

December 19, 2014

Attn: FWS–R2–ES–2013–0056

Division of Policy and Directives Management;

U.S. Fish and Wildlife Service Headquarters,

MS: BPHC, 5275

Leesburg Pike, Falls Church, VA 22041-3803

Submitted electronically via [www.regulations.gov](http://www.regulations.gov)

Re: Comments concerning Draft Record of Decision and Final Environmental Impact Statement for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (*Canis lupus baileyi*)

We write as scientists involved in research pertaining to the Mexican wolf (*Canis lupus baileyi*), and as authors of two peer-reviewed papers<sup>1,2</sup> which are cited extensively in the Final EIS<sup>3</sup> and used as support of statements contained in the draft ROD<sup>4</sup>. Several of us have also been members of or otherwise involved in recovery teams convened by the US Fish and Wildlife Service for Mexican wolf recovery planning. We are concerned that several of these citations misstate, misinterpret or provide incorrect context for the results and implications of our studies. Most of these problematic statements were not present in the draft EIS, but occur for the first time in the final EIS. Therefore this is the first opportunity we have to correct the record. We acknowledge the dedication and hard work of Service staff in furthering recovery of the Mexican wolf, and hope that the information provided below will assist the Service in using results of our work to inform recovery of the Mexican wolf.

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<sup>1</sup> Carroll, C., R. J. Fredrickson, and R. C. Lacy. 2014. Developing Metapopulation Connectivity Criteria from Genetic and Habitat Data to Recover the Endangered Mexican Wolf. *Conservation Biology* 28:76-86.

<sup>2</sup> Wayne, R., and P. Hedrick. 2011. Genetics and wolf conservation in the American West: lessons and challenges. *Heredity* 107:16–19.

<sup>3</sup> Final Environmental Impact Statement for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (*Canis lupus baileyi*). USFWS, Albuquerque, NM. November, 2014.

<sup>4</sup> Draft Record of Decision, Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (*Canis lupus baileyi*). 75 Federal Register 70154.

The problematic representations of our published research present in the final EIS can be grouped into the following two major areas:

#### A. Relationship between Population Size and Viability

On page 60 of the Final EIS<sup>5</sup> information is presented summarizing conclusions published in Carroll et al. (2014)<sup>6</sup> regarding the relationship between the size of the wild Mexican wolf population and extinction risk. We found the following problems with the presentation of our results:

1) Carroll et al. (2014) reports results predicting **extinction risk for a population when it is present within a metapopulation of three connected populations**. The EIS text in several places presents results without this context, potentially leading the reader to assume they represent extinction risk for a single isolated population. We suggest that this context be retained by emphasizing more frequently that the predicted extinction risk occurs only if each population is present within a larger metapopulation.

Carroll et al. (2014)'s results for three populations connected with a very low dispersal rate **can** be used to evaluate the extinction risk that might be faced by a single isolated population. For example, Figure 1a in Carroll et al. (2014) suggests that an isolated population of ~225 wolves would experience ~5% extinction risk given a baseline adult mortality rate of 22.9%. However, this interpretation should be placed in context of two factors: a) the higher extinction risk shown by the Blue Range population versus the other two populations in our simulations (point 2 below), and b) the relatively optimistic assumptions concerning adult mortality rate contained in our simulations (point 3 below).

2) Carroll et al. (2014) reports results summarizing the **average extinction risk** for the three interconnected populations. One of these populations was founded based on the pedigree of the current wild population inhabiting the Blue Range. The remaining two of the three populations were assumed to have been founded using more genetically diverse and less related groups of

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<sup>5</sup> Page 60 of the pdf, corresponding to Chapter 1, p. 20.

<sup>6</sup> Carroll, Fredrickson, and Lacy, op. cit.

animals than are currently present in the Blue Range population. The extinction risk of the new populations was significantly lower than that predicted for the Blue Range population, because of their more diverse genetic composition and lower within-population relatedness. Therefore the average extinction risk presented in the EIS underestimates extinction risk to the Blue Range population. We suggest that this context be highlighted when our results concerning average extinction risk are presented in the EIS.

