

April 24, 2023

Craig Hansen
Regional Recovery Coordinator - Mountain-Prairie Region
U.S. Fish and Wildlife Service

Dear Mr. Hansen,

Thank you for the opportunity to participate as a scientific peer reviewer of the U.S. Fish and Wildlife Service's (Service's) proposed rule to establish a nonessential experimental population (NEP) of the gray wolf (*Canis lupus*) in the State of Colorado, under section 10(j) of the Endangered Species Act of 1973, as amended (Docket No. FWS-R6-ES-2022-0100).

In reviewing the document, I considered the following questions:

1. Is the description and analysis of the biology, habitat, population trends, conservation status, and historical and current distribution of the species accurate?
2. Are there any significant oversights, omissions, or inconsistencies?
3. Are the conclusions we reach logical and supported by the evidence we provide?
4. Did we include all the necessary and pertinent literature to support our assumptions, arguments, and conclusions?
5. Are there additional considerations regarding the geographic boundary of the NEP, the adequacy of the proposed regulations for the NEP, or additional management that may be needed to address expanding gray wolf populations?

Minor comments:

- I did not note any significant concerns with the accuracy of the description and analysis of the biology, habitat, population trends, conservation status, and historical and current distribution of the species.
- Given that this proposed rule contemplates and discusses donor populations from the Pacific Northwest, it may be worth updating Figure 2 with the most recent information available to reflect expansion of wolf packs in Washington and Oregon (ODFW 2023, WDFW et al. 2023).
- The proposed rule states, “While there are no Federal recovery plans addressing wolf recovery in western States outside Idaho, Montana, and Wyoming, the States of California, Colorado, Oregon, Washington, and Utah have demonstrated a commitment to wolf conservation by developing management plans or codifying laws and regulations to protect wolves...” (pg. 10263).
 - I have concerns about including Utah in this list. The Utah Division of Wildlife Resources states, “In 2010, the Utah Legislature directed the Utah Division of

Wildlife Resources (DWR) to prevent any packs of wolves from establishing within the delisted portion of Utah (S.B. 36, Wolf Management Act). The law also directed the DWR to request that the U.S. Fish and Wildlife Service immediately remove any wolves discovered in areas of Utah where they are still listed under the Endangered Species Act” (from <https://wildlife.utah.gov/wolves>).

- Although Utah DWR has a statewide wolf management plan, prevention of establishment in the delisted portion of Utah and requests for immediate removal of endangered wolves elsewhere in the state cannot be defined as a commitment to wolf conservation, particularly in comparison with the other states listed above. I suggest removing Utah from that statement.
- The proposed rule states, “We have also requested input on whether to allow lethal management of gray wolves that are having a significant impact to ungulate populations. If allowed for the purpose of ungulate management, authorization for removal of wolves would require a science-based determination that an unacceptable impact to a wild ungulate herd has occurred and that removal of gray wolves would not impede wolf conservation” (pg. 10270).
 - I suggest defining specifically what would be considered a “significant impact” to ungulate populations and not using the term “unacceptable” impact. “Unacceptable” is value-based and subjective—a more objective, specific metric or term would be more appropriate. If using the word “unacceptable,” specify to what or whom an impact (as specifically defined) is unacceptable.
- The proposed rule defines “problem wolves” as “wolves that we or our designated agents confirm to have attacked any other domestic animals twice within a calendar year are considered problem wolves for purposes of agency wolf control actions” (pg. 10271).
 - I suggest using a more objective term such as “depredating wolves” or “wolves implicated in livestock depredation.”
 - Depredating twice within a calendar year does not indicate any specific or biologically-based pattern of depredation that wolf control would likely be effective in mitigating. I suggest consideration of other depredation pattern and wolf control strategies that have led to low levels of livestock depredation and wolf removals in other states (see WDFW wolf-livestock interaction protocol, available at https://wdfw.wa.gov/sites/default/files/2020-09/20200915_wdfw_wolf_livestock_interaction_protocol.pdf.)
- Table 1 on pg. 10271 has two provisions for taking wolves “in the act of attacking” livestock as well as two on “additional taking” (pg. 10272). None of those provisions address “evidence of unusual attractants or artificial or intentional feeding” but it is important to address wolf attractants/feeding in these provisions as well for clarity, not only in the agency take provision.

- In the “Agency take” provision in Table 1 (pg. 10272), the Service may wish to add the additional consideration of what proactive, nonlethal deterrents were implemented (in addition to “evidence that animal husbandry practices recommended in approved allotment plans and annual operating plans were followed”).

Major comments:

Overall, the proposed rule provides the necessary framework to establish a nonessential experimental population of wolves in Colorado and adequately addresses many important considerations. However, the proposed rule does not adequately address interchange between wolves in the NEP area and Mexican gray wolves (*Canis lupus baileyi*), nor does it propose any management strategies that consider both expanding populations and the likelihood of connectivity/interaction between them.

