October 11, 2016

Cynthia K. Dohner
Regional Director, Southeast Region
US Fish and Wildlife Service
1875 Century Boulevard
Atlanta, Georgia 30345

Dear Director Dohner,

As the scientific team conducting the population viability analysis (PVA) of the future status of red wolves, we were pleased at USFWS' desire to use the best available science to inform decision-making. Unfortunately, the September 12th decision on the future of the Red Wolf Recovery Program included many alarming misinterpretations of the PVA as justification for the final decision. As such, we[1] felt strongly that we should clarify the scientific information we provided.

The June 2016 PVA report summarizes modeling for both the AZA Red Wolf Species Survival Plan® (SSP) population and the wild population in North Carolina; our results highlight the successes of the SSP and wild populations, the challenges they face, and the management actions that can help them. **The most conspicuous misinterpretation of these results in the USFWS decision is focused on the SSP - that "the species is not secured in captivity"[2] and that "with no changes to current management, the species will likely be lost within the next decade"[3].**

According to the decision memo, this conclusion was based on scenarios A and FF. To clarify the appropriate interpretation of the needs of the SSP and these two scenarios:

- **The SSP is under no risk of extinction**. When running over 1000 model iterations, 0% of scenario A and 0.5% of scenario FF iterations went extinct. The SSP population is not at risk of "being lost" within the next decade or within the 125 year model timeline.
- **In addition to its negligible extinction risk, scenario FF does not represent a true projection of the SSP population's future, because it does not reflect that the SSP's management is adaptive and, if a decline began, the SSP would adjust and address ways to increase reproduction.** Scenario FF, which portrayed holding the number of breeding pairs constant at 29, was a "sensitivity analysis" scenario (as indicated in Table 1). Modelers use sensitivity analyses, in which they perturb or hold a variable constant, to test their understanding of the model or illustrate a point – in this case, highlighting the importance of adaptively managing the number of breeding pairs. We constructed scenario FF because we recognized that scenario A was projecting slightly more births and more pairs than the population had been producing in 2012-2014, and therefore might be painting a more demographically robust picture than what is actually happening under current space constraints. Computer models cannot necessarily replicate the complex factors related to exhibit space, canid social dynamics, and human decision-making that influence how many births are produced in any given year, they can only make an approximation. Scenario FF represented an artificial constraint on breeding pairs and does not replicate the adaptive nature of the SSP management. Because space and placement of pups is the reason that the SSP was only recommending 29 breeding pairs during that timeframe, once that constraint is loosened (i.e., if the population began to decline as it was projected to in FF or if more space becomes available) managers would increase the number of recommended pairs to keep the population stable, refilling any available spaces that the decline caused. In fact, in 2015 and 2016, the SSP made such an adjustment, recommending 37 and 39 pairs respectively. As such, scenario FF cannot be accurately interpreted as describing an insecure future for the SSP.

[1] Please note that this response letter was prepared by Lisa Faust, Will Waddell, Sarah Long, and Joseph Simonis. Rebecca Harrison recused herself from involvement in the preparation of the response.
[2] Decision Memo, p3
[3] FAQs, p1

The need for additional space for the SSP is, however, important (as noted in the 1990 Recovery Plan, the 1999 PHVA, and the 2007 five year review) and is still a science-based recommendation from the modeling work:

- **The impact of additional space is that USFWS could be more certain that the SSP could meet its genetic recovery plan goal of maintaining 80% gene diversity (GD), as well as more robustly support future releases.** Without additional space, the chance of remaining above that genetic goal is anticipated to be somewhere between the 35.1% projected in scenario FF and the 65.7% of scenario A. (Note that this is likely much higher than the 35% because we know that the SSP would adapt management as described above if a decline occurred, but 65% is likely optimistic). Additional space makes the likelihood of hitting that benchmark much more attainable – from 80% (scenario K) to 91% (Scenario N) depending on if it is also combined with reproductive improvements. However, within these scenarios we did not "solve for" an optimum amount of space the population should ideally have. Rather, we selected the Recovery Plan target size of 330, and an arbitrary round number higher than that (i.e. 400). If USFWS would like a more nuanced evaluation of the space needed to reach a specific genetic goal with a specific level of certainty, the model can provide that recommendation.
- In addition, **the SSP can support releases to the wild without significant demographic impact at its current size, or at the 330 and 400 sizes tested.** The statement "it is clear that more animals (above the 400 individual targets) are needed in captivity to support any wild population (including the NEP)"[4] is not supported by any model scenarios and was never modeled.
- **There are multiple management strategies for the SSP to get to the appropriate number of births the population needs, and the decision memo misinterpreted the PVA as recommending 52 pairs. Instead of this, we recommend that USFWS focus on the target of space/total population size and allow the SSP to adapt its management to fill those spaces.** We report the number of pairs to help the reader scale the impact of changes to space, much like we report the average number of births in the first 10 model years to help the reader scale changes in reproductive rates. Scenario A, with no additional space, had 52 pairs reproducing in its first decade. Scenarios with more space had 76 pairs/year (scenario K) or 82 pairs/year (scenario L). However, the SSP could also work to increase breeding success of the individual pairs (e.g. by focusing on younger breeding individuals) which would require fewer pairs per year. 52 is not a magic number and that metric is mismatched with the space target of 400. We recommend you focus on the total population size as a target.

Finally, interpretations about the future of the wild population were also imprecise:

- **The SSP does not "need" wild red wolves from North Carolina for its security.** Scenarios O and P, which reflect capturing 32 red wolves and immediately bringing them into the SSP, did not have any demographic impacts on the SSP, but did impact the chance of the species remaining above 80% GD (71% without any additional space and 87% with 330 spaces, compared to the baseline of 66% without incorporating in any wild wolves). However, these impacts could just as easily be gained via transfer of genetic material between the wild population and the SSP. What the model cannot assess is the behavioral and logistical complexities of being able to routinely move wild animals into breeding situations within the SSP (e.g. medical and quarantine considerations, food requirements, transport, etc.), as well as the uncertainty on whether they would have the same mortality and reproductive chances as SSP wolves. Ultimately, scenarios O and P are likely optimistic about the potential impact of the wild wolves on the SSP, and should not be strong justification for removing animals from the wild.
- **A singular focus on the SSP will no doubt result in extinction of red wolves in the wild, as scenario Z clearly indicates; this scenario was not referenced in any of the decision documents – but showed a median time to extinction of 14 years.** If USFWS would like to further explore the possibility and viability of management efforts (e.g. releases from the SSP) that could support their focus on "maintaining a small, and more manageable wild population"[5] on federal lands, the PVA could be a tool to inform that. Without

[4] Decision Memo, p3
[5] Decision Memo, p7

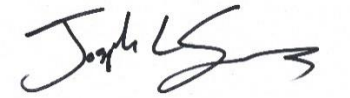
releases or any changes to wild mortality and reproductive rates, that smaller, more restricted wild population will face certain extinction.

We were concerned that these misinterpretations of our model were used as such strong justification for aspects of the decisions made. The USFWS's commitment to use the best available science is a fundamental principle and the correct interpretation of that science is equally essential. **We request that USFWS take our statements in this letter into account as you progress with decision-making; that you continue to use the PVA or additional modeling work to better inform decisions about both populations; and that you edit the FAQs and, if possible, edit or append the decision memo to reflect this more accurate interpretation of our model results.**

Please do not hesitate to contact us if any of our statements are confusing or you have any further questions.

Sincerely,

Lisa Faust, Ph.D.
Vice President of Conservation and Science, Lincoln Park Zoo



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