3) As shown in Carroll et al. (2014) Figure 3, the extinction rate shown by a population is highly dependent on assumptions regarding adult mortality rate. Our baseline simulations made a key assumption that annual adult mortality rate could in the future be reduced to a relatively low level (22.9%), which is below that experienced by the Blue Range population during most of its history. In simulations that assumed mortality rates would remain greater than 22.9%, extinction risk was substantially higher and larger population sizes were necessary to achieve an extinction risk of 5% or less.

4) The presentation in the EIS of our results concerning quasi-extinction rates (the likelihood that a population will drop below a certain size) is somewhat misleading. We suggest that the text on p. 60 that reads "Population sizes of 300 to 325 achieved closer to a 10 percent probability of quasi-extinction regardless of the number of effective migrants per generation" would more accurately read "Population sizes of 300 to 325, when present within a metapopulation, achieved closer to a 10 percent probability of quasi-extinction when the number of effective migrants was at or above 0.5 per generation". This change clarifies that Carroll et al. (2014) Figure 2 shows results from simulations for a relatively well-connected metapopulation of three populations, not an isolated population.

#### B. Relationship between Effective Migration Rate and Viability

On p. 62 (see also p. 239) of the Final EIS, the text states "Based on the best available information in current literature (Carroll et al. 2014, Wayne and Hedrick 2010), we need to integrate two effective migrants into the population each generation while the population is around 100-250 animals. This number could decrease to one effective migrant per generation at population sizes greater than 250."

We found the presentation of our results problematic in that the EIS is here describing results of our simulations that estimated a rate of effective migration that would ensure acceptably low long-term erosion of genetic health in a recovered metapopulation of three populations. However, this does not represent an optimal rate in the short-term for releases from the captive population into the wild Blue Range population to alleviate genetic threats to that population. As described in point 3 above, the current wild population has lower genetic diversity and higher within-population relatedness than 2 of the 3 populations modeled in our simulations. Our simulations suggest that ~2 effective migrants per generation may be enough to maintain the existing level of heterozygosity in the Blue Range population if adult mortality rate is low (~22-23%). However, given the current depauperate genetic composition and the high relatedness of the Blue Range population, in order for this population to contribute to recovery it is necessary to not only forestall further genetic degradation but also reduce the high relatedness of the Blue Range population and increase its levels of genetic variation. The success of this effort depends on it being initiated while the population is still small, when each newly released individual has a greater genetic effect on the recipient population. Releases from the captive population at a rate equivalent to 2 effective migrants per generation would therefore be inadequate to address current genetic threats to the Blue Range population. Additionally, given the practical long-term challenges of maintaining the genetic diversity of the captive population, a strategy based on releases from captivity into a single wild population may be expected to have greater risks than the scenario we modeled, which assumed effective dispersal within a metapopulation composed of three wild populations.

### Conclusion

Our fundamental concern is that the EIS gives an overly optimistic depiction of the long-term viability of the Blue Range population in isolation, even at the sizes contemplated in the EIS (several hundred individuals). We did perform additional simulations of such a scenario and found that an isolated population originating from wolves with the genetic composition of the current Blue Range population showed relatively high extinction rate, long term decline in population size in those populations that did not go extinct, as well as a decline in mean

heterozygosity and other metrics of genetic viability. For this reason, we concluded in Carroll et al. (2014) that “viability of the existing wild population is uncertain unless additional populations can be created and linked by dispersal of  $>0.5$  migrants/generation.”

The Final EIS and ROD are intended by the Service to provide interim guidance for management of the wild Mexican wolf population until a recovery plan can be completed.

It could be claimed that no direct relationship is necessary between short-term management actions proposed in the EIS and ROD and the conditions (population size, number, and connectivity) that would be sufficient for long-term recovery. However, we feel it is necessary to correct the record because 1) misrepresentations of our results contained in the EIS, if left uncorrected, could be referenced by and influence future recovery planning, and 2) our results suggest that actions proposed in the EIS (such as limiting dispersal beyond the Mexican Wolf experimental Population Area [MWEPA]) could have deleterious effects in the near term on the genetic viability of the subspecies, and 3) improving the viability of the Blue Range population by addressing its currently poor genetic composition will be much more difficult and less likely to succeed if the Service waits until the population has reached a much larger size. We hope that these corrections assist you in using results of our work in informing recovery of the Mexican wolf.

Respectfully,

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