

**Red wolf comments to the USFWS from Wildlands Network
July 24, 2017**



From:
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To:
Public Comments Processing
Attn: FWS-R4-ES-2017-0006
Division of Policy, Performance, and Management Programs
U.S. Fish and Wildlife Service Headquarters, MS: BPHC
5275 Leesburg Pike, Falls Church, VA 22041-3803.

Dear US Fish and Wildlife Service:

The purpose of this letter is to provide comments to the US Fish and Wildlife Service (FWS) pursuant to your request for public input on the scope of the environmental review of your proposed rule to revise the nonessential experimental population (NEP) designation for red wolves (*Canis rufus*). The docket ID # for the comment period is FWS-R4-ES-2017-0006.

Sincerely,



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Executive Summary:

1. The US Fish and Wildlife Service (FWS) grossly mischaracterizes their plan to pull the remaining wild red wolves either into captivity or back to federal land in Dare County (NC) as an approach that will help protect the red wolf species. The simple truth is that the proposed action would end the 30-year-old attempt at recovering red wolves in the wild, and result in a situation where only 10-15 token wolves were left on the ground in North Carolina.

2. The recent sharp reduction in the number of wild red wolves in North Carolina is the direct result of policy shifts made by the leadership of the US FWS (dropping coyote management and stopping releases of red wolves from captivity) and the failure of the Agency to address the correspondingly sharp increase in gunshot mortality affecting the wolves. There are effective strategies (such as landowner outreach and incentives, and also better law enforcement) that could be employed to rescue the wild wolf population in NC.

3. The captive population of red wolves is in no immediate danger, and the FWS is essentially lying to the public and the media when making the claim that wolves must be pulled from the wild to bolster the captive animals. The captive wolf population is currently limited by available pen space, and genetic exchange from the wild wolves back into captivity could be accomplished with no reduction in the wild population size.

4. The best available science showed that hybridization between red wolves and coyotes was already well under control thanks to the natural tendencies of the wolves to prefer larger mates, and to the adaptive coyote management activities of the red wolf field team. However, the FWS leadership canceled those activities, and the rise in gunshot mortality has exacerbated the hybridization threat, breaking up red wolf pairs right before breeding season and reducing the number of potential mates.

5. Maintaining the wolves back in captivity for the indefinite future with no hope for wild recovery is not a sustainable solution. Captive conditions will inevitably result in genetic damages and loss of wild fitness for the caged wolves.

6. Rather than retreat, the FWS should proceed quickly with revamping the northeast NC wild red wolf population, and then replicating the success of that program in at least two other locations around the southeast. True recovery for the red wolf is achievable, but we recommend adjusting the recovery/delisting criteria upwards from the current underestimate of 220 wolves to a more biologically realistic level of thousands of wolves spread across millions of acres of habitat in the region. Recovering the wolves is essential for restoring ecological balance to the richly diverse natural habitats of the southeast.

Section 1 - Response to Framing of the Current Red Wolf Issue by USFWS

Rather than respond only to the questions posed by the FWS (at the website <https://www.regulations.gov/document?D=FWS-R4-ES-2017-0006-0001>; see Sections 2 and 3 below), we feel like it is important to begin by addressing the framing statements made by your Agency on the same website, since those statements form the underlying basis and scope for the Agency's proposed decision to scale back the red wolf program. In this first section, we offer a critique of the background and proposed action statements made by FWS.

1.A Background

The "Background" portion of the website lists the causes of decline of the red wolf as habitat loss and predator control activities. This is historically accurate, but misleading in the current situation, as habitat loss is no longer a direct driver of endangerment for red wolves at least in the short term. It is also likely true that habitat loss wasn't the most important historical driver of the sharp and range-wide decline of red wolves. Rather, the loss of forests made it easier for humans to find and persecute the wolves, and at the same time, humans were also decimating the white-tailed deer population, to the point where deer were also pushed to extinction in many areas of the southeast. Wolves, including red wolves, are well-known to be generalists when it comes to habitat types, and it is likely that red wolves could have survived the widespread (and temporary) loss of forest in the southeast if they had not also been shot, trapped, and poisoned into oblivion, and if they had not lost their primary food base (deer) at the same time.

The contemporary wild red wolves in northeastern NC are known to frequent and in some cases even prefer agricultural fields (Chadwick et al. 2010, Dellinger et al. 2013, Hinton et al. 2016, Karlin et al. 2016), as opposed to the dense pocosin wetlands that dominate the federal land in the recovery area. Now that white-tailed deer have recovered across the region, the mix of forests and fields that characterize much of the rural landscape of the broader southeast region is likely to be quite suitable for red wolf recovery. The primary threat now facing the wolves is once again persecution, not habitat loss or competition/hybridization with coyotes.

There is a long-term threat of habitat loss caused by ongoing rapid urbanization in the southeast, and if present trends continue, urban development will likely fragment the region to the point where a recovered, interconnected metapopulation of a few thousand red wolves is simply an impossibility. But such is not the case at present time, as evidenced by the ongoing recovery of black bears in the same landscapes, and the ease with which the red wolf's sister species, the coyote, has been able to colonize the farms, forests, and suburbs of the region.

