American Society of Mammalogists

DOUGLAS A. KELT, President
Department of Wildlife, Fish,
and Conservation Biology
University of California
Davis, CA 95616-5270
(530) 754-9481
Email: dakelt@ucdavis.edu

ENRIQUE P. LESSA, President-Elect
Universidad de la República
(+598) 2525-8618
Iguá 4255 piso 6
Montevideo 11400, Uruguay
Email: enrique.lessa@gmail.com

FELISA A. SMITH, Vice-President
Department of Biology
University of New Mexico
Albuquerque, NM 87131-001
(505) 277-6725
Email: fasmith@unm.edu

HAYLEY C. LANIER, Recording Secretary
Dept. of Biology and Sam Noble Museum
University of Oklahoma
Norman, OK 73072
(405) 310-7281
Email: hclanier@ou.edu

MATTHEW E. HOPTON, Secretary-Treasurer
U. S. Environmental Protection Agency
Office of Research and Development
26 W. Martin Luther King Dr., MS 483
Cincinnati, OH 45268
(513) 569-7718
Email: matt.hopton.asm@gmail.com

PAUL STAPP, Publications Director
Department of Biological Science
California State University, Fullerton
Fullerton, CA 92831
(657) 278-2849
Email: pstapp@fullerton.edu

CODY W. THOMPSON, Program Director
Department of Ecology and Evolutionary Biology
and Museum of Zoology
University of Michigan
Ann Arbor, MI 48109
(734) 615-2810
Email: cwthomp@umich.edu

27 July 2018

Mr. Greg Sheehan, Principal Deputy Director
U.S. Fish and Wildlife Service
c/o Public Comments Processing, Attn: FWS-R4-ES-2018-0035
U.S. Fish and Wildlife Service, MS: BPHC
5275 Leesburg Pike, Falls Church, VA 22041-3803

Dear Mr. Sheehan:

The American Society of Mammalogists (ASM) is a non-profit, professional, scientific, and educational Society consisting of nearly 2,400 members from all 50 United States and 60 other countries worldwide. The ASM was founded in 1919 and is the world's oldest and largest organization devoted to the study of mammals. We strongly support the conservation and responsible use of wild mammals based on current, sound, and accurate scientific knowledge. The Society has a long history of reviewing issues related to mammalian conservation, and where appropriate, adopting positions on issues concerning the conservation and responsible management of mammals and their habitats based upon our extensive scientific expertise.

The red wolf (*Canis rufus*) is the rarest wolf species worldwide. Extirpated in the wild by 1980, it is now listed as critically endangered (IUCN 2017). Whereas the historic range of this species once extended from the northeastern USA and extreme eastern Canada, south to Florida and west to central Texas (Paradiso and Nowak 1972, Nowak 2002), red wolves are now restricted to an introduced range comprising five counties in North Carolina, surrounding the Alligator River NWR and Dare County Bombing Range. Although this population peaked at 130 individuals within the last two decades, it is now estimated at approximately 45 individuals, with as few as three breeding pairs (Hinton et al. 2017b, USFWS 2014, 2017b, 2018a). Without increased recovery efforts, the best available evidence indicates that this species likely will once again be extinct in the wild in as few as 8 years (Faust et al. 2016, USFWS 2018b). Unfortunately, current management actions by the US Fish and Wildlife Service (USFWS) related to red wolf recovery are not based on the best current science and are of great concern to ASM, as outlined below.

The red wolf non-essential experimental population (NEP) plan was developed and implemented to establish a viable wild population of red wolves in eastern North Carolina by focusing reintroductions on USFWS National Wildlife Refuges. The program involved monitoring wolf activities, disease prevention, "take" that included removal of individual animals (due to location, threat to human safety or property, or disease) and returning them to federal lands or captive breeding facilities, and coyote management to reduce competition and lessen potential for hybridization with the wolf population.

