U.S. Fish and Wildlife Service, Southwestern Region January 27, 2022

Re: Proposed rule to revise the non-essential experimental population of the Mexican wolf, and supplemental environmental impact statement; 86 Fed. Reg. 59953 (October 29, 2021).

Submitted via www.regulations.gov, Docket no. FWS-R2-ES-2021-0103.

To whom it may concern,

Please consider the following comments on behalf of the Center for Biological Diversity, a national non-profit conservation organization dedicated to saving and restoring imperiled species and their ecosystem. Our comments reflect our 1.7 million members' and supporters' hopes for recovery of a unique subspecies that we have long championed.

The Center was founded in 1989 in an inholding of the Apache National Forest (managed by the Gila National Forest) in New Mexico, where Mexican gray wolves now roam. In 1990, the Center operating then under the name Wolf Action Group served as lead plaintiff in a lawsuit against Fish and Wildlife Service and Department of Defense (for its opposition to reintroduction in the then-recommended White Sands Missile Range) to compel reintroduction of the Mexican gray wolf to the wild.

Throughout the 32 intervening years, the Center has watchdogged and sought to reform recovery efforts. Our 2004 petition for rule-making and subsequent litigation led to promulgation of the current but illegal Mexican wolf management rule.[1] Our subsequent litigation with conservationist partners led to the March 31, 2018 Federal District Court ruling that repudiated that rule and led to the instant proposed rule. We urge you to change course so that the upcoming final rule that you must promulgate by July 2022 will finally serve to conserve and recover the Mexican wolf.

Introduction: The Instant Rulemaking Fails to Address Deficiencies in the 1998 and 2015 Rules.

In the context of the Mexican gray wolf's dire genetic plight and the U.S. Fish and Wildlife Service's legal and moral responsibility to save and recover this unique subspecies, this proposed rule is an abomination. If finalized, it will not further recovery. In fact, it would likely hasten extinction. For that reason and all the reasons explained in sections to follow, finalizing this proposed rule in anything like its present form would violate the Endangered Species Act.

Moreover, the draft supplemental environmental impact statement inadequately explains much less analyzes the pertinent issues and, if finalized in anything like its present form, would not fulfill the requirements of the National Environmental Policy Act.

[1] 80 FR 2512 (January 16, 2015)

Lastly, the arbitrary and capricious trajectory of this rulemaking and the Service's failure thus far to examine closely (or at all) the pertinent facts and base its regulatory conclusions on those facts within the context of the Endangered Species Act -- would render a final rule based on this proposed rule a violation the Administrative Procedures Act.

As explained in sections below, the proposed rule does not fix the deficiencies in the 2015 rule. Moreover, the 2015 rule only partially fixed the flaws in the original 1998 reintroduction rule.

1. Independent Scientific Review in 2001 Recommended Effectively Preventing Wolves From Scavenging on Non-wolf-killed Livestock Carrion, That the Instant Rulemaking Still Does Not Address.

In 2001, the Fish and Wildlife Service contracted with the Conservation Breeding Specialists Group to conduct the official three-year review of the reintroduction program, as required under the 1998 10(j) reintroduction and management rule. The four experts contracted by CBSG recommended a suite of regulatory changes including that livestock operators using public lands be required to remove or dispose of the carcasses of non-wolf-killed stock, in order to reduce the likelihood that wolves scavenge and begin preying on livestock.[2]

In 2004, the Center for Biological Diversity petitioned for that provision and two others recommended in the three-year review. Specifically, we requested rulemaking to define "nuisance" and "problem" wolves so as to exclude animals that scavenge on the carcasses of livestock that die from non-wolf causes. After the Service did not respond substantively to our petition, in 2006 we filed suit. In 2007, the Service initiated rulemaking and our lawsuit was dismissed as moot. But after it initially conducted a scoping period in 2007, the Service allowed the rulemaking to lay dormant for another six years. We filed suit again in 2013 and obtained a settlement agreement that led to the 2015 10(j) rule. However, that rule did not address the 2001 three-year review recommendation regarding restricting wolves' access to livestock carrion nor our request to implement that recommendation in our 2004 review.

Notwithstanding that we and other commenters again raised the issue in our June 2020 comments on the scoping notice for this rulemaking, the Service again refuses to address this ongoing cause of losses to the wild U.S. population of the Mexican wolf, which was also one of the causes of the catastrophic losses of genetic diversity that have occurred since a few years after reintroduction began in 1998, and an ongoing hinderance to replenishing (insofar as is possible) that genetic diversity. The draft supplemental environmental impact statement for the present rule-making has the following two cursory and inadequate responses to requests to address the issue:

> *Alternative that includes no take/removal provision for wolf predation on livestock where carcasses of non-wolf-killed livestock attracted the wolves to the vicinity of livestock.* We eliminated this alternative from further consideration because it does not promote flexibility in the management of Mexican wolves in the MWEPA in making decisions related to the take and removal of Mexican wolves to allow for consideration of social or economic impacts within the biological context of advancing recovery. We recognize that

[2] Paquet, P.C., Vucetich, J.A., Phillips, M.K. and Vucetich, L.M.. 2001. Mexican wolf recovery: Three-year program review and assessment, Conservation Breeding Specialist Group, Apple Valley, MN; for the U.S. Fish and Wildlife Service, Albuquerque.

> carcass removal has varying levels of logistical feasibility across the recovery area and that it is extremely difficult in remote areas. Carcass removal occurs in some areas, such as on some public lands. However, occasionally carcasses can assist in management actions for problem wolves in specific situations.[3]

And:

> **Comment:** Several commenters suggested improved rules regarding livestock carcass removal to reduce the frequency of depredations, including: (1) increasing requirements for accountability to ensure livestock owners remove dead livestock carcasses and keep track of livestock movements; (2) regulating failure to remove a livestock carcass as a form of illegal baiting, which would result in appropriate penalties; (3) providing federal dollars to help livestock owners remove carcasses (with dynamite, burning, or the application of lime); (4) requiring commitment to carcass removal as a condition for receipt of a grazing permit on federal land; and (5) not allowing removal of a wolf following a depredation event if the relevant landowner did not properly remove a non-wolf killed carcass.
> **Response**: We have forwarded these suggestions to the Forest Service and will continue to work cooperatively to reduce attractants that may increase the likelihood of depredations. Currently, the Forest Service issues carcass removal recommendations for specific areas where removal is feasible.[4]

Those two passages in the draft SEIS including the Service's response above do not analyze the nature of the problem nor do they grapple with the ongoing failure of voluntary efforts to prevent wolves from scavenging as a prelude to their preying on livestock – and then suffering removal authorized by the Service. Over the course of almost two decades, the Center for Biological Diversity, other conservation organizations, scientific experts, and members of the public have requested that the Service and cooperating agencies take action to stop the ongoing loss of wolves and of valuable genetic diversity that is caused by allowing owners of livestock to leave carrion that recurringly draws wolves into proximity with vulnerable, live domestic animals and is the cause of subsequent predation on stock and ensuing removals of wolves by the government. We again request action on this now and provide additional information in a section of this letter to follow.

2. <u>The 2015 Management Rule Illegally Curtailed Conservation.</u>

As explained by the U.S. District Court in Arizona in the ruling that remanded the 2015 rule to the Fish and Wildlife Service and required the instant rulemaking, the 2015 rule suffered from a myriad of legal deficiencies. It failed to conserve the species. It did not rely on the best available science. The rule does not ensure sufficient effective emigrants into the population, and thereby does not address the threat of inbreeding. The cap on the number of wolves as well as the increase in 'take' of wolves would worsen the future genetic outlook for the subspecies.

[3] U.S. Fish and Wildlife Service. 2021. Draft supplemental environmental impact statement for the proposed revision to the regulations for the nonessential experimental population of the Mexican wolf (*Canis lupus baileyi*); p. 17.
[4] Ibid. p. 193.

The 10(a)(1)(a) permit and accompanying pledge requiring the Service to remove wolves that leave the experimental population area in the U.S. cuts off connectivity and exacerbates the long-term genetic threat.

Regrettably, the instant proposed rule does not ameliorate or in some cases even address these identified illegalities. The solutions you do offer are not really solutions.

I. The Final Rule Must Further Conservation of the Mexican Gray Wolf.

A. The Final Rule Must Fix Deficiencies in the 2015 Management Rule

1. The Final Rule Must Reduce 'Take' In Its Myriad Forms That Cause Losses of Genetically Valuable Wolves, including through its issuance of telemetry receivers and in other provisions.

The Service's Jan. 2015 Mexican wolf 10(j) management rule increased the opportunities and circumstances in which wolves can be killed, on top of those in the Service's original Jan. 1998 10(j) reintroduction rule – notwithstanding that scientists – including the independent biologists who wrote the Service's three-year review in 2001,[5] and the American Society of Mammalogists in 2007[6] -- urged reductions in wolf mortality, not increases.

The 2015 rule loosened the criteria for when wolves might be killed for killing their natural prey such as elk, loosened criteria for when wolves might be killed for killing livestock, expands the area in which wolves may be killed or removed to south of Interstate 10, authorizes the Service to issue permits that would allow landowners to kill wolves (and even non-depredating wolves) on private lands and does nothing to prevent baiting such wolves from adjoining public lands, exculpates in advance USDA Wildlife Service agents for killing wolves that they confuse for coyotes, and establishes a hard cap on the number of wolves to be allowed in the wild in the southwestern U.S.. Those measures are all at odds with the urgent need to lower mortality to a maximum annual rate of 24.9% to grow and eventually to sustain genetic diversity. Those measures should all be repealed, not just in some limited circumstances and for a limited span of time until arbitrary standards are met. The final rule should greatly reduce the circumstances in in which Mexican wolves can be killed or removed alive from the wild.