The FWS Background section also states that removing the red wolves from the wild from Texas in the 1970's was the only way to save them. This is probably not true. An alternative plan could have been for the Agency to step in and purchase several hundred thousand acres of habitat around the area where the last wolves

were found, and manage that habitat preferentially for large-canid survival. From there, a larger red wolf population could have been recovered around the region.

This is somewhat of a moot point at present, since the Agency proceeded with driving the wolves to extinction in the wild. But it reinforces the fact that there are alternative, more aggressive strategies for ensuring the survival of a large carnivore like the red wolf in the southeast landscape, and it emphasizes the point that since the FWS decided to remove the red wolves from the wild instead of conserving them *in situ*, it has a commanding moral and ethical responsibility to ensure that reintroduction and recovery efforts continue unabated.

1.B Proposed Action

The proposed action laid out by the FWS on this website, and in more detail in the Agency's announcement of their new plan in September 2016, represents nearly complete abandonment of the 30-year effort to restore a functional and sustainable population of red wolves to the wild in eastern North Carolina.

In the first part of the text framing the proposed action, the FWS states that it undertook joint management of the wolves with the NC Wildlife Resources Commission (NC WRC) as a way of acknowledging the growing concerns by landowners. This gross simplification and sterilization of the actual story is worth correcting here. What really happened is that after a major political shift in the leadership of state government in North Carolina, the legislature and governor proceeded to appoint anti-wolf individuals to the governing board of the NC WRC. At the same time, a wealthy real estate developer, Jett Ferebee, who owns a hunting preserve inside the red wolf recovery area, but does not live there full time, started to self-fund an energetic campaign to undermine landowner support for the wolves. Ferebee was later aided in his efforts by an insurance company owner (and leader of the NC Sportsmens' Caucus) Scott Griffin, and together, the two men spread lies and misinformation about the red wolf, such as the gross exaggeration that the wolves were causing the "greatest wildlife disaster in the history of North Carolina" (see page 1 of the NC Hunt and Fish Forum's red wolf scandal thread online).

The anti-wolf campaign led by these two men was not countered or addressed by the FWS in any meaningful way. In fact, the Agency stood idly by while public resentment of the wolves grew to the point where gunshot mortality rates for the wolves skyrocketed, and the wolf population, after growing to a high of 150 in 2005, and holding fairly steady to 2012, suddenly started to plummet (Hinton et al. 2017b). There was no organic increase in landowner hostility to the red wolf program derived from actual complaints about the wolves. In fact many of the anti-wolf agitators on the NC Hunt and Fish Forum, cited above, have clearly stated that they have no real issues with the wolf, only with the federal government.

In the same paragraph, the FWS website text states that "it became clear that the current direction and management of the NEP project is unacceptable to the Service and all stakeholders." This is grossly misleading. The NEP direction and management were acceptable to wildlife conservation groups right up to 2012/2013. The wolf population was doing well until that point, and our only complaint would be that the Agency had not made a concerted effort to respond to

the noted increase in gunshot mortality rates that started to occur in the mid- to late-2000's (USFWS 2007, Hinton et al. 2017a).

Starting in 2013, however, the Southeast Regional Director's Office of FWS commenced to undermine and abandon the wild wolf recovery effort in eastern NC, and that is what we find unacceptable. In quick succession, regional director Cindy Dohner eliminated the job of the red wolf recovery coordinator (David Rabon) in 2014, and then in 2015 the Agency stopped adaptive management of coyotes and stopped releasing wolves into the wild from captivity. Shortly after that, the Agency started issuing lethal take permits to landowners, which led directly to the death of a lactating female wolf in 2015, an animal that turned out to be one of only a handful of breeding female red wolves left in the wild anywhere in the world.

This new trajectory of the red wolf program is what was understandably unacceptable to conservationists, as it quickly led to the devastation of the red wolf population under Dohner's leadership. The FWS should not have been unduly concerned with the question of whether real estate developers accepted their efforts to recover the red wolf or not. Making real estate developers happy (a opposed to any sort of formal economic impact analysis) is not listed in the Endangered Species Act as a proper goal for the Agency. In any event, the supposed concerns of Jett Ferebee and others have turned out to be deceitful and inaccurate. The wolves have not caused any kind of wildlife disaster on the Albemarle Peninsula, much less the entire state of North Carolina. Wildlands Network has been monitoring the recovery area with a set of 20+ wildlife cameras at Alligator River and Pocosin Lakes NWR's, and adjoining private lands (with permission), and we have documented abundant populations of deer, turkey, black bear, bobcats, and other species in the presence of red wolf packs - see www.flickr.com/photos/redwolfreality/albums.

