González-Saucedo, J. Servín, C. González, N. Díaz, C. Miguel, C. García and J. Oakleaf. April 2017. Mexican wolf habitat suitability analysis in historical range in the Southwestern US and Mexico. 80 pages. Report available from the U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, N.M. https://www.fws.gov/southwest/es/mexicanwolf/pdf/20170628_DftMexiWolfRevRecPlan_Public%20Comment.pdf.

Miller, P. June 2017. Population viability analysis for the Mexican wolf (*Canis lupus baileyi*) Integrating wild and captive populations in a metapopulation risk assessment model for recovery planning. IUCN SSC Conservation Breeding Specialist Group. Prepared for the U.S. Fish and Wildlife Service, New Mexico Ecological Services – Albuquerque, NM. 68 pp. https://www.fws.gov/southwest/es/mexicanwolf/pdf/20170628_DftMexiWolfRevRecPlan_Public%20Comment.pdf.

Reed, D., J. O'Grady, B. Brook, J. Ballou, and R. Frankham. November 2002. Estimates of minimum viable population sizes for vertebrates and factors influencing those estimates. Biological Conservation 113 (2003) 23 – 34. 12 pp.

Ripple, W. and R. Beschta. 2007. Restoring Yellowstone's aspens with wolves. Biological Conservation 138: 514-519. www.elsevier.com/locate/biocon.

Ripple, W. and R. Beschta. 2004. Wolves, elk, willow and trophic cascades in the upper Gallatin Range of Southwestern Montana USA. Forest Ecology and Management 200: 161-181. www.elsevier.com/locate/foreco.

Ripple, W., E. Larsen, R. Rankin, and D. Smith. 2001. Trophic cascades among wolves, elk and aspen on Yellowstone National Park's northern range. Biological Conservation 102: 227-234.

U.S. Fish and Wildlife Service. June 2017. Draft Biological Report for the Mexican wolf (*Canis lupus baileyi*). Southwest Region, Albuquerque, New Mexico. 68 pp. https://www.fws.gov/southwest/es/mexicanwolf/pdf/20170628_DftMexiWolfRevRecPlan_Public%20Comment.pdf.