Telemetry receivers should be restricted to federal and state personnel engaged in wolf recovery and scientists engaged in legitimate research. This rulemaking should require the Service and other federal and state agencies to retrieve from members of the public and from Catron County, New Mexico all government-owned radio-telemetry receivers that were programmed to track radio-collared Mexican wolves in Arizona and New Mexico, and cease providing additional such receivers. Providing receivers to opponents of wolf recovery in the Southwest is supposed to reduce conflicts with livestock, but there is no evidence that it is doing so. The programmed receivers make the wolves vulnerable to illegal shooting through stripping them of their abilities to stay hidden.

Given the high rate of illegal shooting of Mexican wolves, as well as the large number of wolves disappearing under suspicious circumstances (such as the simultaneous disappearance of the Middle Fork Pack's two, radio-collared alpha animals along with one pup, in early 2013),

[5] Paquet et al (2001), p. 27.
[6] Reintroduction and Conservation of the Mexican Gray Wolf, 88 J. of Mammalogy 1573 (2007).

wolf-frequency-programmed receivers should only be in the hands of government employees responsible for protecting and recovering the wolves, and in the hands of scientists studying them.

According to Department of Justice press releases coupled with records obtained from the Fish and Wildlife Service, two individuals who the Service provided with telemetry receivers programmed to wolves radio collars, pled guilty to crimes associated with illegally killing Mexican wolves.

Just yesterday, we received an initial tranche of 105 record from the Service in response to a FOIA filed four years ago, that show misuse of a telemetry receiver provided by the Service and/or USDA Wildlife Services with Fish and Wildlife Service tacit authorization to Catron County. These records show widespread abuse of the receiver by Catron County as well as a dire prediction by a Service biologist that giving them even more info would result in "dead wolves." (Had the Service complied with FOIA in a timely manner we could have analyzed and demonstrated the misuses revealed in Service files.)

It is difficult to gage the extent of misuse of telemetry receivers to destroy Mexican wolves. The 2006 baiting of the Durango Pack on the Gila National Forest in New Mexico, facilitated through a government-loaned radio telemetry receiver, provides a glimpse into the potential for additional and ongoing abuse. The incident also shows the folly of providing powerful tools that can be used against wolves to people who express their fervid opposition to wolves. A ranch employee boasted to *High Country News* that he brought a cow about to give birth close to the Durango Pack's den -- located through the government-provided telemetry receiver -- and branded the cow there (creating an olfactory lure) to draw the wolves to depredate and thus suffer the consequences. After the wolves killed the cow and newborn calf, USDA Wildlife Services shot the adult female wolf; subsequently her radio-collared mate and their lone pup disappeared. (After publication, the ranch employee denied making the statements quoted in the story. *High Country News* stood by its article, which also stated: "Armed ranchers on ATVs routinely patrol Forest Service roads in Catron County, tracking wolves with radio receivers provided by the Fish and Wildlife Service.")[7]

The final rule should provide for retrieval and retention of all telemetry receivers programmed to the wolves' radio collars, that had been loaned to people not employed in recovering the wolves or not engaged in scientifically researching them.

The final rule should prevent wolves from being removed from the wild for preying on livestock on public lands if there was not a person actively seeking to protect the stock on that allotment at the time of predation.

The final rule should prevent wolves from being removed from the wild for preying on livestock south of Interstate 10, where the population can conceivably still connect with the wolf population in Mexico, and might be able to connect in the future if and when the border wall is dismantled in whole or in part. The 2015 rule expanded MWEPA from I-10 southward to the border with Mexico in part on this non-supported rationale:

> Expanding the MWEPA was a recommendation in the Mexican Wolf Blue Range Reintroduction Project 5- Year Review (AMOC and IFT 2005, p. ARC–3). We are making this modification because the reintroduction effort for Mexican wolves now being undertaken by the Mexican Government has established a need to manage Mexican

[7] Dougherty, J. Last Chance for the Lobo: Mexican wolves caught in the crossfire in the battle over public lands. High Country News, Dec. 24, 2007.

> wolves that may disperse into southern Arizona and New Mexico from reestablished Mexican wolf populations in Mexico. An expansion of the MWEPA south to the international border with Mexico would allow us to manage all Mexican wolves in this area, regardless of origin, under the experimental population 10(j) rule. The regulatory provided by our revisions to the 1998 Final Rule would allow us to take management actions within the MWEPA that further the conservation of the Mexican wolf while being responsive to needs of the local community in cases of problem wolf behavior.[8]

That rulemaking enabled the capture and continued incarceration of a genetically valuable female wolf, F1530 (aka "Sonora") who traveled from Mexico into Arizona in March 2017. She could not have been legally 'taken' prior to 2015, had she been there then. In order to establish connectivity, the final rule should restore protections that are equivalent to those in place in the 1998 rule when wolves south of I-10 that might arrive from Mexico were accorded full protection as endangered species, and were not members of the experimental population.

The final rule should permanently remove the authority in the 2015 rule that is delegated to private individuals under Service permit to kill wolves -- including non-depredating wolves -- on private land.

The Service should stop removing wolves based on their movements crossing arbitrary boundaries, and stop allowing others to do so, for example in zone 3. The 2015 rule contained guarantees by the Service that it would remove wolves from the wild on the basis, not just of their behaviors, but under specific circumstances based on their locations solely. It pledged to remove wolves that leave the experimental population area and those on tribal lands at the requests of the tribe. It pledged to remove wolves within the population area but too far west in Arizona too early. And it authorized unlimited killing of wolves on Zone 3 lands within the experimental population area through poisons and strangulation snares:

> Also, we are revising and reissuing he Mexican Wolf Recovery Program's section 10(a)(1)(A) research and recovery permit (TE–091551–8 dated 04/04/2013) so that it applies to management of Mexican wolves both within and outside of the MWEPA. Under this permit we will authorize removal of Mexican wolves that can be identified as coming from the experimental population that disperse and establish territories in areas outside of the MWEPA.[9]

The so-called "phased management" that entails wolf removals in northwestern Arizona to protect elk, but with no justification for wolves, must also be examined, especially since and the new rule will supplant a timely 5-year review that was intended to address this issue:

> Mexican wolves can disperse naturally from Zones 1 and 2 into, and occupy, the MWEPA (Zones 1, 2, and 3). However, during Phase 1, dispersal and occupancy in Zone 2 west of State Highway 87 will be limited to the area north of State Highway 260 and west to Interstate 17.[10]

And:

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[8] 80 FR 2519
[9] 80 FR 2525
[10] 80 FR 2520

> If determined to be necessary by the 5-year evaluation, we will initiate Phase 2 (Figure 4). In Phase 2, initial releases and translocation of Mexican wolves can occur throughout Zone 1 including the area west of State Highway 87 in Arizona. No translocations can be conducted west of Interstate Highway 17 in Arizona. Mexican wolves can disperse naturally from Zones 1 and 2 into, and occupy, the MWEPA (Zones 1, 2, and 3) with the exception of those areas west of State Highway 89 in Arizona.[11]

Moreover, the Service must address the impacts of wolf removals from sovereign Native American tribes' reservations, where wolves must be removed at any time the tribes demand:

> No agreement with a Tribe is necessary for the capture and removal of Mexican wolves from tribal trust land if requested by the tribal government.[12]

The Service has given no justification for why some forms of removal based on a wolf's location are prioritized over others. The 2015 rule states, for example:

> We will not remove a Mexican wolf if a landowner (other than tribes on tribal trust lands) requests removal and the wolf is not engaging in activities that fit the definition of a ''problem wolf.'' We have clarified the language to allow the initial release and translocation of Mexican wolves onto private lands if there is an agreement with the landowner and concurrence with the State game and fish agency.[13]

The Service must now explain in the final supplemental EIS how removals based on location, in each policy provision, effect viability and recovery. In so doing, the Service must examine potential wolf habitats within and outside of the experimental population area, including but not limited to north of Interstate 40 in New Mexico, Arizona, Utah and Colorado; west into California; and east into eastern New Mexico and west Texas including Big Bend National Park, Guadalupe Mountains National Park, and the Davis Mountains. And the Service must examine connectivity to Mexico including routes of wolves that crossed in the past. The EIS must consider the benefits to recovery and to ecosystem conservation of all these places that wolves might migrate, but for provisions to remove them based on location, in relation to establishing boundaries. The final rule should eliminate all boundaries delimiting without Service discretion where wolves are allowed to roam, including within the experimental population area and when crossing outside of the experimental population area, as authorized in a ESA 10(a)(1)(a) permit. It should eliminate the additional 'take' authority, for example in snaring in zone 3, that is based on geography in the 2015 rule.

Wolves should not be removed for natural predation on wildlife. The Service must reconsider the effects on genetics and on ecosystems consistent with the Act's purposes of authorizing the killing of wolves to protect native ungulates such as elk. The final rule should permanently remove this 'take' provision and not just temporarily.

There should be no default population cap on the number of wolves through managing for an average of 320 or above or anything similar. An abundance of studies including those

[11] 80 FR 2521
[12] 80 FR 2525, 2563
[13] 80 FR 2527

relied on by the Service in its 2015 rulemaking, and the Service's own Mexican Wolf Recovery Team, state that at least 750 wolves must exist in a metapopulation to ensure recovery. Even above that number there is no conservation or ecosystem benefit in removing wolves, including genetically valuable wolves that would have to be removed once the bi-state population is significantly higher than 320. The Service must analyze the downsides of a population cap that would require wolf removals from the single, isolated, genetically depleted population in the U.S., and the supplemental EIS must explain how preventing population growth comports with the Act's purposes.