In a subsequent paragraph, the FWS makes the claim that the risks currently faced by the red wolf generate a situation where recovery of the species has poor prospects. This again is misleading. Yes, the current trajectory of the wolf population is downward, but this is directly the result of the recovery program being abandoned and undefended by the Agency's own leadership. Hybridization is listed as a cause of concern, for example. The available science indicates that the program of coyote adaptive management to prevent hybridization with red wolves was surprisingly effective and successful (Gese and Terletzky 2015, Gese et al. 2015). Bohling et al. (2016) found that less than 4% of canids surveyed by scat DNA genotyping were hybrids, looking across the broader region of the recovery area and surrounding counties. The leading cause of hybridization identified by Bohling and Waits (2015) was mortality events caused by humans, which broke up red wolf breeding pairs. In 2015, the FWS abandoned coyote management, and the Agency has done little to stop or reduce gunshot mortality rates (Hinton et al. 2017a). Thus, the hybridization issue can be viewed as one that is currently self-inflicted by an Agency that no longer appears to want its own program to succeed.

The same section also claims that habitat loss due to sea level rise is a grave concern for the future of the red wolf population in NE NC. Looking out across the next 50-100 years+, this may be true. But at present time, gunshot mortality is a much more pressing concern, and to our knowledge, no red wolf packs have been

displaced yet from breeding territories by sea level rise. The sea level rise issue is one that would be properly addressed not by panicking and abandoning the red wolves on the Albemarle Peninsula, but instead by initiating calm and steady efforts to ensure that habitat corridors exist connecting Alligator River NWR to Pocosin Lakes NWR, and then Pocosin Lakes NWR to the extensive bottomland hardwood forests of Roanoke River NWR. Wolves are highly mobile on the ground and excellent swimmers as well, and should have no trouble migrating off the peninsula if they are allowed to do so. Many other freshwater wetland species and smaller animals may not be so fortunate, but the wolf can easily respond and adapt to sea level rise. It is also worth noting that the FWS is not giving up on conserving other less-controversial endangered species in the wild, even though these other species are also facing similar threats of climate change and sea level rise.

The Agency also claims that population decline is a factor in the poor prospects for the wild red wolf population. Again, this decline is purely the result of abandonment and inaction on the part of the regional and national leadership of the FWS, and the anti-wolf campaign led by a wealthy real estate developer. Blaming the parameters of the NEP, or the wolf itself, for the current rapid decline of the wild population, is inappropriate and misleading.

The final issue cited by the FWS in setting the stage for their proposed decision is the supposed endangerment of the captive red wolf population. First, as noted above, the primary reason for the existence of the captive population is to support the rapid and effective return of the red wolf species to the wild, where it belongs. Second, we are surprised that the Agency has the temerity to try to repeat this lie again here in their proposed rule-making documents. The FWS has already been called out in the national press (Fears, 2016) for misleading the media and the public in the Agency's September announcement, where it was also claimed that the captive population was in jeopardy. The same scientists who conducted the Population Viability Assessment for the FWS (Faust et al. 2016a) took the extraordinary step of writing a public letter to Agency leaders accusing them of grossly misrepresenting their data (Faust et al. 2016b). The captive population, according to those scientists, is in no danger of extinction, and is in fact only limited at present by the availability of pen space. The wild population, on the other hand, will likely go extinct quickly if present trends are allowed to continue.

We do not deny that there is value in growing the captive population (see below Section 4b). But the only way to do that is to grow the available set of zoo enclosures and associated care and feeding budgets. Claiming some need to devastate the wild red wolf population by removing almost all of the animals back to captivity is pure nonsense. We predict the captive population could be doubled in size quite quickly if the necessary pen space was available.

We also agree that there could be some value in returning the occasional targeted red wolf from the wild into captivity, to assist with maintaining genetic diversity in the captive population. But, this could easily be accomplished with no reduction in the wild population, by simply removing the needed pups from wild litters at the same time as new captive pups are fostered in. Since the wild population is under much more serious demographic threats (due to unabated gunshot mortality) than the captive population (Faust et al. 2016a), it would make

sense to place 2-3 captive puppies in the wild litter for every wild pup that was removed. In this manner, red wolves could be cycled back and forth into captivity quite easily and with no reduction of the wild population. It is worth noting that if the wild population is reduced to only 10-15 animals, as proposed by the FWS, there will be very little genetic benefits obtained by further cycling wolves from the wild into captivity. Only a much larger, more diverse wild population will retain value for bolstering the genetic health of the captive red wolf population.

The "Proposed Action" section continues with a discussion of the merits of treating the wild and captive wolves as a metapopulation. Again, we emphasize that this goal could (and should) be accomplished with no reduction in the wild population of wolves. In fact, and per the standards of the ESA, any such move should be geared to increase the recovery rate and population size of the wild red wolves in North Carolina. Wild recovery is the goal of the 30+ year effort to save the red wolf. Promoting the captive population is only acceptable if it also promotes the recovery of the species in the wild.