The section of the proposed rule “*Other Considerations*” (pg. 10273) considers that gray wolves in Colorado may disperse far enough south to encounter Mexican wolves but does not consider the opposite scenario—that Mexican wolves may disperse northward and encounter gray wolves in the NEP area. This scenario is highly likely and should be anticipated. Although the NEP area and the Mexican Wolf Experimental Population Area (MWEPA) are separate and have discrete boundaries, these two population areas are well within documented dispersal distances for wolves (Jimenez et al. 2017). Odell et al. 2018 list examples of extensive dispersal movements of wolves from the Northern Rocky Mountains (NRM) population to Arizona and New Mexico and note “potential for Mexican wolves to move from extra-limital recovery areas northward through well connected habitat into areas occupied by Northwestern gray wolves. Mexican wolves from the current Arizona-New Mexico population have dispersed distances in excess of 250 km” (Odell et al. 2018, pg. 294). Given the high likelihood that these two wolf populations will exchange dispersers and eventually expand into the habitat between them, the proposed rule should consider the following ideas:

The section of the proposed rule “*Means To Identify the Experimental Population*” (pg. 10269) states that “any wolf within the State of Colorado will be considered part of the NEP regardless of its origin.” Does that include Mexican gray wolves? The proposed rule should answer that question.

This section also states, “...the small numbers of individuals likely to occupy the NEP following the release and the sizable distances between populations makes any potential interaction between individuals or a merging of populations highly unlikely” and “...gray wolves reintroduced into Colorado will be wholly geographically separate from the delisted portion of the NRM population as well as the remainder of the currently listed 44-State entity” (pg. 10269). These statements do not reflect the exceptional ability and propensity of wolves to disperse and expand into unoccupied suitable habitat, as demonstrated by the relatively rapid recovery of wolves in the NRM, Western Great Lakes, and Pacific Northwest (Wydeven et al. 2009, USFWS 2016, ODFW et al. 2023, WDFW et al. 2023). Initially, wolves reintroduced into Colorado may be wholly geographically separate from other wolf populations, but that could change with a few dispersal events. Over time, interaction between individuals and merging of populations should be considered as a true possibility.

The section of the proposed rule “*Other Considerations*” (pg. 10273) states that “if contact were to occur [between gray wolves reintroduced to Colorado and Mexican wolves], interbreeding could be a concern for the Mexican wolf, depending on its state of recovery at the time. If gray wolves come to occupy Mexican wolf recovery areas, these physically larger wolves are likely to dominate smaller Mexican wolves and quickly occupy breeding positions, as will their hybrid offspring.”

As stated above, dispersal of individual wolves between these two populations as both expand is likely given wolf biology and should be anticipated. Although Odell et al. 2018 state concerns about genetic interchange between Mexican wolves and northerly gray wolves, other scientists believe that genetic admixture may benefit highly inbred populations such as Mexican wolves (Whiteley et al. 2015, Wayne and Shaffer 2016, Hedrick et al. 2018, Hendricks et al. 2019) and that “delineation of exact geographic boundaries presents challenges. Rather than sharp lines separating taxa, boundaries should generally be thought of as intergrade zones of variable width. These “fuzzy” boundaries are a consequence of lineages of wolves that evolved elsewhere coming into contact with each other. Historical or modern boundaries should also not be viewed as static or frozen in any particular time” (Chambers et al. 2012).

Furthermore, it is well-established that gene flow through hybridization followed by introgression has been fundamental in evolutionary history of all North American *Canis* populations (Heppenheimer et al. 2020; vonHoldt et al. 2011, 2018). The taxonomy and evolutionary history of wolves in North America are complex and controversial, with the number of subspecies described expanding and contracting since the early 1900s (Brewster and Fritts 1995). As many as 24 subspecies were described historically (Young and Goldman 1944; Hall and Kelson 1952, 1959), ranging to the more widely accepted number of five North American subspecies (Nowak 1983, 1995). However, some scientists have questioned whether subspecies lines should be drawn within the gray wolf species at all, given that isolation of wolf populations was largely driven by Pleistocene glaciation and human influence; levels of dispersal, gene flow, and intergradation of wolf populations are high without these barriers (Nowak 1983, Brewster and Fritts 1995). All wolves in western North America are widely recognized as a single species, but “the science pertaining to gray wolf subspecies designations, unique evolutionary lineages, ecotypes, and admixture of formerly isolated populations continues to develop and remains unresolved” (USFWS 2019).