The 2015 rule's population cap was premised on the future addition of more populations that would supposedly be spelled out in recovery plan, which didn't happen in the politically-directed 2017 recovery plan and is not contemplated or made possible through the instant proposed rule.

Private wolf trapping must be banned. The final supplemental EIS must consider how allowing so-called unintentional trapping of Mexican wolves comports with the Act's purposes, through a numeric and genetic analysis of the fates of the numerous Mexican wolves that have been trapped. The Service should discontinue allowing wolves to be trapped and instead make trapping or snaring of a wolf throughout the experimental population area, a violation of the rule. The Service's allowing of private trapping has already harmed numerous wolves, including in last year wolf M1693 who is one of the genetically valuable animals initially cross-fostered from captivity.

Private shooting of wolves must be banned. The Service should permanently end all opportunities to shoot wolves and get away with it. The final rule should state that the Justice Department's so-called McKittrick policy that bans prosecution of people (including USDA Wildlife Services employees) who claim they think that a wolf is a coyote, and shoot the wolf, will not apply to the Mexican wolf in the experimental population area. It is imperative that the standard of ethical hunters to know one's target before pulling the trigger, apply in the cases of Mexican wolves. Recklessness or even in some instances malice and bad intent should no longer be facilitated under the law, particularly given the very high number of wolves that are shot by persons unknown, and the excuse of mistaking the wolf for a coyote or dog proffered by most of the few shooters who have been charged with violations of the Act or associated violations of public property (for destroying radio collars).

2. <u>The Final Rule Must Stop Livestock Owners From Leaving Carrion of Non-wolf-killed Livestock For Wolves to Scavenge</u>.

On both private and public lands, livestock owners should be required to properly dispose of carcasses of stock that die from non-wolf causes, so as to render them entirely unpalatable to wolves and thereby prevent scavenging and ensuing predation on live stock. Wolves that scavenge on domestic livestock that died of non-wolf causes should not be removed from the wild for killing livestock afterwards.

Livestock die before they are destined for slaughter for a variety of causes, including from illness, birthing problems, eating poisonous plants, and predation by mountain lions, black bears and coyotes. Once wolves scavenge on carrion from domestic animals, they may stay closer to the area where they found such food, and therefore may be more likely to end up preying on vulnerable nearby livestock.

The U.S. Fish and Wildlife Service's independently-conducted 2001 three-year review of the Mexican wolf reintroduction program recommended that the Service require livestock

owners to take responsibility for carcass removal or disposal, noting that at least three packs had been removed from the wild because they first scavenged on dead livestock left on national forest land.[14] The American Society of Mammalogists reiterated this recommendation for Mexican wolf recovery in 2007.[15] In 2011, researchers who examined wolf scavenging on livestock carrion and their predation behaviors in Alberta, Canada, recommended "sanitary disposal of dead livestock to prevent wolves from becoming accustomed to feeding on livestock."[16]

Oregon and Washington both provide some degree of protection for wolves by premising potential removal actions on the wolves not having been baited. In Oregon, the wolf management plan requires that "[n]o identified circumstances exist that are attracting wolf-livestock conflict" before wolves can be targeted for removal.[17] In Washington, the management plan similarly premises the killing of wolves on "no evidence of intentional feeding or unnatural attraction of wolves by the livestock owner."[18]

In reintroducing northern Rocky Mountain gray wolves to Yellowstone National Park and central Idaho in 1995, the Fish and Wildlife Service premised the removal of depredating wolves on their not having been attracted to livestock in the place where they were depredating:

> The Service and authorized agencies of the Service would use the following conditions and criteria to determine the status of problem wolves within the non-essential experimental population area . . . (2) No evidence of artificial or intentional feeding of wolves can be present. Improperly disposed of livestock carcasses located in the area of depredation will be considered attractants.[19]

In order to prevent wolves from scavenging, livestock carcasses can be doused in gasoline and burned, when there is snow on the surrounding ground or otherwise it is safe. With road access, carcasses can be removed or buried by backhoe. A carcass can even be exploded into pieces too small to attract a wolf via dynamite. But perhaps the most versatile technique is to dump lime, which can be brought in on horseback, on the carcass to immediately decompose it.

Requiring that owners of domestic livestock remove or render inedible the remains of their animals that die of non-wolf causes before any wolves scavenge on them, should be required through exculpating in advance, and holding harmless and not molesting in any way, any wolf that scavenges on domestic livestock that died of non-wolf causes, for the extent of the wolf's natural life thereafter, for any subsequent depredations that he or she may commit.

The voluntary approach is not working. The Center has been requesting for almost two decades not only regulatory action, but also documentation of when wolves feed on dead livestock that died of non-wolf causes. That too has not been granted, but information that does

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[14] Paquet et al (2001), pp. 67-68.
[15] Reintroduction and conservation of the Mexican gray wolf, eighty-seventh annual meeting American Society of Mammalogists. 2007. Journal of Mammalogy, 88(6):1570–1576, 2007; p. 1573.
[16] Morehouse, A.T. and M.S. Boyce. 2011. From venison to beef: seasonal changes in wolf diet composition in a livestock grazing landscape. Front Ecol Environ 2011; doi:10.1890/100172; p. 1.
[17] Oregon Wolf Conservation and Management Plan, p, 51.
[18] Wiles, G. J., H. L. Allen, and G. E. Hayes. 2011. Wolf conservation and management plan for Washington. Washington Department of Fish and Wildlife, Olympia, Washington, p. 88.
[19] 59 Fed. Reg. 60272 (Nov. 22, 1994).

come out shows how scavenging leads to predation on livestock, and then wolf removals. The Service should require action in the final rule as well as full documentation.

3. The Final Rule Must Not Thwart Ecosystem Conservation As Did the 2015 Rule.

The Service must comply with Endangered Species Act sections 10(d) and 2. The 2018 Court ruling faulted the Service for not complying with Endangered Species Act Section 10(d), which states as follows:

> PERMIT AND EXEMPTION POLICY.—The Secretary may grant exceptions under subsections (a)(1)(A) and (b) of this section only if he finds and publishes his finding in the Federal Register that (1) such exceptions were applied for in good faith, (2) if granted and exercised will not operate to the disadvantage of such endangered species, and (3) will be consistent with the purposes and policy set forth in section 2 of this Act.

Section 10(a)(1)(a) is the basis for the authorization of 'take' provisions in Section 10(j). In order to comply with Section 10(d), the Service must make a finding based on facts that the agency acted in good faith in expanding take provisions. The Service must also explain how each facet of its take provisions does not operate to the disadvantage of the Mexican wolf.

Furthermore the Service must ensure that the take is consistent with section 2, which in states in part:

> (b) PURPOSES.—The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section. (c) POLICY.—(1) It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act.

Note that Section 10(d) is the only part of the Act that specifically requires consistency with the purposes and policies of the Act. On this basis, not only must the upcoming rule ensure the conservation of the Mexican wolf, it also must ensure the conservation of the Mexican wolf's ecosystems. Accordingly, the upcoming DEIS must consider and identify the Mexican wolf's ecosystems. It should do so based in part on analysis of the Mexican wolf' historic range, the subspecies genetic status and plight, and the size of the population and the area that will be required to support it in order to ensure future viability and future recovery. After identifying the Mexican wolf's ecosystems, the Service must then consider what is important in conserving those ecosystems. As part of that process, the Service must apply the scientific advances in understanding predators' importance to ecosystem functioning, including in the effects on other species of animals and plants known as trophic cascades.

The Service must incorporate scientific findings on wolves' roles in their ecosystems from elsewhere and analyze those effects and how they would be influenced in the upcoming rule. The Service must address how 'take' of wolves effects their ecosystems, as well as how other practices authorized or sanctioned in or stemming from rule-making, such as the artificial

feeding of (most recently reported) 70% of wolf packs in the Southwest, may serve to prevent the development of natural trophic cascades, and undercut the conservation of the Mexican wolf's ecosystems.

The Endangered Species Act's first statement of purpose is "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved."[20] Biologists explicating how that might be carried out point to the recovery criteria as a means to ensure that statement of purpose is fulfilled. "Ecosystem-focused criteria [in recovery plans] are important not only for ensuring sufficient habitat quantity, quality, and connectivity, but also for restoring the ecological function of species by maintaining abundance at a level that provides a particular ecosystem function (Soulé et al. 2005, Estes et al. 2010)," according to a 2015 review article in *Bioscience* that stressed in particular the importance of restoring this function "for strongly interactive species that are key to ecosystem structure and function such as keystone species, foundation species, ecosystem engineers, and top predators (Soulé et al. 2005, Carroll et al. 2006)."[21] The authors pointed out that the Service in at least one instance has adapted this approach: "A recent example is the ecosystem delisting criterion for the northern sea otter (*Enhydra lutris kenyoni*) in southwestern Alaska, which requires otter abundance to reach population levels that bring about a shift of more than half of otter habitat to a kelp-dominated state (USFWS 2010)."[22]

Few if any other species have been so closely and scientifically tied to their ability to shape and conserve their ecosystems, as the gray wolf, through the ecological process of initiating trophic cascades. Yet, through limiting the wolf population to 320 – 380 animals within the U.S., the draft recovery plan would preclude establishment of trophic cascades initiated by Mexican wolves.