Pulling all but a handful of wild wolves into captivity for an indefinite and quite possibly perpetual state of zoo life is not a sustainable scenario. Not only would this ignore the reason why the wolves were placed into captivity in the first place, but it also raises the specter of long-term genetic changes and essentially domestication of the captive wolves as they become more and more adapted to living in small pens on display at public zoos (Frankham and Loebel, 1992, Frankham 2008, Grueber et al. 2017). As noted by Frankham (2008), "In captivity, species adapt genetically to the captive environment and these genetic adaptations are overwhelmingly deleterious when populations are returned to wild environments." This does not imply, as red wolf critics have sometimes asserted, that the initial period of captive residency of the last remaining red wolves somehow disqualifies the animals for release into the wild. But it does indicate that returning the wolves to the wild is a race against time spent in captivity, and hence the FWS should use all haste to proceed with recovery efforts in the field.

The Agency continues the paragraph with this misleading statement: "Therefore, the Service is proposing to change the goal of the current NEP project from solely that of establishing a self-sustaining wild population to a goal of also supporting viability of the captive wolves of the red wolf breeding program (proposed action)." This is the crux of the Agency's proposed action, and yet it is completely misrepresented here. What the Agency's proposal (of pulling all of the wild wolves to federal land in Dare County) would do is utterly abandon the functional recovery of wild red wolves in North Carolina. And, since no realistic or funded plans appear to be in place for even the beginnings of red wolf recovery efforts in other states, this proposal represents giving up on wild red wolf recovery altogether, in favor of what the Agency must see as the more politically expedient task of growing the captive population. As noted above, the captive red wolf population's size is not limited by a lack of influx of genes from the wild wolf population, the captive wolves are limited by pen space (Faust et al. 2016b).

Keeping only 10-15 semi-domesticated red wolves at Alligator River NWR and the Dare County Bombing range is an option that has nothing to do with actual recovery of red wolves in the wild. The Agency's own staff have admitted in public

meetings that 10-15 animals (2-3 packs) is all that the combined federal lands in Dare County could support.

Furthermore, there has been no evidence provided by the FWS that such a small population of wolves living in Dare County would accomplish the other goals listed for this bizarre and disappointing plan; namely, to improve the genetic health of the captive wolves, promote natural instincts, and provide a "population" for research into wild wolf behavior and management. Such a small group of wolves (10-15 individuals) is not a population, not at least in the way that most biologists define the term. If many of those wolves derive from captivity anyway, then the small group of heavily-managed wolves would have even less value for studying wild behavior patterns. If the Agency wants to talk about a wild red wolf population, they need to look back at the 150 wolves they had on the ground in 2005, before the FWS abandoned the wolf recovery program to gunshot mortality and political expediency. That population, or preferably even one larger than that, could begin to accomplish the goals the Agency has listed for the small cluster of semi-domesticated wolves they propose to retain in Dare County.

The proposal by the Agency to "recognize that the size, scope, and management of the NEP will be focused on maintaining a wild population on Federal lands within Dare County" should therefore be re-written in the interest of truthfulness, replacing "focused on" with "contracted and reduced to." Calling the 10-15 wolves in Dare County a population is false. The same FWS statement continues with a bald assertion that this plan will "protect the species" by assisting the captive population. The only thing that would assist in protecting the species, at this point, is figuring out how to quickly regrow the wild population back to the point where it was before the FWS jettisoned their own program, and then figuring out how to replicate that success in several other areas around the southeast region.

The FWS then proceeds to claim this proposal would lead to better management of the remaining wolves and reduce risk of hybridization. While this is a truism of sorts (for example, if there was only one pair of wolves left in the wild, presumably the Agency could focus more attention on preventing those animals from breeding with coyotes!), it ignores again the fact that the Agency's own science (Gese et al. 2015, Gese and Terletsky 2015) was showing that coyote hybridization was already being well controlled even with the larger population of red wolves that existed prior to the current crisis. The only reason hybridization is more of a threat now is that coyote management has been terminated at the direction of Regional Director Dohner, and the gunshot mortality problem continues unabated.

The Agency proceeds to speculate that it will remove "isolated packs" from private lands. This is an ironic phrase, given that the net result of the entire proposal by the FWS would be to create a set of 2-3 very isolated packs at the end of the Albemarle Peninsula. The FWS should instead be doing all that it can to regrow the packs on private lands, and to allow the expansion of the wolves onto adjacent public lands across the region.

Section 2 - Information Requested

Now that we've dealt with the misrepresentations and inaccuracies of the background and proposal statements offered by the FWS, we will also address the itemized requests for information made by the Agency.

2.A Contribution of the NEP to recovery goals

The NEP of red wolves in northeastern NC has demonstrated successfully that a red wolf population could be grown on a mix of public and private lands, and in the face of the hybridization threat posed by coyotes. This was a very useful demonstration. However, the main problems with the NEP designation were that there was no endgame offered by the FWS in case their experiment was successful, and there was no built-in mechanism to adjust the generous take mechanisms of the NEP regulations if poaching ever got out of hand. The logical step to conserve the red wolf would have been to declare (back in 2005) that the experiment had worked so well (and with so little hindrance to private landowners) that the NEP wolves would be transitioned to a fully-protected population of endangered red wolves at the same location. The process could then be replicated in several other locations as part of the path to recovery.