Brewster and Fritts (1995) suggest that local extinctions and subsequent recolonizations in an area by the nearest wolf population (even if considered a different subspecies or ecotype) were relatively common events in the evolutionary history of the species, documented multiple times in recent history particularly in island and peninsula populations. Historical glaciation and human-related extirpation (neither being present-day barriers for wolves) were major influences on isolation of wolves leading to differences in populations and subspecies, and areas being recolonized by or repopulated with the nearest wolf population has occurred both naturally and through human influence (Brewster and Fritts 1995). The propensity for dispersal and admixture, behavioral and adaptive plasticity of the species, and high levels of intergradation in populations and subspecies make certain political divisions of wolf populations questionable in the long-term. The proposed rule should consider and address the extensive literature available that

discusses the history and potential benefits of genetic interchange and admixture of wolf populations, not solely the possibility of genetic swamping noted by Odell et al. 2018.

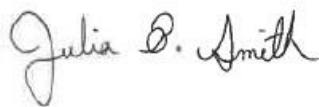
It is well-established that Mexican gray wolves are a genetically unique subspecies locally adapted to a particular habitat (Taron et al. 2021) and should be recognized and managed as such in the short-term. However, Odell et al. 2018 not only acknowledge historical intergradation between wolf subspecies but also indicate the intergradation zone falls within the MWEPA: “However, extensive skull measurements and documentation of phenotypic differences by those having experience with historical populations of wild southwestern wolves clearly place the zone of intergradation between the Mexican wolf and a larger Plains wolf (*Canis lupus nubilus*) in central Arizona and New Mexico...” (pg. 295-296).

In the long-term, the Service should consider the future of connectivity among different listed gray wolf entities in the western United States with the understanding of gene flow and population connectivity that occurred historically among wolf populations and subspecies across the western United States (recognizing that some wolf subspecies and ecotypes, including the Mexican wolf, are locally adapted) and plan for a future where that connectivity and interchange is allowed to occur naturally. Interchange among wolves in the NRM, the Pacific Northwest, and Canada has resulted in robust, genetically diverse wolf populations. The Service may wish to consider the opportunity of wolf restoration in Colorado as a potential link in connectivity between wolf populations, subspecies, and listed entities rather than create artificial boundaries and barriers to dispersal (that involve costly, intensive, and invasive management) that may prolong and possibly hinder long-term recovery of both wolves in the NEP area and MWEPA. At the very least, the proposed rule should consider that interchange of dispersing wolves from both populations is likely to occur (given that the boundaries of the NEP area and MWEPA are <150 miles apart in some places).

The Service may wish to reconsider their statement that “hybrid population(s) thus derived will not contribute towards recovery because they will significantly threaten integrity of the listed entity” (pg. 10273) in the context of the information provided above (in particular, see vonHoldt et al. 2018), recognizing that all gray wolves (*Canis lupus*) in western North America (whether originating in the NRM, the NEP area, or the MWEPA) are widely recognized as one species (USFWS 2019). Short-term genetic and management considerations should not preclude long-term conservation opportunities.

Thank you again for the opportunity to participate in the Service’s rule making process as a scientific peer reviewer.

Respectfully,

A handwritten signature in cursive script that reads "Julia B. Smith". The ink is dark and the signature is fluid, with the first and last names being more prominent than the middle initial.

Julia B. Smith
Wolf Policy Lead
Washington Department of Fish and Wildlife

References cited

- Brewster, W. G., and S. H. Fritts. 1995. Taxonomy and genetics of the gray wolf in western North America: a review. Pages 353–373 *in* L. N. Carbyn, S. H. Fritts, and D. R. Seip. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, University of Alberta, Edmonton, Alberta.
- Chambers, S. M., S. R. Fain, B. Fazio, and M. Amaral. 2012. An account of the taxonomy of North American wolves from morphological and genetic analyses. *North American Fauna* 77:1–67.
- Hall, E. R., and K. R. Kelson. 1952. Comments on the taxonomy and geographic distribution of some North American marsupials, insectivores, and carnivores. *Univ. Kansas Publ. Mus. Nat. Hist.* 5:319–341.
- Hall, E. R., and K. R. Kelson. 1959. The mammals of North America. Vol. 2. The Ronald Press, New York, N. Y. 536 pp.
- Hedrick, P., R. Wayne, and R. Fredrickson. 2018. Genetic rescue, not genetic swamping, is important for Mexican wolves. *Biological Conservation* 224:366–367.
- Hendricks, S. A., R. M. Schweizer, and R. K. Wayne. 2019. Conservation genomics illuminates the adaptive uniqueness of North American gray wolves. *Conservation Genetics* 20:29–43.
- Heppenheimer, E., K. E. Brzeski, J. W. Hinton, M. J. Chamberlain, J. Robinson, R. K. Wayne, and B. M. vonHoldt. 2020. A genome-wide perspective on the persistence of Red Wolf ancestry in Southeastern Canids. *Journal of Heredity* 111:277–286.
- Jimenez, M. D., E. E. Bangs, D. K. Boyd, D. W. Smith, S. A. Becker, D. E. Ausband, S. P. Woodruff, E. H. Bradley, J. Holyan, and K. Laudon. 2017. Wolf dispersal in the Rocky Mountains, Western United States: 1993–2008. *The Journal of Wildlife Management*, 81(4): 581–592.
- Nowak, R. M. 1983. A perspective on the taxonomy of wolves in North America. Pages 10–19 *in* L. N. Carbyn, ed. *Wolves in Canada and Alaska: their status, biology, and management*. Can. Wildl. Serv. Rep. Ser., No. 45.
- Nowak, R. M. 1995. Another look at wolf taxonomy. Pages 375–398 *in* L. N. Carbyn, S. H. Fritts, and D. R. Seip. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, University of Alberta, Edmonton, Alberta.
- Odell, E. A., J. R. Heffelfinger, S. S. Rosenstock, C. J. Bishop, S. Liley, A. González-Bernal, J. A. Velasco, and E. Martínez-Meyer. 2018. Perils of recovering the Mexican wolf outside of its historical range. *Biological Conservation* 220:290–298.