The USFWS has requested public comments as part of the National Environmental Policy Act (NEPA) process for their Environmental Assessment (EA) proposal to consider modifying the existing red wolf NEP management plan by considering the following alternatives:

1. maintain the NEP program in its current state (status quo);
2. revise the existing NEP plan by employing management activities identified in the Red Wolf Adaptive Management Work Plan (RWAMWP) in the 5 county NEP area;
3. revise the existing NEP plan by employing management activities identified in the RWAMWP, but only on federal lands (one county); or
4. eliminate the NEP program.

After reviewing the proposed alternatives, and in light of our understanding of the biology of the red wolf, the ASM believes that the survival of the red wolf as a viable species in the wild requires that the USFWS incorporate lessons from the past three decades into a renewed focus on the original Red Wolf Recovery Plan (USFWS 1989). We recognize that this entails numerous challenges. For example, the human population of North Carolina and Virginia has increased by over 45% since the Recovery Plan was published. Moreover, the rapid and successful expansion of coyotes in eastern states has increased the threat of both competition and hybridization (Bozarth et al. 2011, Kays et al. 2010). We remain optimistic that these challenges can be overcome. In the following letter, we outline our rationale for not supporting each of the four alternatives proposed in the draft EA. We then outline our rationale for returning to the original Recover Plan, which we believe provides the best approach to recovering wild populations of red wolves.

Alternative 1 (status quo) would continue the current active management program to enhance the existing population. However, after strong population growth in the first years of the NPE, this population declined significantly over the past two decades (USFWS 2018a). To reverse this decline, additional measures or modifications to the existing plan are needed. Alternative 1 maintains the core area of the wild population in multiple counties, but to meet the objectives of the Recovery Plan (USFWS 1989) additional releases appear needed from the captive population into the NEP.

Alternative 2 (revised NEP in 5-county area) is the most scientifically sound of the proposed alternatives for achieving red wolf recovery in the wild. This option would allow the NEP to remain in effect in the existing 5-county area, implement the RWAMWP, focus additional effort on private lands with willing landowners, allow for additional releases (up to five individuals annually) from the captive population into the NEP, and seek to reduce unauthorized lethal take. The need for these changes in the existing NEP program is driven in part by a lower than expected or desired wild population of red wolves in eastern North Carolina. This population remained at approximately 100 individuals for several years, but since 2014 has declined to as few as 45 wolves (Hinton 2017b, USFWS 2017b), due largely to human-caused mortality (USFWS 2018a). The total population size is insufficient to remain viable for long-term recovery. Concerns over hybridization

with coyotes, inbreeding depression, potential impact of disease, the effective habitat size of the NEP being too small to sustain a viable population, impact of stochastic events (flooding, major storms, disease), and illegal take are formidable problems which require more robust solutions for the program to succeed.

Alternative 3 (revised NEP only on federal lands) is the preferred alternative by the USFWS, but would appear to suffer all problems associated with Alternative 2, but concentrated in a smaller area and on a smaller population. This alternative provides for maintaining a small population (estimated at 15 animals) centered on Dare County (Alligator River NWR and the Dare County Bombing Range). A major drawback of this alternative is that it would sharply reduce the acceptable range of this population to a single county, making it much more susceptible to stochastic events. The goal of the NEP would shift from seeking to maintain a viable wild population to managing this as a source of red wolves that are raised in, and adapted to, natural conditions for the purpose of facilitating future reintroductions. Unfortunately, management of this small population under Alternative 3 will be guided by the RWAMWP only on federal lands, constituting a 90% decrease in the amount of lands originally designated as the Red Wolf Recovery Area. In addition, while this alternative would allow for the movements/exchanges of wolves between the captive breeding program population and the wild population, and allow for continued coyote management, there would be no prohibitions against any take on non-Federal lands. The unstated premise of this alternative appears to be that the NEP has failed and that additional measures will not promote success.

Finally, Alternative 4 (elimination of the NEP program) would suspend all efforts to sustain red wolves in the NEP. Efforts would be made to capture red wolves in the NEP and place them in the captive population. The NEP for North Carolina would be terminated. We cannot support this alternative, which appears to be contrary to the spirit and the intent of the Endangered Species Act.