Instead, the NEP program stagnated after achieving success, and there were no resources or Agency resolve available to respond to the surge in gunshot mortality that occurred after 2005 (and even more so after 2012; WMI 2014). The NEP did what it was intended to do, now it is time for the real recovery of red wolves to begin, with fully-listed wolves and critical habitat designation across the region. If the Agency is unprepared to make that shift, then it should acknowledge the fact that the NEP is currently the "only game in town" when it comes to recovery of the red wolf, the only shining prospect for returning this wonderful and unique animal to the wild. As such, the NEP must be considered essential to the survival of red wolves. And, if the "Experimental" aspects of the NC population are no longer promoting the survival of the population, then that designation should also be dropped, and the NC wild wolves reclassified as full endangered species.

2.B Tools for population management

The previous success of the red wolf recovery program in growing a population of 150 wild wolves by 2005 provides strong evidence that with the right approach, success is still achievable on the ground for the red wolf. There are several tools that should be more effectively used for population management of red wolves, with the goal of once again increasing the size of the wild red wolf population. These include:

- 1. Mitigating gunshot mortality** through a combination of enforcement actions, outreach and education, and providing a robust system of landowner incentives. The incentives tool is perhaps the most important. As long as the red wolf is a deeply controversial species, and at least until studies have firmly cemented the benefits or lack of negative consequences of having the wolves on private property, the FWS should work with private conservation groups to pay major landowners to host wolves on their land. This would shift the dynamic from

the wolves being a minor nuisance that could be tolerated, to being an actual benefit for landowners, ideally to the point where the presence of the wolves would be desired and cultivated.

2. Increasing the scope of red wolf releases from captivity into the wild.

In addition to reducing gunshot mortality, actually bolstering the wild population with aggressive pup-fostering efforts (supported by increased zoo breeding facilities) would be very helpful in growing the wild population. Releasing several dozen captive wolves into the NEP area each year would help counteract the gunshot mortality impacts on the population. We think the FWS should adopt and publicly advertise a policy of releasing 2-3 wolves from captivity for every wild wolf that is killed by humans, this would help bolster the population and at the same time psychologically discourage rogue poachers from attempting to destroy the red wolf recovery effort single-handedly.

3. Reduction of road-mortality events via enhanced wildlife road

crossings. After gunshot mortality, collisions with motor vehicles are the second greatest threat to red wolf survival in northeast NC. There are already 3 functioning underpasses in place on US 64, and plans for more crossing structures on the rest of US 64 as it passes by Alligator River NWR, if that particular widening project is funded. More crossing locations could be identified and mitigated around the region, particularly in places where the movement of wolves should be encouraged (e.g. inland across US 17).

2.C Management strategies to address hybridization

In the immediate sense, this is an easy question. The FWS should simply restart all of the adaptive management programs that were in place prior to 2015. The available science indicates that those measures were successful at limiting hybridization. More research could be done to try to figure out even better ways of limiting hybridization events. But perhaps the most important step to address hybridization, would be to find ways to eliminate the gunshot mortality problem, since the data indicates that a plurality of hybridization events stem from wolf pairs being broken up by illegal poaching (Bohling and Waits 2015, Hinton et al. 2017a).

At the same time, it would also be useful for the FWS to evaluate whether coyote-red wolf hybrids could be beneficial for encouraging the persistence of red wolf DNA in the landscape. We note, for example, that Gese and Terletzky (2015) found that hybrids actually had higher annual survival rates than either red wolves or coyotes. This could be fodder for another NEP experiment, where wolves would be released in large numbers at a different location outside of NC, but no attempt would be made to prevent the wolves from breeding with coyotes. The question would be whether or not the unique red wolf genes appeared to persist after several generations in the resulting hybrid swarm. The general assumption has been (since the Texas wolves were rounded up in the 1970's) that the red wolf genes simply cannot hold their own against more numerous coyotes. But those Texas wolves were floundering at least in part because there were no large prey items available, such as deer.

Now that deer have recovered, it could be that the larger size and packing behavior of the wolves would provide sufficient selective advantages to allow the wolf genes to not just survive, but prosper in the broader canid population. If successful, this experiment could point the way towards a future where red wolves and coyotes are allowed to merge genetically in the southeast, and the resulting animals could require very little ongoing management to survive. There does seem to be evidence from the northeastern US that wolf genes can persist in stable fashion in the emerging eastern coyote/coywolf population (Kays et al. 2010). The percentage of wolf genes might be enhanced (in the southeast or northeast) by regularly introducing more wolves into the population. It could even be possible to use cross-species pup-fostering to release pure red wolves into wild coyote litters, to investigate whether such a technique could allow for easy injection of wolf DNA into the coyote population.

2.D Appropriate provisions for take

Until a population of at least 500 wild wolves is reached, we think the FWS should not allow any lethal take of red wolves except in the exceedingly rare and unlikely case where a wolf posed an immediate threat to human health. Mere damage to livestock should not be enough to trigger lethal take permits for one of the rarest species on the planet. Landowners should be compensated for their losses and assisted in developing mitigation techniques for reducing wolf-livestock conflict, which is rare in the northeast NC red wolf recovery area anyway due to the prevalence of row-crop agriculture. In terms of nonlethal take, wolves should not be removed from private lands unless actual economic damages can be documented and proven to be the fault of the wolves. Even then, removal of the wolves (either to captivity or to a different site) should still only be pursued if mitigation techniques (such as landowner education efforts, guard dogs, or better fencing) have been tried and found inadequate.