- ODFW (Oregon Department of Fish and Wildlife). 2023. Oregon Wolf Conservation and Management 2022 Annual Report. Oregon Department of Fish and Wildlife, 4034 Fairview Industrial Drive SE. Salem, OR, 97302.
- Taron, U. H., I. Salado, M. Escobar-Rodríguez, M. V. Westbury, S. Butschkau, J. L. A. Paijmans, B. M. vonHoldt, M. Hofreiter, and J. A. Leonard. 2021. A sliver of the past: The decimation of the genetic diversity of the Mexican wolf. *Molecular Ecology* 30:6340-6354.
- USFWS (U.S. Fish and Wildlife Service), Idaho Department of Fish and Game, Montana Fish, Wildlife & Parks, Wyoming Game and Fish Department, Nez Perce Tribe, National Park Service, Blackfeet Nation, Confederated Salish and Kootenai Tribes, Wind River Tribes, Confederated Colville Tribes, Spokane Tribe of Indians, Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Utah Department of Natural Resources, and USDA Wildlife Services. 2016. Northern Rocky Mountain wolf recovery program 2015 interagency annual report. M. D. Jimenez and S. A. Becker (eds.). U.S. Fish and Wildlife Service, Ecological Services, Helena, Montana.
- USFWS (U.S. Fish and Wildlife Service.) 2019. Endangered and threatened wildlife and plants; removing the gray wolf (*Canis lupus*) from the list of endangered and threatened wildlife. *Federal Register* 84(51):9648–9687.
- vonHoldt, B. M., J. P. Pollinger, D. A. Earl, J. C. Knowles, A. R. Boyko, H. Parker, E. Geffen, M. Pilot, W. Jedrzejewski, B. Jedrzejewska, V. Sidorovich, C. Greco, E. Randi, M. Musiani, R. Kays, C. D. Bustamante, E. A. Ostrander, J. Novembre, and R. K. Wayne. 2011. A genome-wide perspective on the evolutionary history of enigmatic wolf-like canids. *Genome Research* 21:1294–1305.
- vonHoldt, B. M., K. E. Brzeski, D. S. Wilcove, D. S., and L. Y. Rutledge. 2018. Redefining the role of admixture and genomics in species conservation. *Conservation Letters* 11:e12371.
- Wayne, R. K., and H. B. Shaffer. 2016. Hybridization and endangered species protection in the molecular era. *Molecular Ecology* 25:2680-2689.
- WDFW (Washington Department of Fish and Wildlife), Confederated Tribes of the Colville Reservation, Spokane Tribe of Indians, Yakama Nation, Swinomish Tribe, and U.S. Fish and Wildlife Service. 2023. Washington Gray Wolf Conservation and Management 2022 Annual Report. Washington Department of Fish and Wildlife, Ellensburg, WA, USA.
- Whiteley, A. R., S. W. Fitzpatrick, W. C. Funk, and D. A. Tallmon. 2015. Genetic rescue to the rescue. *Trends in Ecology & Evolution* 30:42-49.
- Wydeven, A. P., J. E. Wiedenhoef, R. N. Schultz, R. P. Thiel, R. L. Jurewicz, B. E. Kohn, and T. R. Van Deelen. 2009. History, population growth, and management of wolves in Wisconsin. Pages 87-105 in A. P. Wydeven, T. R. Van Deelen, and E. J. Heske, editors. *Recovery of gray wolves in the Great Lakes region of the United States: an endangered species success story*. Springer, New York, New York.

Young, S. P., and E. A. Goldman. 1944. The wolves of North America (part II). Dover Publications, Inc.: New York.