The term "trophic cascades" refers to the trickle-down processes triggered by the predatory behaviors of top-of-the-food-chain animals such as wolves on the numbers and/or the behaviors of their prey species and on a variety of other species affected in turn. Insofar as a robust population of wolves hunts herbivores such as elk, the trophic cascades initially manifest in increases in the numbers and distributions of plants fed on by those herbivores. Insofar as wolves prey on smaller carnivores such as coyotes, the trophic cascades initially manifest in increases in the numbers and distributions of those meso-predators' own prey animals – such as foxes in Yellowstone National Park, pronghorn in Grand Teton National Park or hares in the Midwest. The affects of trophic cascades can continue to ripple through the ecosystem, as for example, in portions of Yellowstone National Park, through the regeneration of riparian forests that were previously browsed so heavily by elk as to prevent survival of saplings; now, 22 years after wolves were reintroduced, maturing cottonwoods support a new abundance of nesting songbirds. Some cottonwoods and other trees spared from elk are utilized by a resurgent beaver population, whose dams support fish and will – over the course of decades – silt in and provide meadow habitat that future generations of elk will utilize.

Yet, when the wolves prey on the ecosystem-degrading livestock, they are usually removed from the wild, thus keeping wolf numbers lower than they would be otherwise and directly undercutting the establishment of trophic cascades tiered to livestock-induced changes in the ecosystem, as well as indirectly precluding establishment of elk-related trophic cascades.

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[20] Endangered Species Act, Sect. 2(b).

[21] Wolf, S., B. Hartl, C. Carroll, M. C. Neel and D. N. Greenwald. 2015. Beyond PVA: Why recovery under the Endangered Species Act is more than population viability. Bioscience. 215 65(2):200-207 (Feb. 2015); pp. 201-202.

[22] Ibid, p. 202.

Indeed, research shows that no such trophic cascades are apparent in the Southwest, precisely because there are too few wolves: "The low number of Mexican wolves relative to their primary prey (elk) suggests that an ecologically effective density of wolves has not become established in east-central Arizona. Furthermore, the lack of recent aspen recruitment in stands accessible to elk indicates an absence, to date, of a tri-trophic cascade."[23]

Once wolves become more numerous on a landscape, at some point their effects begin to manifest as trophic cascades. Once they are at or very close to their "carrying capacity" based on available biomass that they might eat, they are no longer killing prey that would likely have died of other causes had the wolves not gotten them. Therefore the wolves' relatively-high numbers would be sure to exert an ecological effect, which might not occur at lower wolf numbers since their predation then would likely be "compensatory" and not additive to other causes of death in the population (such as elk) on which they subsist.

The proposed rule would essentially cap Mexican wolf numbers at a little over 320 in the U.S.. That is too low to allow the wolves to trigger trophic cascades because it is well below the wolf carrying capacity for the entire MWEPA where they would be permitted to roam. The carrying capacity for the (former) Blue Range Wolf Recovery Area, which is a fraction of the size of the MWEPA, was calculated at 468 animals based on the biomass of elk and deer alone and not counting other animals that wolves eat such as hares, beaver, peccary, bighorn sheep and more.[24] For that reason, even were there to be 380 wolves in the BRWRA alone, it is not clear that that would suffice to trigger trophic cascades; but a lower number of around 320 wolves distributed over a much larger landscape certainly will not do so. The final rule must ensure ecosystem conservation.

B. The Final Rule Must Be Based on the Best Available Information, Not on the Unscientific 2017 Mexican Wolf Recovery plan.

The proposed rule asserts its reliance on the best available science by citing to the 2017 Mexican wolf recovery plan. That recovery plan underlies decisions in the proposed rule on how many wolves to release from captivity to the wild and, supposedly though not actually, justifies those releases consisting of neonatal pups without their parents released into non-related wolves' dens in the wild. The recovery plan underlies the proposed rule's decision to maintain an "average" of 320 wolves or higher in the population – an unstated cap on the population that the Service in the proposed rule concedes it would impose through lowering the levels of food given the wolves and increasing the number that it would removal (alive or dead) from the wild.

However, the recovery plan is not based on the best available science, as shown in a 2019 study that showed that the population and viability assessment underlying the recovery plan's recovery actions and its delisting criteria showed unwarranted and overly-optimistic assumptions pertaining to survival rates, inbreeding and reproduction, and normalized an almost unprecedentedly high risk of extinction.[25] The recovery plan and its standard of wolf releases and eventual recovery do not represent the best available science on the Mexican wolf.

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[23] Beschta, R. L. and W. J. Ripple. 2010. Mexican wolves, elk, and aspen in Arizona: Is there a trophic cascade? Forest Ecology and Management 260: 915–922.

[24] Paquet et al (2001), p. 47.

[25] Carroll, C., R.C. Lacy, R.J. Fredrickson, D.J. Rohlf, S.A. Hendricks and M.K. Phillips. 2019. Biological and sociopolitical sources of uncertainty in population viability analysis for endangered species recovery

1. Measuring Extinction Risk Only to 100 Years and Accepting An "Approximately" Ten Percent Chance of Extinction Within That Span is Unreasonable.

The recovery plan sets an inadequate goal that the threshold for recovery should include only two, and not connected to each other, wild populations with each facing an approximately 90% chance of persistence over just 100 years: "We consider a population that has approximately a 90% probability of persistence over 100 years to contribute to achieving recovery criteria, as described in our Rationale for Recovery Criteria." In that rationale, the recovery plan defines "a *resilient* population" as a population that "is able to maintain approximately a 90% likelihood of persistence over a 100-year period. At this level of *resiliency*, the threat of demographic stochasticity has been ameliorated because the population is secure from random population fluctuations and mortality rates are sufficiently low to allow for stable, long-term persistence of the populations (USFWS 2017a)." That latter citation is to the accompanying Biological Report on the Mexican wolf, which merely reiterates the specious rationale:

> Ensuring wild populations represent approximately 90% of the gene diversity retained by the captive population provides a guideline for *representation* based on community of practice in the management of captive populations (Siminski and Spevak 2016). We consider approximately 90% to be a reasonable bar for recovery because it ensures wild populations contain a high degree of the genetic diversity available, while recognizing that we cannot control breeding events in the wild and need flexibility in our management of wolves (e.g., removals may impact the gene diversity the population).[26]

Moreover, the recovery plan cites the PVA that underlies that biological report, to show that, with that "approximately" 90% threshold for persistence over 100 years, an average of just 320 animals in the U.S. wild population will suffice: "Based on population viability modeling, we predict the MWEPA population will achieve *resiliency* when an average population of 320 wolves can be maintained for eight years, given an average adult mortality rate below 25% (Miller 2017)."

However, because the approximately-90%-persistence-probability-over-100-years threshold criterion is inadequate, so also is the low average of 320 wild wolves in the U.S. inadequate as a recovery criterion. Furthermore, we demonstrate in the following sections that the biological report and the PVA rely on untenable assumptions that undermine their conclusions. So, even considering the approximately-90%-persistence-probability-over-100-years criterion to be adequate – which we reiterate it is not – the PVA and biological report are incorrect in arriving at a (pre-set) average of 320 wolves that would suffice to meet that threshold.

One hundred years is a very short threshold to measure the chances of extinction. Species and subspecies such as the Mexican wolf can be doomed to extinction within a fraction of a century yet still contain some remnant survivors in just 100 years. One hundred years is only 25 Mexican wolf generations,[27] which is a small number of generations in which to assess the effects of inbreeding. In contrast, for example, the isolated population of gray wolves on Isle

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planning. Scientific Reports, 9:10130. http s://doi.org/10.1038/s41598-019-45032-2.

[26] Biological Report, p. 45.

[27] Miller, P.S. 2017. Population Viability Analysis for the Mexican Wolf (Canis lupus baileyi): Integrating Wild and Captive Populations in a Metapopulation Risk Assessment Model for Recovery Planning; p. 6.

Royale National Park, with fewer founding and other contributing members (3) than the Mexican wolf subspecies (7), due to inbreeding depression was all but extirpated (with one or two surviving animals) before a reintroduction program was recently begun. But the fact that it survived so long, with fewer than half the number of founding animals than the number of survivor/founders of all current Mexican wolf populations, shows that even a genetically-doomed population can retain a few survivors for exceptionally long period of time. Other recovery plans, appropriately, assess the risk of extinction over much longer timeframes.

A more reasonable assessment of risk by the Service would have defined "resilience" for the sake of establishing a threshold for population persistence, at a point where the population would have a 99% probability of persistence over a 500-year period. That would have led to the need for a much larger effective population (i.e. number of animals that successfully reproduce) with greater genetic diversity than the Service is managing and planning for.

2. Goal of Representing Only 90% of Captive Population's Genetics Within Wild Populations Will Worsen Inbreeding Depression

The recovery plan and associated biological report provide not only an inadequate but also a dishonest justification for its bedrock criterion that gene diversity in the wild populations should comprise approximately 90% of the diversity in the captive population. The recovery plan states: "Ensuring wild populations represent approximately 90% of the gene diversity retained by the captive population provides for *representation* based on community of practice in the management of captive populations (Siminski and Spevak 2016)." The explanation is repeated at greater length:

> *Representation*
> The gene diversity criterion ensures that Mexican wolf populations have genetic *representation* and that genetic threats have been ameliorated, while having Mexican wolves across large portions of their range ensures ecological *representation*. Ensuring gene diversity in the near term will help ensure that inbreeding depression is avoided, while over a longer timeframe it will ensure the Mexican wolf has the ability to respond and adapt to various and changing environmental conditions. We consider the degree to which wild populations contain the gene diversity (expected heterozygosity) available from the captive population to be an important indication of genetic *representation* for recovery (USFWS 2017a). Ensuring wild populations represent approximately 90% of the gene diversity retained by the captive population provides for *representation* based on community of practice in the management of captive populations (Siminski and Spevak 2016). We consider approximately 90% to be reasonable for recovery because it ensures wild populations contain a high degree of the gene diversity available (Siminski and Spevak 2016), while recognizing that we cannot control breeding events in the wild and need flexibility in our management of wolves (e.g., removal of Mexican wolves from the wild for management purposes may positively or negatively affect the gene diversity of the population).