2.E Protocols for red wolves that leave the NEP

Any wolves that leave the 5-county NEP region should be viewed as success stories, as those are the animals that are trying hardest to recover themselves to the broader southeast region. We think the FWS has almost intentionally squashed efforts by the wolves in the past to naturally expand their range, and that is tragic, especially given the current situation with the wolves back on the brink of extinction in North Carolina. Wolves leaving the NEP should be carefully tracked using GPS collars (which do not rely on local overflights for reporting wolf locations), and they should trigger robust public outreach, poaching-prevention, and landowner incentive efforts wherever they go. In fact, an intriguing policy solution would be to change the law so that the NEP boundaries automatically adjust with the dispersal and expansion of the red wolf population. Or, more simply, the wild wolves in NC could be transitioned to being considered full endangered species, and then the animals would be protected wherever they traveled.

Section 3: Environmental impacts of revising the 10j rule

In this section we respond to the FWS request for details about the expected environmental impacts of their proposed decision to significantly scale back the scope of red wolf recovery in the wild.

3.A Impacts to floodplains, wetlands, etc.

If the red wolves are removed from the wild except for a small set of isolated packs in Dare County, this will mean that all of the other floodplains, wetlands, and ecologically sensitive lands across the entire southeast region will continue to lack a large-bodied canid predator. As studies in Yellowstone National Park have famously documented, wolves and other top carnivores play immensely important ecological roles in regulating the health of ecosystems and the survival of many other wildlife species (Estes et al. 2011, Ripple et al. 2014). By indefinitely delaying the recovery of red wolves to some future date, the FWS would be encouraging and promulgating further ecological degradation to the sensitive habitats across the southeast region, due to the impacts of overabundant deer and mesopredators, such as raccoons and possums.

Alternatively, and more in keeping with the mission of the Agency, the red wolf could be used as a flagship conservation species for the southeast. The Agency could designate approximately 16 million acres of critical habitat for the red wolf (enough for 1000 packs of five wolves each, with an average pack territory size of 25 square miles), preventing large-scale commercial developments, highway projects, etc., and also stabilizing the conservation situation for countless other threatened species in the process.

A good example of how this could succeed is provided by the red-cockaded woodpecker, whose listing under the ESA and subsequent habitat protections have stabilized the amount of longleaf pine habitat across the region. Red wolves could do the same for bottomland hardwood forests, though we think it is likely that the wolves were originally also common in upland forest types, piedmont prairies, and other available terrestrial habitats. Protecting so much habitat for the wolves now, while the recovery process is ongoing, would prevent the tragic but seemingly otherwise inevitable scenario where we eventually figure out how to promote faster growth of red wolf populations, only to find that rampant urbanization in the ensuing decades has fragmented the available habitat to the point where recovery is no longer possible.

3.B Impacts on park lands

See above (3A). The continued absence of red wolves will imperil the native vegetation and songbird diversity of all of our protected natural areas around the region, by encouraging the continued overabundance of deer and mesopredator mammals. This is true even if the park lands are otherwise well protected from urban development, mining, and other major threats. If top carnivores aren't present, ecosystems can still suffer meltdowns from within (Terborgh et al. 2001).

3.C Impacts on human health and safety

White tailed deer currently are involved in around 20,000 documented collisions with automobiles each year in North Carolina alone, and this figure is thought to underestimate the true number of crashes by at least 50%. During the period 2013-2015, deer-vehicle collisions caused 12 human fatalities and 3386 reported human injuries in North Carolina (Oliver 2016). Hence, it can safely be said that overabundant white tailed deer represent a significant threat to human health and safety in North Carolina, and by extension, in the remainder of the southeast as well. Compare that to the red wolf, which has, to our knowledge, been involved in zero fatal attacks or unprovoked human injuries since its reintroduction began in 1987. Red wolves and other top carnivores like cougar/panther could more than pay for the costs of their own recovery by reducing the risks of deer-vehicle collisions on the highway, as recently noted by Gilbert et al. (2016).

If, however, the FWS continues with its plan to scale back red wolf recovery, this can be predicted with some certainty to result in injuries and possibly even human deaths in the former red wolf recovery area, as vehicle accidents will happen with deer that would otherwise have been consumed by a healthier number of red wolves. This is a bold assertion and it is one that is worth repeating: inaction or retreat on wolf recovery will imperil human safety and well-being across the entire region.

The deer-vehicle-human health connection is firmly established. More speculatively, there have been recent assessments made that the absence of top carnivores may play a significant role in promoting outbreaks of zoonotic diseases, such as Lyme Disease. One theory that has been proposed is that the smaller coyote is an effective competitor for native fox species, which are themselves significant predators on white footed mice, the primary vector for Lyme Disease besides deer (Levi et al. 2012). Restoring wolves would reduce coyote densities, promote fox populations, and hence better control the densities of mice and their ticks. There is also the more direct logical connection that if wolves do reduce deer densities to more natural levels, then there will be fewer hosts for the adult stages of Lyme Disease ticks.