As noted above, the ASM argues that all four alternatives appear unlikely to promote the development of viable wild populations of red wolves. As such, we find them both unacceptable scientifically and contrary to the mandate of Endangered Species Act of 1973 (and since amended). Instead, we contend that the USFWS should incorporate the wealth of biological and sociological understanding that has been generated to date into the original Recovery Plan (USFWS 1989). We believe this is the only viable plan to recover the red wolf in the wild and to uphold the spirit and letter of the Recovery Plan as well as the Endangered Species Act. The Recovery Plan called for the reintroduction of wolves into at least three areas within the wolf's historic range. This was recently endorsed by an independent review commissioned by the USFWS and conducted by the Wildlife Management Institute (WMI 2014; see USFWS 2016), which recommended that additional wild release areas be identified by October 2017. The Recovery Plan established the goal of approximately 220 wolves across these three wild populations, with each population large enough to minimize threats of local extirpation and evolutionary processes to operate as conditions change. WMI (2014) concurred that the identification of suitable areas and reintroduction of red wolves to two additional locations within its historic range, as called for in the Recovery Plan (USFWS 1989), is required to ensure continued survival of the red wolf in the wild. The population in eastern North Carolina had been the most successful of all wild reintroductions of red wolves, reaching 130 wolves in at least 20 packs in 2005, and as many as 100 wolves as recently as 2014 (USFWS 2017a). This 5-county site, as well as other potential future reintroduction sites, would allow for the eventual establishment of self-sustaining wild populations of red wolves, as outlined in the Red Wolf Recovery Plan (USFWS 1989). The limited area of federal lands resulted in the need to

include private lands in the Recovery Plan, with incentives for landowners to participate. If NEP core lands were expanded and human-caused mortality and disturbance reduced, red wolf numbers likely would increase again, resulting in lowered inbreeding depression problems associated with small isolated populations (Brzeski et al. 2014). The natural social dynamics of red wolf packs tends to avoid inbreeding (Sparkman et al. 2012). Expansion of the current wild program to establish a healthy metapopulation structure should facilitate genetic exchange among multiple packs, a critical factor in species restoration and eventual delisting. Increased genetic diversity from additional reintroductions should buffer the impact of inbreeding, but also may play a role in the population's ability to respond to new challenges (e.g., pathogens).

A recent population viability analysis (PVA) conducted for the wild population of red wolves at the request of the USFWS (Faust et al. 2016) suggested that the one remaining population is likely to go extinct within 8 to 37 years, barring improvements to their vital rates. Faust et al. (2016) expressed concern that extinction probably would occur even earlier because the population has already declined to lower than their model starting point. The PVA scenarios that would lead to low (<10%) probability of extinction in the next 125 years involve a combination of reduced mortality rates (including control of legal and illegal killing; see Hinton et al. 2013, 2017a), increased breeding rates (thought to be achievable by reducing the disruptive effects of breeding season mortality), and continued releases from the captive populations for a short, intense period (15 years), followed by intermittent releases to maintain genetic health of the population. It is unclear to the ASM why this important analysis was not a central component of the alternatives in this draft EA.

The red wolf is critically endangered, with as few as 45 individuals in the single remaining wild population, a high level of human-caused mortality threats, and strong evidence for population declines (Faust et al. 2016, Hinton et al. 2013, 2017a, 2017b, USFWS 2017b). Given these threats and the current population status of the red wolf, every individual in this population is essential to the continued survival of this species. Therefore, we recommend that the current designation of a "non-essential" experimental population (NEP) of red wolves should be changed to an "essential" experimental population (EEP). We believe that there is a strong need for the USFWS to revise the ESA Section 10(j) rule to prioritize red wolf conservation and recovery, and to disallow the killing of red wolves by landowners except under extreme circumstances. The current implementation of the red wolf 10(j) rule allows for liberal take, which is one of the leading causes of mortality in red wolves, seriously hampering their recovery and threatening the existence of this species in the wild (Hinton et al. 2017a). Protection from harvesting should help restore the natural social structure of wolf packs (Rutledge et al. 2010). The lenient standards of the current 10(j) rule, intended to bolster landowner support for the program, must be balanced against the needs of the species to exist; at this critical point in time, available data strongly suggest that further actions must be used to curtail all human-caused mortality in red wolves. Gunshot mortality reduction requires a proactive campaign of public relations and information dissemination (e.g., WMI 2014). Effective, non-lethal methods for avoiding conflict are widely available (Much et al. 2018, Shivik 2004, Stone et al. 2017), but it is unclear what efforts have been made to inform landowners of these non-lethal methods.