However, this passage misuses the citation from Siminski and Spevak (2016), which publication consists of the annual species survival plan (SSP) for conserving the captive population of

Mexican wolves. The 90% threshold for retaining gene diversity is specific to captive populations, i.e. those managed by the American Zoological Association or AZA:

> **Green Species Survival Plan® (Green SSP) Program –** A Green SSP Program has a population size of 50 or more animals and is projected to retain 90% gene diversity for a minimum of 100 years or 10 generations. Green SSP Programs are subject to AZA's Full Participation and Non–Member Participation Policies.
> **Yellow Species Survival Plan® (Yellow SSP) Program –** A Yellow SSP Program has a population size of 50 or more animals but cannot retain 90% gene diversity for 100 years or 10 generations. Yellow SSP participation by AZA institutions is voluntary.[28]

The recovery plan repeats the phrase "community of practice in the management of captive populations" to attempt to justify the misapplication of the 90% proportion from its original context to an arbitrary, new context. Consistent with SSP programs' usage of the 90%-threshold for classifying captive-breeding programs for endangered wildlife as "green" or "yellow," this SSP assessed the implications for the Mexican wolf: "When gene diversity falls below 90% of that in the founding population reproduction may be increasingly compromised by, among other factors, lower birth weights, smaller litter sizes, and greater neonatal mortality. The current gene diversity of this population is 83.07%."[29] And the SSP projects that gene diversity in the captive population will decrease even further in the future.

There is no logical reason for the recovery plan to take the already-inadequate 83.07 percent of the diversity inherited originally from the seven founding/surviving wolves, account for continued erosion of that diversity well-below the recommended 90% minimum of the founders' diversity, and then apply a 90% proportion to the resulting genetic diversity to reach a standard to attain and retain in the wild populations. Seven founding members of the entire subspecies is already too low. Eighty-three percent of their genetic diversity is already too little. Projected additional loss is unacceptable and unnecessary. To conserve in the wild only approximately 90% of what will then remain in captivity is akin to holding on to just a fraction of a life-giving force that has already been reduced excessively. Invoking "community of practice in the management of captive populations" doesn't make that acceptable or in any way mitigate the infirmities in reproduction and survival that such a low genetic standard would all-but-guarantee.

Planning for approximately 90% of the captive population's future genetic diversity to be represented in the wild in two separate populations falls significantly short of the recovery plan's fantastical speculation that "genetically diverse wild populations in the MWEPA and northern Sierra Madre Occidental will be better able to respond to not only the current range of habitat conditions, but also future changing conditions such as shifts in prey availability, drought, or other environmental fluctuations." Dr. Philip Hedrick, the "dean" of Mexican wolf genetic analysis, wrote in 2017 that even three connected populations with 250 Mexican wolves in each "is not adequate to maintain genetic variation for future adaptation."[30] The question is not whether the "approximately"-90%-threshold would allow wild Mexican wolves to adapt to a

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[28] Siminski, P. and E. Spevak. 2016. Population analysis and breeding and transfer plan: Mexican wolf Species Survival Plan yellow program. Association of Zoos and Aquariums, Silver Spring, Maryland; p. 69.
[29] Ibid., p. 2.
[30] Hedrick, P. 2017. Genetics and recovery goals for Mexican wolves. Biological Conservation 206: 210-211 (Feb. 2017).

rapidly changing world – it will not – but rather to what extent that threshold would consign such populations to reduced reproductive and survival rates, and how quickly.

The captive population's declining and already-depleted genetic diversity should not be the metric for assessing the sufficiency of the wild population's genetic diversity. The Service acknowledges that "[t]he Mexican wolf captive population is an intensively managed but genetically depauperate population."[31] It acknowledges that "In its current condition, the population would be expected to retain 75% gene diversity over 60 years and only 70.22% in 100 years."[32] Tying the wild population's genetic future to that of the captive population solely is like tying a life-raft full of people to a slowly-sinking ship; instead, the people in the raft must salvage what they can from the ship but eventually set out for shore.

The recovery plan's explanation for why only approximately 90% of genetic diversity in the captive population will be represented in the wild population doesn't hold water: "Unlike the captive breeding program, where specific wolves can be paired to maximize the retention of gene diversity, we cannot control which wolves breed in the wild. Due to this, and because introductions of wolves from the captive population is limited to those wolves that are over-represented in captivity, we expect gene diversity in the wild to be lower than in the captive population."[33]

In fact, there are several steps that the recovery plan could undertake to ensure that the wild populations end up with much greater genetic diversity than "approximately" 90% of the future, diminished diversity of the captive population. For example, the Service could (and should) establish new recovery and reintroduction areas in the southern Rocky Mountains and the Grand Canyon ecosystem and work with states to ensure some degree of natural connectivity through dispersal between Mexican wolves and northern gray wolves, while also ensuring that northern wolves do not genetically "swamp" Mexican wolves. This is consistent with the recommendations from geneticists: "If the reintroduced population does not increase soon, it may be necessary to consider extraordinary measures, such as introducing northern gray wolves, a closely related subspecies (Leonard et al. 2005), into the reintroduced Mexican wolf population."[34] Although the population did increase, because of mismanagement that increase was accompanied by a decline in genetic diversity. Re-establishing natural connectivity is now necessary.

The decision that wild populations will only retain 90% of the genetic diversity that will be available in the captive population is also at odds with previous Service policy. The 2010 Mexican Wolf Conservation Assessment stated that "For the purpose of the reintroduction, the success of the captive program is only meaningful if genetic variation is transferred to the wild population."[35]

Retaining just "approximately" 90% of the captive population's genetic diversity in the wild population also flouts the longstanding scientific consensus about the role of the captive population in recovery. A 2010 scientific study stated that "It was assumed that the increase in fitness from lineage crossing would be used expeditiously to enhance the numbers of wild wolves and that a second round of crosses [between Mexican wolf lineages] would not be

[31] Biological Report, p. 34.
[32] Ibid.
[33] Ibid, p. 35.
[34] Hedrick & Fredrickson (2010), p. 622.
[35] U.S. Fish and Wildlife Service (2010), p. 76.

necessary."[36] The 2016 SSP document widely cited in the biological report reflected the underlying assumption that the genetic status of the wild populations would improve in large part because the number of wolves in that population would increase, and both positive trends would over time lessen the need for as large a captive population: "The number of captive wolves needed for the current reintroduction effort has decreased greatly, as the reintroduced population has grown,"[37] with nothing to suggest that this need would not continue apace. The SSP expected that genetic diversity in the wild populations would be "initially lower" than in the captive population "as the wild population was begun with animals that were already genetically well represented within the captive population."[38] This shows again that the disparate genetic diversity between wild and captive wolves is a momentary artifact of the cautious sequence of wolf releases, and that, until issuance of the recovery plan, nobody conceived of that disparity as a goal to achieve and maintain.

3. Final Rule's Genetic Goals Should Include Actual Genetic Standards, Despite Recovery Plan Chicanery.

The 2017 Mexican wolf recovery plan's delisting standard that 22 introduced wolves survive until breeding age is incorporated into the instant proposed rule. It has no scientific basis in achieving conservation. Here is the sole source of this supposedly scientific standard from the PVA which was crafted to try to uphold the preconceived recovery standards and to justify minimizing wolf releases and setting no meaningful restrictions on removals:

> Both demographic and genetic viability of the MWEPA population is improved through releases of wolves into this population from the SSP. The results of the PVA reported here indicate that it is difficult to retain relatively high levels (e.g., at least 90%) of population-level gene diversity in MWEPA relative to the SSP, even if the risk of the MWEPA population declining to extinction is very low. This suggests that the current release schedule laid out in the Mexican Wolf EIS may be insufficient to adequately bolster the genetic integrity of the MWEPA. Under the conditions simulated in this analysis, the transfer schedule laid out in the EIS specifies a total of seven pairs and associated pups. Our modeling effort therefore removed 14 adults and 21 pups from the SSP population. However, because of the documented levels of post-release mortality discussed in this report (see Table 3 page 16), only four adults and 10.4 pups survive after release to the next breeding cycle. The pups will have another round of mortality before they are recruited into the adult stage; hence, a total of seven pups survive after release to adulthood, meaning that a grand total of eleven adults are added to the MWEPA population from 35 wolves released from the SSP. If this effective number of adults added to MWEPA through releases were, for example, doubled to 22 wolves, the genetic benefit may be substantial. Preliminary analysis of this scenario (not reported in detail here) suggests just such an outcome. Interpretation of these types of results is critically dependent on the threshold by which genetic integrity will be judged, but the general concept remains highly relevant. An alternative to increasing the number of wolves released from the SSP is to increase the survival of the same number of animals

[36] Hedrick & Fredrickson (2010), p. 622.
[37] Siminski & Spevak (2016), p. 8.
[38] Ibid, pp. 8-9.

> immediately following release, so that a specified target of effective releases can be achieved. Careful consideration must be given to the relative costs and benefits of each alternative before changes to management activities are recommended.[39]

Even if those 22 animals were to survive and reproduce at the anticipated rates (and the wolves released since 2016 are already not doing so), that supposedly canonical number 22 merely indicates being twice as effective in increasing genetic diversity as the earlier contemplated number of 11 releases, which number was already based on unrealistic and optimistic assumptions.