Also, it is worth pointing out that if the FWS were to declare a substantial critical habitat area for red wolves, this would offer profound opportunities for human outdoor recreation. The benefits of outdoor experiences in nature for human health are increasingly well documented, including solitude, relaxation, freedom from excess noise, and aerobic exercise (Louv 2008). Outdoor lands are essential for human mental health, and the southeast, in particular, needs more protected natural areas if we're going to keep per-capita levels of natural habitats relatively stable even as human population growth continues. Humans would derive immense benefits from sharing a 16 million acre conservation network with red wolves and other southeastern wildlife species.

3.D Impacts on air, soil, and water

Failing to protect a viable population of red wolves in the southeast will go hand in hand with witnessing the loss of substantial amounts of natural habitats across the southeast region. Urban development will cause air and water pollution, and

contribute to ongoing loss of soil to erosion as bulldozers continue to plow through the mud in hundreds of new suburbs each year.

Alternatively, if we protect 16 million acres of habitat for the red wolf, that milestone would provide substantial benefits for clean air, clean water, and preventing soil erosion in numerous significant watersheds.

3.E Impacts on prime agricultural lands

As noted above, red wolves are compatible with agriculture, and may even prefer farmlands to other habitat types, in large part due to the availability of deer and other prey, and the thick cover provided by mature crops (Chadwick et al. 2010, Hinton et al. 2016). Failing to protect sufficient rural landscapes for red wolves will facilitate the loss of millions of acres of prime agricultural lands around the region. The absence of wolves will also continue to promote deer overabundance across many areas of the southeast, leading to widespread crop damages that are already a serious problem for many farmers (e.g. Southeast Farm Press 2010, Ober et al. 2016).

Alternatively, if critical habitat is designated for the red wolf, that could help stabilize farmland availability and promote the survival of farming economies even in the face of rampant urban development in the other portions of the southeast.

3.F Impacts to other species of wildlife

The FWS proposal to scale back the recovery of red wolves to just federal lands on one county in eastern North Carolina would mean that all of the hundreds of other counties across the southeast, with the exception of a small portion of southern Florida, would continue to lack any species of true top carnivores. As noted above, top carnivores are essential for the health of natural ecosystems (Estes et al. 2011). So the FWS, by choosing to give up on the wild red wolf program, would also be choosing to inflict further ecological harm on all of the natural habitats of the region, a plan that can hardly be seen as consistent with the mission of the Agency.

On the other hand, if red wolves can be restored broadly across the landscape, that should provide benefits to numerous wildlife species, such as the ground-nesting birds (e.g. quail, turkey, nightjars) that are most vulnerable to raccoon and possum overabundance. The full ecosystem impacts of red wolves have yet to be studied with anywhere near the resources and energy that the gray wolves in Yellowstone have received. But given the trophic cascade impacts of top carnivores that have been observed all over the world, it seems to be a safe assumption that red wolves too would play strong roles, if only they are allowed to recover to ecologically significant levels.

3.G Disproportionate impacts on minority and low-income populations

We are not aware of any significant evidence for negative impacts of red wolves on minority or low-income populations. Failure to recover red wolves could contribute to preventing sustainable ecotourism economies from developing in places like Tyrrell County, NC, one of the poorest counties in North Carolina. If critical habitat were declared instead across 16 million acres of rural landscapes in the southeast, some of the affected lands would be owned by poor or minority landowners, but

many other areas would not. If red wolf habitat isn't designated, then urban development will continue to encroach on rural lands, to the likely benefit of already-wealthy landowners and to the detriment of struggling property owners who will be hard hit by rising property values.

3.H Any other effects

Letting the red wolf go functionally extinct in the wild again (10-15 tightly controlled wolves in Dare County should not count as a remnant population) will have the effect of further homogenizing and sterilizing the natural world available to all residents of the southeast region.

3.I Any potential conflicts with environmental laws

The Endangered Species Act requires FWS to attempt to recover endangered species in the United States. The NEP approach in North Carolina was working well, but then it was abandoned suddenly and capriciously by the FWS. That abandonment, and now the proposed re-extinction of the wolves in the wild and the retreat to captivity, can only be seen as detrimental to the recovery of red wolves. Therefore, the September (2016) proposal by the FWS should be considered to be contrary to the letter and spirit of the ESA, and unlawful.

Section 4. Details of an Alternative Vision for Red Wolf Recovery

In this section, we detail the components of what we think would be a much-preferred alternative to the current proposal that was articulated in September 2016 by FWS.