Tools for population management must also include reduction of hybridization with coyotes, a well-documented threat to red wolves (e.g., Bohling et al. 2016, Bohling and Waits 2015, Fredrickson and Hedrick 2006, Gese et al. 2015, Roth et al. 2008, Sparkman et al. 2012). A high proportion of red wolf/coyote hybridizations occur following the disruption of a stable breeding pair

(commonly from gunshot mortality during the hunting season, which precedes the breeding season) or after the dissolution of a pack, usually due to human-caused factors (Bartel and Rabon 2013, Bohling and Waits 2015). Incidence of hybridization also declines in larger populations, due to a larger pool of conspecific mates (Bohling and Waits 2015, Gese et al. 2015, Roth et al. 2008, Sparkman et al. 2012). Targeted control of coyotes and hybrids, and release of sterilized ("placeholder") coyotes to hold territories until red wolves move into the territory or are reintroduced, have been shown to limit introgression of coyote genes into the red wolf population (Bohling and Waits 2015, Fredrickson and Hedrick 2006, Gese et al. 2015, Gese and Terletzky 2015). Hinton et al. (2018) emphasize that the risk of hybridization can be minimized by promoting an environment that bolsters red wolf populations and facilitates encounters between red wolves (for example, soft releases of multiple wolves).

Finally, we believe that greater outreach efforts are needed to interface effectively with the public, to inform them of progress in the red wolf recovery program, and to solicit their input on associated human-wildlife issues. To this end, we encourage the USFWS to reestablish the Red Wolf Recovery Coordinator position that appears to have terminated in 2014. This position also could promote a strong public education program associated with the red wolf recovery program, which WMI (2014) argued was important a successful outcome.

In summary, the ASM is unable to support any of the options provided by the draft EA presented by the USFWS (2018a). In our view, these alternative actions posit small remedies to what is, in reality, a dire situation in need of redirection. We believe that none of these alternatives will ensure the long-term recovery of the red wolf, and that the draft EA fails to address key aspects of the Recovery Plan (USFWS 1989) as well as recommendations of experts contracted by the USFWS to help address pressing questions on the red wolf recovery program (e.g., WMI 2014, Faust et al. 2016). We base our conclusion on the fact that the red wolf faces several pressing constraints, including: 1) low population size but high levels of human-induced mortality; 2) lack of suitable coyote control and the high potential for hybridization; 3) lack of a red wolf recovery coordinator; 4) limited outreach and public education, including a lack of effective communication to private landowners in the 5-county area regarding the need for red wolf recovery and conservation; and 5) a limited financial incentive program for depredation by red wolves. We believe that each of the alternatives presented by the USFWS serve to increase the probability of eventual extinction of the red wolf in the wild, which is contrary to the Endangered Species Act, to the Recovery Plan, and unacceptable to the American Society of Mammalogists. We argue that a more comprehensive program that addresses concerns outlined in this letter is needed to ensure successful red wolf recovery moving forward.