The 2017 recovery plan should have set standards to measure reproduction of released wolves and introgression of underrepresented genes into the populations in ensuing generations. There is no reason to calibrate recovery goals nor the instant proposed rule's goals to projections of genetic diversity rather than the reality.

Finally, even if one were to assume the validity of the PVA's inputs and assumptions (which we do not) ,the PVA analyzed and the recovery plan anticipated the genetic and population-persistence effects of survival of 22 animals released to the wild as family groups, not as neonatal pups taken from their parents. Not only are ensuing survival rates but also ensuing reproduction rates turn out differently depending on whether family groups or pups without their birth families are released. Thus, even in accepting all the Service's other (ludicrous) claims at face value, it still does not represent the best available science in the instant rulemaking to only release neonatal pups and to consider 22 of them surviving for two years an adequate amelioration of the threat of inbreeding.

The goal for the recovery plan should have been, and for the final rule should still be the same as the goal of the Mexican Wolf Species Survival Plan for the captive population: The SSP recommended increasing ancestry from the Ghost Ranch and Aragon lineages to as much as 25% each, and reducing the McBride lineage to 50%.[40]

4. Delisting Criteria Tied to 320 Wolves Are Insufficient and Arbitrarily Derived, and Cannot Serve to Justify Managing For Around 320 Wolves in the Instant Rulemaking

The proposed rule cites the recovery plan as the basis for the intent to manage for an average of 320 or more wolves – essentially to cap the population. That number was pre-determined and derives from inputs to the PVA and the assumptions written into it intended to downgrade the threat represented by inbreeding, with the goal of lowering the number of wolves and the number of isolated populations that the PVA model would conclude are necessary to protect against extinction.

The mortality rates used in PVA modeling are unlikely to reflect future mortality rates. The PVA analysis assumed that average annual wolf-mortality rate would be limited to a maximum of 24.9%. Yet the Fish and Wildlife Service acknowledged eight years ago that mortality was likely to go up, not down in the U.S. population: "We consider the potential for wolf mortality due to illegal killing, vehicular mortality, or removal due to depredation or nuisance issues as likely to occur at the same or increased levels, compared to current levels, as

[39] Mexican wolf PVA. 2017, p. 44.

[40] Hedrick, P. W. and R. Fredrickson. 2010. Genetic rescue guidelines with examples from Mexican wolves and Florida panthers. Conservation Genetics, 11:615-626, p. 619.

wolves disperse within the MWEPA"[41] (as a consequence of wolves occupying areas with higher livestock densities than in the former Blue Range Wolf Recovery Area, i.e. Gila and Apache National Forests, where most of the population has lived since reintroduction). In assuming in the PVA that it could limit the average annual wolf-mortality rate to 24.9%, the Service assumed that the relatively-low mortality rate from 2009 to 2015 could be replicated consistently in the future. The overall mortality rate from 1998 through 2015 was much higher, and was not used in the calculations that arrived at the 320-number as a threshold for delisting because it would require a much-larger number than 320 to address the genetic effects of higher mortality on overall population viability:

> Thus, we chose to rarefy depredation related removals by 50% (removal rates were approximately 50% higher for adults (the most robust data) during 2003-2008 relative to other time periods) during 2003 to 2008 to normalize the aspect of the data that was impacted by the management strategy and to redo the analyses with the full complement of other data (mortalities and radio days). This resulted in the reduction of 5 removals from the overall analyses.[42]

The Service's senior Mexican wolf biologist John Oakleaf informally explained in a more straight-forward manner, in an email that we obtained via the Freedom of Information Act, the choice to utilize mortality data only from 2009 to 2015: "I think it also illustrates the wisdom of not utilizing Mexican wolf data in the original version of the modeling effort because the population would obviously crash with the mortality and removal figures."[43]

By cooking the books in the inputs to the PVA analysis, the Service created conditions in the model that don't reflect the reality of the past 24 years but that it claims will be the reality in the future -- even as the evidence shows that an entirely new and different regulatory and management approach would be necessary to achieve that.

The PVA modeling did not account for causal relationships between reductions in supplemental feeding and increases in mortality and in inbreeding depression. The Service acknowledges "that the maximum number of pups in the summer is affected by feeding efforts,"[44] which the Service explains as follows:

> Diversionary food caches are road-killed native prey carcasses or carnivore logs provided to denning wolves to reduce potential conflicts with livestock in the area. Diversionary food caches have been used on increasing proportions of the population since 2009, providing about 10 pounds of meat per wolf every two to three days sometimes for several months when the likelihood of depredations are high (e.g., during denning season). In 2016, we provided diversionary feeding for approximately 70% of the breeding pairs during denning season (U.S. Fish and Wildlife Service files). This management change away from wolf removal and toward proactive management,

[41] U.S. Fish and Wildlife Service (2014), Appendix D, p. 2.
[42] Miller (2017), Appendix D, Addendum, p. 67.
[43] Email from J. Oakleaf to D. Smith and cc.ing R. Fredrickson, T. Melbihess and M. Phillips entitled "re: meeting notes addition" and sent at 4:23:01 pm on Feb. 25, 2016.
[44] Biological Report, p. 32.

> coupled with a shift toward mostly wild-born wolves was accompanied by a lower mortality rate in the population.[45]

The Service also claimed that it will reduce that supplemental feeding:

> As described earlier in the explanation of litter size calculations for wild adult females, the presence of diversionary feeding influences the size of that female's litter. Management authorities in the United States and Mexico estimate that about 70% of pairs are currently receiving diversionary feeding in each country. As the populations grow, the extent of feeding will decline due to logistical complexities and other sociological factors. The rate at which feeding declines will be a function of the rate of population growth to the management target; populations that are growing at a faster rate will experience a more rapid decline in the rate at which they are fed. This dynamic diversionary feeding process was incorporated into all our population simulations. We assumed that feeding will begin to decline five years into the simulation, with the subsequent rate of decline from 70% feeding determined by the extent of growth toward that population's management target. Authorities assume that the long-term feeding rate will not drop to zero but will likely be maintained at approximately 15% to allow for management of occasional livestock depredations.[46]

However, the recovery plan does not analyze or even consider the effects of reducing that supplemental feeding on future wolf predation on livestock and how that would affect wolf mortality. All else being equal – and the recovery plan suggests no offsetting actions – there will be more depredations and more political pressure on the Service and state governments (particularly after downlisting when states will assume more authority) to authorize wolf removals – as well as more individual efforts under the 2015 10(j) rule's expanded authorities to kill wolves.

Moreover, masking the deleterious effects of inbreeding through widespread supplemental feeding may delay the purging of damaging alleles from the population and ultimately – once supplemental feeding is reduced – make the recrudescence of inbreeding more lethal and otherwise harmful to the population than before. But the Service neglects to consider this factor, too.

Moreover, the PVA modeling systematically underestimated the effects of inbreeding depression. The PVA model inexplicably and unreasonably quadrupled the causal power of "age of dam" in order to reduce the causal explanation from inbreeding in its analysis of whether a wolf pair would breed, thus arriving at the equivocal and less-alarming-sounding statement that "[o]ur data suggest that probability of an adult pair producing pups in the wild is a function of age of the dam and relationship of the paired female to her mate (i.e., the predicted inbreeding coefficient of the pups)."[47] Had the PVA not been structured so as to boost the explanatory power of the age of the dam, the extent of inbreeding depression would have come into clearer focus.

The Service also relied on the fallible memory of Service wolf biologist John Oakleaf in assuming that supplemental feeding began in 2009 or later as a method of curtailing wolf predation on livestock. In fact, contrary to the draft Biological Report's statement that

[45] Biological Report, p. 33.
[46] Miller (2017), p. 10, lines 382-395.
[47] Biological Report, pp. 31-32.

"[d]iversionary food caches have been used on increasing proportions of the population since 2009,"[48] this management practice was widespread and common even earlier, as shown in the annual progress reports and the Service's 2010 Conservation Assessment, throughout the entirety of the reintroduction program, and increased in duration and frequency beginning in 2007 and more so in subsequent years.

So although the PVA and Biological Report acknowledged to a limited effect that supplemental feeding masks the extent and effects of inbreeding on pup birth and survival – through underestimating the duration of significant supplemental feeding -- the Service underestimated the masking effect of the practice and thereby underestimated the effects of inbreeding – which also enabled the agency to improperly set a delisting threshold at the genetically-insufficient number of 320 animals in the U.S. and use that as justification in the instant proposed rule for managing the population at around this number.

The PVA modeling did not assess the genetic effects of a decision to effectively cap the U.S. population and remove most wolves above an average of 320. The Service acknowledged in the recovery plan that capping the U.S. population of Mexican wolves between 320 and 380 animals will entail "allowing mortality rates to rise higher than 25%." However, the PVA and biological report do not examine how that will curtail and decrease genetic diversity and thereby increase the likelihood of extinction.

That omission was on purpose. The hand-written poster notes from one of the Service's first closed-door meetings with state agency officials and their allies to develop this recovery plan show the genesis of not analyzing the genetic effects of a post-delisting population cap: "What about terminating analysis when pops achieve recovery? Model shouldn't include post-delisting management, should include only those activities/characteristics that lead to recovery."[49] By not looking at how many wolves would be killed post-delisting, the Service improperly avoided examining the genetic effects of those killings on the long-term prospects for Mexican gray wolf survival. Again, the PVA and recovery plan cannot justify this rulemaking and in particular the decision not to allow wolf numbers to grow substantially beyond 320 animals.