4.A True recovery of red wolves

The current recovery criteria for the red wolf (220 wild wolves spread among 3 populations; USFWS 1990) is woefully out of date and insufficient from the standpoint of modern conservation biology. More recent estimates indicate that vertebrate population sizes in the thousands are needed for true population viability and genetic health (Reed et al. 2003, Traill et al. 2007). We think an appropriate target for delisting the red wolf from endangered to threatened status would be a wild population size of 2,000 animals. To delist the wolf altogether, the population size should reach at least 5,000, and the species should still be actively monitored to be sure it does not fall below that threshold again.

By way of comparison, there are an estimated 15,000 black bears currently residing on approximately 20 million acres of land in North Carolina, and the bears appear to be thriving despite an active hunting season (NCWRC 2017). To reach 5,000 wolves, it seems clear that most of the large blocks of natural habitat in the southeast would need to be recolonized, plus adjacent farmlands, pine plantations, and rural areas, totaling at least 16 million acres of relatively contiguous and interconnected critical habitats (see above calculation: 1000 packs of 5 wolves each, with an average territory size of 25 square miles). There should also be firm evidence in place before delisting that the red wolf population is robust and

genetically diverse enough for the wolves to hold their own against coyotes without ongoing management interventions.

4.B Five step plan to recovering red wolves

In this section we present five key steps to rekindling a robust recovery effort for red wolves in the southeastern USA.

1. Revamp the existing wild red wolf population in northeast North Carolina across the existing 5-county designated area. The Agency should restart all management activities that were in place in 2011 prior to the politically-motivated changes that began in 2012 and were expanded in 2014 and 2015. This would include rehiring essential field staff, resuming adaptive management of coyotes, and increasing the number of captive wolf pups being fostered into wild litters, to counteract the demographic effects of gunshot mortality. FWS should also reduce gunshot mortality with a combination of intensive public outreach, aggressive law enforcement, and generous landowner incentives.

2. Preemptively designate critical habitat for red wolves across the southeast region, totaling at least 16 million acres of the best remaining, lowest-road-density, lowest-human-density areas. As was noted for the black pine snake critical habitat designation (USFWS 2015), the critical habitat for red wolves would not cause much interference with rural economic activities such as farming, forestry, or even hunting. The only prohibitions necessary for the sake of red wolf survival would be a prohibition on canid hunting and trapping, and a prohibition on intensive urban development. It is also conceivable that a slightly larger critical habitat area could be declared jointly for the red wolf and the Florida panther, conserving the needed landscapes to secure the future of both of these wide-ranging species at the same time, along with literally thousands of other species as well, likely at a considerable cost savings for the FWS (as opposed to Agency efforts to conserve those species individually around the region). Sixteen million acres may sound like an unrealistic goal for critical habitat designation, but we calculate that it represents only 2.6% of the total landmass of the southeast region (Texas to Florida to Virginia, plus Missouri, Arkansas, Oklahoma, and Kentucky).

The viable alternative to regulatory designation of critical habitat, of course, would be for Congress and the US Department of the Interior to commence with large-scale habitat protection efforts across the southeast region via purchases of land and conservation easements from willing sellers. Such an approach, if properly funded with hundreds of millions if not billions of dollars per year, and targeted at accumulating and coalescing large blocks of suitable habitat for red wolves and other priority southeastern species, could also secure a sufficient amount of critical habitat for the red wolf to reclaim as its population grows in ensuing decades.

3. Within the larger blocks of designated critical habitat, identify at least two additional sites for red wolf recovery and reintroduction efforts. Given the lessons learned from the NEP in North Carolina, it would be preferable if these additional sites were not designated as NEP's, but rather as full-blown endangered

species reintroduction areas. This would make sure the wolves were fully protected by the ESA, and thus less vulnerable to poaching. The positive management techniques developed in North Carolina should be employed at these other sites, including coyote management and pup fostering, and landowner incentives should be put into place as well from the very beginning.

4. Establish an additional NEP site, not adjacent to the other reintroduction sites, where red wolf recovery would be attempted without active management of coyotes or any efforts to prevent hybridization. Red wolves would be reintroduced in large numbers to a core restoration area, and the resulting canid swarm would be monitored for a decade or more to track the status of red wolf genes on the landscape. The ecological impacts of hybrid wolf-coyotes would also be studied to investigate whether the animals were able to fulfill the ecological roles of wolves. If proven successful, (which isn't guaranteed, hence the experimental designation) this approach could provide a cheaper, more effective solution for recovering the unique DNA of red wolves into wild canids across the region. And, if the resulting hybrids were nearly as resilient to human impacts as coyotes (as suggested by Gese and Terletzky 2015), they would need very little management or support from the federal government.

5. Expand the captive population to the level needed to sustainably support 4 reintroduction sites at the same time around the southeast, as described above. This could mean as many as 800 captive wolves, which would require significant investments in captive breeding facilities and staff time for management. The expansion would also alleviate any and all risk of genetic erosion caused by the small size of the current captive population (~200 animals), and could be achieved quickly with renewed captive breeding efforts once the pen space was made available. Red wolves breed well in captivity, and as mentioned above the main limiting factor on the size of the captive population is the current lack of facilities (Faust et al 2016b). Any needed genetic interchange with the wild population(s) should be easily achieved with cross-fostering of pups.

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