I close by reiterating that the ASM recognizes that extreme challenges face the successful establishment of wild populations of red wolves. We believe that the science continues to support an argument that red wolves can exist in the wild, but that the options provided by the EA (USFWS 2018a) appear to serve as poor substitutes for the original Recovery Plan, and confer a sense of resignation rather than resolve. The extinction in the wild of a charismatic and endemic carnivore species such as the red wolf should not be acceptable to the American public or to the US Fish and Wildlife Service, and it is not acceptable to the ASM. The ASM remains hopeful that the USFWS will update their proposed action plan to better reflect the scientific evidence and to ensure the continued survival of the red wolf in the wild. Numerous members of the ASM have expertise and many years of experience working with large carnivores, including red wolves. We stand ready to

offer technical assistance in whatever ways needed. Thank you for the opportunity to provide our assessment of this important issue.

Sincerely yours,

Douglas A. Kelt, Ph.D., President
American Society of Mammalogists

Literature Cited

BARTEL, R.A. AND D.R. RABON. 2013. Re-introduction and recovery of the red wolf in the Southeastern USA. Pp. 107-115, in Global re-introduction perspectives. Further case studies from around the globe (Soorae, P.S., editor). IUCN/SSC Re-introduction Specialist Group, Gland, Switzerland and Abu Dhabi Environment Agency, UAE.

BOHLING, J.H., J. DELLINGER, J.M. MCVEY, D.T. COBB, C.E. MOORMAN, AND L.P. WAITS. 2016. Describing a developing hybrid zone between red wolves and coyotes in eastern North Carolina, USA. Evolutionary Applications 9:791-804.

BOHLING, J.H., AND L.P. WAITS. 2015. Factors influencing red wolf-coyote hybridization in eastern North Carolina, USA. Biological Conservation 184:108-116.

BOZARTH, C.A., F. HAILER, L. L. ROCKWOOD, C.W. EDWARDS, AND J.E. MALDONADO. 2011. Coyote colonization of northern Virginia and admixture with Great Lakes wolves. Journal of Mammalogy 92:1070-1080.

BRZESKI, K.E., D.R. RABON, JR., M.J. CHAMBERLAIN, L.P. WAITS, AND S.S. TAYLOR. 2014. Inbreeding and inbreeding depression in endangered red wolves (*Canis rufus*). Molecular Ecology 23:4241-4255.

FAUST, L.J., J.S. SIMONIS, R. HARRISON, W. WADDELL, AND S. LONG. 2016. Red wolf (*Canis rufus*) population viability analysis – report to the US Fish and Wildlife Service. Lincoln Park Zoo, Chicago, IL.

FREDRICKSON, R.J., AND P.W. HEDRICK. 2006. Dynamics of hybridization and introgression in red wolves and coyotes. Conservation Biology 20:1272-1283.

GESE, E.M., F.F. KNOWLTON, J.R. ADAMS, K. BECK, T.K. FULLER, D.L. MURRAY, T.D. STEURY, M.K. STOSKOPF, W.T. WADDELL, AND L.P. WAITS. 2015. Managing hybridization of a recovering endangered species: the red wolf *Canis rufus* as a case study. Current Zoology 61: 191-205.

GESE, E. M. AND P. A. TERLETZKY. 2015. Using the "placeholder" concept to reduce genetic introgression of an endangered carnivore. Biological Conservation 192:11-19.

HINTON, J.W., K.E. BRZESKI, D.R. RABON, AND M.J. CHAMBERLAIN. 2017a. Effects of anthropogenic mortality on critically endangered red wolf *Canis rufus* breeding pairs: implications for red wolf recovery. Oryx 51:174-181.

HINTON, J.W., M.J. CHAMBERLAIN, AND D.R. RABON, JR. 2013. Red wolf (*Canis rufus*) recovery: a review with suggestions for future research. Animals 3:722-744.

HINTON, J.W., J.L. GITTLEMAN, F.T. VAN MANEN, AND M.J. CHAMBERLAIN. 2018. Size-assortative choice and mate availability influences hybridization between red wolves (*Canis rufus*) and coyotes (*Canis latrans*). Ecology and Evolution 8:3927-3940.