The definition of 'recovery' in the recovery plan would leave Mexican wolf still vulnerable to extinction The Endangered Species Act defines recovery as "the point at which the measures provided pursuant to this Act are no longer necessary."[50] However, the recovery plan is sprinkled with oblique but telling suggestions that one of the measures provided by the Act – releases of animals from captivity to the wild (i.e. "transplantation"[51] and "release"[52]) – will nonetheless still be necessary after delisting. For example: "We do not expect regular releases from the captive population to be necessary after Mexican wolves have been recovered because gene diversity from captivity will have been incorporated into the wild populations and wild populations will be sufficiently abundant such that releases from captivity for population augmentation will not be necessary."[53] This suggests that *irregular* releases will still be necessary due to the greater genetic diversity that would be retained in a (presumed) post-delisting captive Mexican wolf population. The fact that the draft plan seeks to retain more

[48] Biological Report, p. 33.
[49] Poster board notes from Mexican wolf recovery meeting, Dec. 16, 2015, p. 18. Obtained via FOIA.
[50] Endangered Species Act, Sect. 3(3).
[51] Ibid, Sect. 3(3).
[52] Ibid, Sect. 10(j).
[53] Draft Mexican Wolf Recovery Plan, p. 24, lines 725-728.

genetic diversity in the captive population than in either of the wild populations attests to its tacit assumption that management to prevent extinction will be necessary, post-delisting, in perpetuity.

Yet, unless the wild populations of wolves can be shown to be genetically viable and demographically and geographically resilient with no resort to recurring management to control the threats of extinction, including inbreeding, the Mexican gray wolf cannot be considered recovered and may not be delisted. This too shows that the PVA does not represent the best available science or even the best information that the Service must use in this rulemaking.

II. The Proposed Rule Will Not Only Do No Good, But Will Actively Hinder Conservation of the Mexican Wolf.

A. The Proposed Rule Would Lessen Genetic Diversity in its Provisions to Release Wolves From Captivity to the Wild.

The final rule must ensure effective releases from captivity to the wild such that genetic diversity is increased in the population. That should be done by mandating releases of family packs to the wild for significant genetic improvement. Cross-fostering should be utilized solely in circumstances in which there is a specific and valid reason not to release the pups' parents and other family members with them, for example to retain genetic diversity in the captive population or because other family members exhibit behaviors that would not be conducive to survival in the wild.

The proposed rule would replace the 2015 rule's standards for effective immigrants into the population, which requires reproduction, survival to adulthood and then reproduction by the new generation, of animals from outside the wild U.S. population – i.e. from captivity. The proposed rule dispenses with all that to codify utilization of cross-fostering instead of family group releases, even though results so far show it has not ameliorated the genetic crisis.

The experimental procedure of removing captive-born Mexican wolf pups from their mothers and inserting them into the dens of wild wolves has been underway every spring since 2016. Notwithstanding the Service's insistence that a reliance on cross-fostering without family pack releases would diversify the wild population's genes and reduce inbreeding, over the past five years the mean kinship (i.e. average relatedness) of the wild population has increased from 0.2409 to 0.2377.[54] Over almost the same period, the mean inbreeding coefficient – which is the proportional decrease in observed heterozygosity relative to the expected heterozygosity of the founder population[55] -- has increased by 3% from 0.200 to 0.2062.[56]

Among the 50 neonatal pups released from 2016-2020, just 10 are known to be alive today. Just four cross-fostered animals are known to have reproduced. But just one of those four has known surviving offspring – six offspring. Those six with ancestry from just a single one of

[54] Mexican Wolf Experimental Population Area Initial Release and Translocation Proposal for 2017 (Feb. 2, 2017), p. 1; Mexican Wolf Experimental Population Area Initial Release and Translocation Proposal for 2022 (undated), p. 2.

[55] Siminski, P. and E. Spevak, Population Analysis & Breeding and Transfer Plan, Mexican Wolf (*Canis lupus baileyi*), AZA Species Survival Plan (2017), p. 67.

[56] Siminski and Spevak (2017), p. 9; Mexican Wolf Experimental Population Area Initial Release and Translocation Proposal for 2022, p. 2.

the pups released without parents are the only offspring from those animals released as pups that are known to be alive now.

The increase in mean kinship and 3% increase in the mean inbreeding coefficient since the advent of cross-fostering shows that the Fish and Wildlife Service's efforts to reduce inbreeding are not working at the speed necessary to save remaining genetic diversity.

That may be in part because captive-born pups cross-fostered into wild wolves' dens survive to breeding age at an 18% lower rate than the Service's minimum predicted rate. The Service's annual release proposals (verbatim each year) provide benchmarks for pup survival in assessing the success of cross-fostering in the absence of family pack releases:

> [F]rom birth to one year of age, approximately 50% of pups survive, and average survival for yearlings is 0.673. Thus, we would predict that 0.34 (0.5 * 0.673) of cross-fostered pups would survive to breeding age (two years old) should crossfostered animals perform similarly to other wild-born pups. This survival rate would likely be considered a minimum estimate because packs that receive cross-fostered pups are also provided a supplemental food cache to increase pup survival."[57]

Unmentioned by the Service is that a predicted 0.34 two-year survival rate for cross-fostered pups should also be considered a minimum estimate for another reason: The cross-fostered pups are less inbred than wild-born pups, and therefore should be expected to survive at a higher rate than wild-born pups given the overall inverse correlation of inbreeding to pup survival.[58] So in addition to the survival boost they are afforded through supplemental feeding, cross-fostered pups are afforded a survival boost through their genetic composition.

Despite these dual advantages that should translate into a significantly higher two-year survival rate than 0.34, cross-fostered pups are surviving at significantly lower rates thus far.

From 2016 through 2020, the Fish and Wildlife Service inserted 50 captive-born pups into the dens of wild wolves. However, less than two years have elapsed since cross-fostering of 20 of those pups in 2020, so it is as-yet premature to assess those cohorts' two-year survival rates. Among the cohorts of 18 pups released from 2016 – 2018, five lived through their second year, for a 28% survival rate to breeding age – as opposed to the predicted minimum rate of 0.34. That amounts to an 18% reduction in the survival rate from the Service's predicted minimum. And unless an additional wolf or wolves released as a pup at any time from 2016 through 2019 is or are located – and we very much hope that more such wolves are alive -- the two-year survival rate for cross-fostered pups will be even lower, at just 20% (i.e. 6 animals out of 30).

The annual release proposals all state that "Cross-fostering requires significant disturbance of the targeted wild pack(s) dens, and may result in packs moving pups to another location. However, data from red wolves and Mexican wolves indicate that den movement does not impact survival of the pups."[59] Notwithstanding this assertion, given the shortfall in survival of cross-fostered animals, this boilerplate language carried over from previous years' cross-fostering proposals does not appear to account for presently-available data of a low pup-survival rate that we clarify, above.

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[57] Mexican Wolf Reintroduction Project Initial Release and Translocation Proposal for 2021, p. 4.

[58] Fredrickson, R. J., P. Siminski, M. Woolf and P. W. Hedrick. 2007. Genetic rescue and inbreeding depression in Mexican wolves. Proc. R. Soc. B, 274:2365–2371.

[59] Mexican Wolf Reintroduction Project Initial Release and Translocation Proposal for 2021, p. 9.

Releases of well-bonded family packs led to significantly greater survival and reproduction than cross-fostering of pups. Today's Mexican wolf population in the U.S. Southwest was reintroduced in the late 1990's and early 2000's through the releases of captive-born, well-bonded wolf pairs along with their pups and yearlings. The last release of a well-bonded (i.e. paired six months or longer) male/female pair with their offspring occurred in 2006. The annal release proposals all acknowledge "that 66% . . . of the initial released breeding animals with dependent pups in areas of adequate native prey have been successful." The proposal defines success as a "released wolf that survives and produces pups in the population in the future."[60]

Three metrics are worth observing here. First, success for released adult wolves is measured more stringently than success for released neonatal wolves, which only have to reach breeding age (two years old) to be considered successful whether or not they actually breed.

Second, despite disparate definitions for success, when captive-born adult pairs with pups are released where there is adequate native prey, they are successful at a rate of 66%; whereas when captive-born pups are released the expectation is for success at 34% but (as seen) actual success as yet is just 28% and will sink to 20% or lower next year unless additional cross-fostered wolves are identified.

Third, the Fish and Wildlife Service's calculation of adult releases includes instances of the releases of pairs that were not well-bonded. Success rates are even higher for wolves who were paired together for extended periods.

Halting the releases of well-bonded family packs worsened inbreeding. Releases of captive-born, well-bonded male-female wolf pairs with pups began in 1998 and continued sporadically through 2006. Over the ensuing 16 years, the Fish and Wildlife Service has proffered multiple rationales for the cessation of family pack releases. For many years, it blamed its own 1998 management rule that prohibited releases of captive-born wolves that had not yet been in the wild into New Mexico, while neglecting to rectify that deficiency through promulgating a new rule until 2015 when forced to do so through litigation. The Service also blamed the ostensible lack of habitat in areas in Arizona in which it was permitted to release wolves, even as unoccupied habitat remained available along the roadless and cattle-free lower Blue River corridor. Additionally, at various junctures the Service blamed a forest fire, uncollared wolves in a proposed release area (supposed animals that were never subsequently documented to exist), and the need to communicate more extensively with the Arizona Game and Fish Department. In recent years, including in the current proposal, the Service blames the supposed propensity of released adult animals to engage in "nuisance" behavior – a claim which we debunk below.