HINTON, J.W., G.C. WHITE, D.R. RABON, JR., AND M.J. CHAMBERLAIN. 2017b. Survival and population size estimates of the red wolf. Journal of Wildlife Management 81:417-428.

IUCN. 2017. *Canis rufus*. The IUCN Red List of Threatened Species 2017-1 (http://www.iucnredlist.org/details/3747/)

KAYS, R., A. CURTIS, AND J.J. KIRCHMAN. 2010. Rapid adaptive evolution of northeastern coyotes via hybridization with wolves. Biology Letters 6:89-93.

MUCH, R.M., S.W. BRECK, N.J. LANCE, AND P. CALLAHAN. 2018. An ounce of prevention: Quantifying the effects of non-lethal tools on wolf behavior. Applied Animal Behaviour Science 203:73-80.

NOWAK, R.M. 2002. The original status of wolves in eastern North America. Southeastern Naturalist 1:95-130.

PARADISO, J.L., AND R.M. NOWAK. 1972. *Canis rufus*. Mammalian Species 22:1-4.

ROTH, J.D., D. L. MURRAY, AND T.D. STEURY. 2008. Spatial dynamics of sympatric canids: modeling the impacts of coyotes on red wolf recovery. Ecological Modeling 214:391-403.

RUTLEDGE, L.W., B.R. PATTERSON, K.J. MILLS, K.M. LOVELESS, D.L. MURRAY, AND B.N. WHITE. 2010. Protection from harvesting restores the natural social structure of eastern wolf packs. Biological Conservation 143:332-339.

SHIVIK, J. A. 2004. Non-lethal alternatives for predation management. Sheep & Goat Research Journal 19: 64-71.

SPARKMAN, A.M., J.R. ADAMS, T.D. STEURY, L.P. WAITS, AND D.L. MURRAY. 2012. Pack social dynamics and inbreeding avoidance in the cooperatively breeding red wolf. Behavioural Ecology 23:1186-1194.

STONE, S.A., S.W. BRECK, J. TIMBERLAKE, P.M. HASWELL, F. NAJERA, B.S. BEAN, AND D.J. THORNHILL. 2017. Adaptive use of nonlethal strategies for minimizing wolf-sheep conflict in Idaho. Journal of Mammalogy 98:33-44.

US FISH AND WILDLIFE SERVICE. 1989 [1990]. Red wolf recovery plan. US Fish and Wildlife Service, Region 4, Atlanta, GA.

US FISH AND WILDLIFE SERVICE. 2014. Red wolf recovery program, 2nd quarter report, Jan-Mar 2014. USFWS Region 4, Atlanta, GA.

US FISH AND WILDLIFE SERVICE. 2016. Science leads Fish and Wildlife Service to significant changes for red wolf recovery. https://www.fws.gov/news/ShowNews.cfm?ref=science-leads-fish-and-wildlife-service-to-significant-changes-for-red-&_ID=35794 [Accessed 23 July 2017]

US FISH AND WILDLIFE SERVICE. 2017a. Red wolf recovery. USFWS Region 4, Atlanta, GA. https://www.fws.gov/redwolf/ [Accessed 23 July 2017]

US FISH AND WILDLIFE SERVICE. 2017b. Red wolf recovery program review. https://www.fws.gov/southeast/faq/red-wolf-recovery-program-review/#what-were-the-findings-of-the-service-s-review-section [Accessed 26 July 2018]

US FISH AND WILDLIFE SERVICE. 2018a. Draft environmental assessment for proposed replacement of the regulations for the nonessential experimental population of red wolves in Northeastern North Carolina. USFWS, Region 4, Raleigh Ecological Services Field Office, 49 pp.

US FISH AND WILDLIFE SERVICE. 2018b. Red wolf species status assessment. Report April 19, 2018. USFWS, Region 4, Atlanta, GA.

WILDLIFE MANAGEMENT INSTITUTE. 2014. A comprehensive review and evaluation of the red wolf (*Canis rufus*) recovery program. Wildlife Management Institute, Virginia Tech, Blacksburg, VA, 171 pp.