In 2007, scientists correlated inbreeding in Mexican wolves with smaller litters and/or low pup-survival rates, but observed that there was still potential to reduce inbreeding and establish vigorous wild populations through effective releases of cross-lineage wolves from captivity to the wild.[61]

The Service's response to the revelation of inbreeding depression (reduced fitness due to inbreeding) and the opportunity to ameliorate the condition through releases, was to virtually *end* the releases of captive-born wolves to the wild. From 2007 through 2012, just one captive-born wolf was released for the first time; from 2013 to 2015, four more captive-born wolves were

[60] Mexican Wolf Reintroduction Project Initial Release and Translocation Proposal for 2021, p. 6.
[61] Fredrickson et al (2007).

released. But none released after 2006 were given sufficient time to bond with a mate before their releases. Ultimately, just one of those five animals left descendants in the wild population.

Genetic diversity in the wild population deteriorated concurrent with the Service's politically-derived decision to cease releases of family packs. For example, in 2009, the mean kinship in the population was 0.2196.[62] Today it stands at 0.237[63] which represents a significant increase in the relatedness of the wolves in the wild over the course of 13 years.

The Service's tactic to address the long-term, severe and worsening inbreeding has been to mask the symptoms, instead of attacking the cause in the only manner that has been shown to be effective – through releasing these highly-social mammals as well-bonded, multiple-generation family groups. As noted, the symptoms of inbreeding manifesting as inbreeding depression are lower reproductive success; the inbred wolves are bearing fewer live pups and/or a smaller portion of the pups who are born, live through their first few months. However, increasing calorific intake by virtually any mammal is liable to boost reproduction and survival. The Service and its agency partners feed 70% of the wolf pairs in the wild,[64] thereby mitigating temporarily some of the reproductive deficiencies even as the underlying inbreeding worsens.[65]

The 2021 initial release and translocation proposal acknowledges that "it is easier to affect the gene diversity of the wild population when it is small, and it will become more difficult as the population increases."[66] After multiple downturns in the number of wolves in the population, the population now seems likely to continue to grow, with an anticipated present population of approximately 200 wolves. Given that gene diversity has declined concurrent with the sole use of cross-fostering for initial releases with a smaller population, just to keep the decline from worsening at a *faster* rate, more wolves will have to be successfully released than in recent years. The Service has provided no information indicating that it has the capacity to increase cross-fostering at all, much less at a rate sufficient to achieve the significant genetic improvement that it has been unable to achieve with a smaller population.

The service asserts with no evidence that family pack releases promote so-called nuisance behavior. The annual release proposals blithely assert that cross-fostering "eliminates the potential for nuisance wolf interactions that are often associated with the release of naïve captive adult wolves."[67] They state that "[i]nitial-released adult wolves do not have wild experience, typically exhibit some level of naivety towards humans, and can exhibit nuisance behavior primarily for the first four months following release,"[68] and cite that justification for not resuming family pack releases. That ill-founded rationale is carried over into the instant proposed rule.

However, the Fish and Wildlife Service has never shown through data or analysis that adult wolves released as part of well-bonded pairs with their offspring are disproportionately engaged in nuisance behavior.

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[62] Siminski, D. P. and E. M. Spevak. 2009. Population Analysis and Breeding Plan Mexican Wolf (*Canis lupus bailey*) Species Survival Plan, p. 8.

[63] Mexican Wolf Experimental Population Area Initial Release and Translocation Proposal for 2022, p. 2.

[64] U.S. Fish and Wildlife Service, Draft Biological Report for the Mexican Wolf (*Canis lupus baileyi*), June 22, 2017, p. 33.

[65] Hedrick, P., R. Wayne and R. Fredrickson. 2018. Genetic rescue, not genetic swamping, is important for Mexican wolves. Biological Conservation, Aug. 2018, 224:366-367.

[66] Mexican Wolf Reintroduction Project Initial Release and Translocation Proposal for 2021, p. 3.

[67] Mexican Wolf Reintroduction Project Initial Release and Translocation Proposal for 2021, p. 9.

[68] Mexican Wolf Reintroduction Project Initial Release and Translocation Proposal for 2021, p. 7.

In other words, after years of rooting around for other justifications for not continuing in successful wolf reintroduction through family pack releases, the Service adopted a rationale that is entirely based on hearsay, not on an iota of evidence.

B. The Proposed Rule Would Lessen Protections For Wolves Including Genetically Valuable Wolves Through Eliminating Reporting Requirements and Some Wolf-Killing Numeric Limits.

The proposed rule would eliminate restrictions on the number of wolves individuals could kill with a Fish and Wildlife Service permit, and eliminate reporting requirements for 'take' permits to be issued by the Service for private land, both after its proposed temporary restrictions on take would no longer be in effect. No longer would individuals given the right to kill wolves be limited by a specific number of days that the permit would be valid or the number of wolves that could be killed. Nor would livestock owners have to report killing a wolf, nor provide "evidence that the wolf was in the act of biting, killing or wounding livestock at the time of the take."

Deletion of these important measures is not analyzed in the draft supplemental EIS. The effects could be significantly detrimental for the population's genetic diversity. The proposed deletions are outrageous.

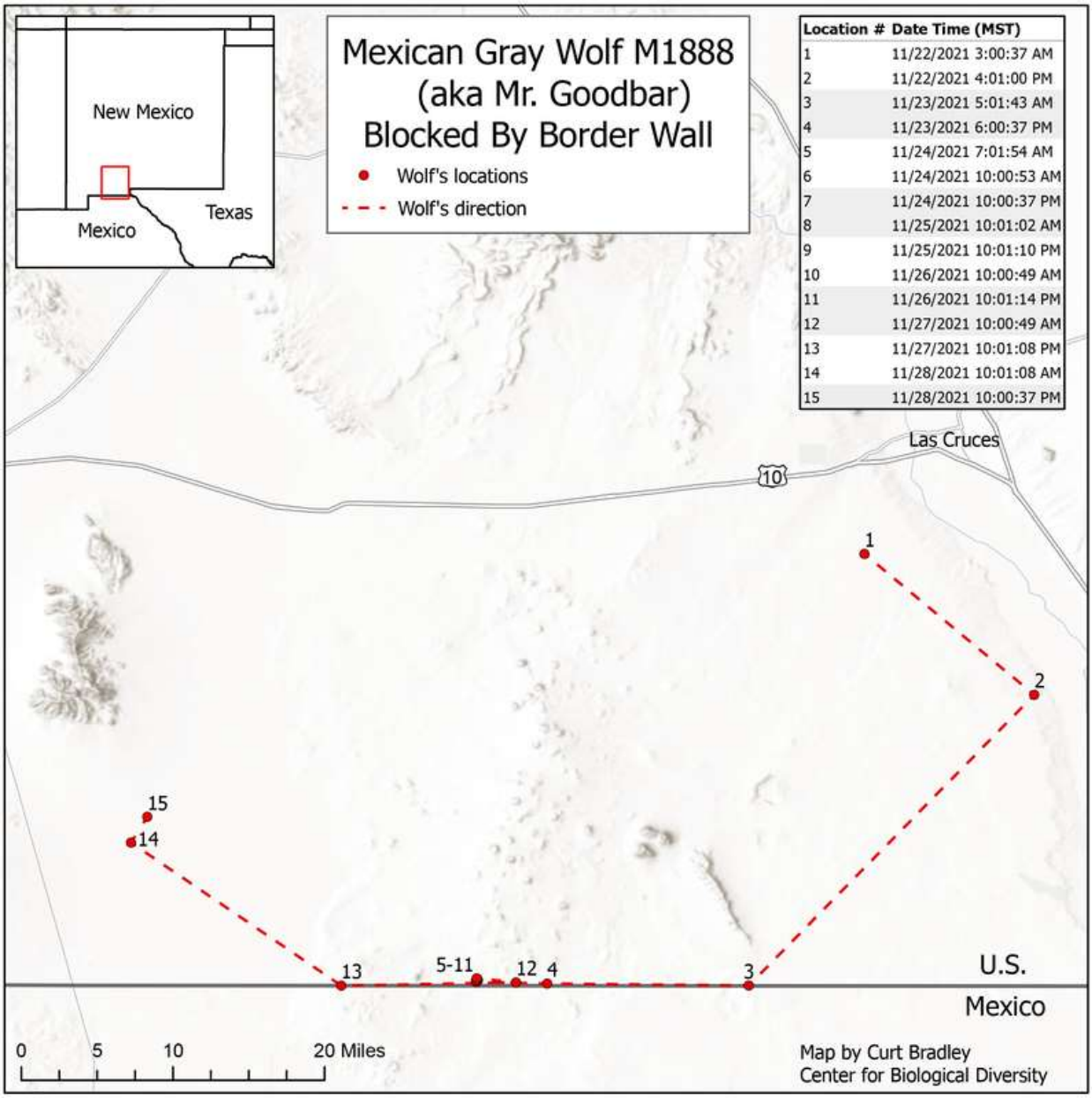
III. The Mexican Wolf Population is Essential.

Since the 1982 Mexican Wolf Recovery Plan and in numerous subsequent assessments, the Fish and Wildlife Service has repeatedly acknowledged that one relatively small population of Mexican wolves that is largely or entirely separated from other populations, could not be viable and could never be considered recovered. Notwithstanding the Service's reversal of this stance in its politically-based 2017 Mexican Wolf Recovery Plan, the science that the Service has long relied on remains solid. For example, as recently as in its 2015 rule, the Service wrote:

> We recognize that the reestablishment of a single experimental population of Mexican wolves is inadequate for recovery, and we are fully cognizant that a small isolated Mexican wolf population, such as the existing experimental population, can neither be considered viable nor self-sustaining.[69]

Since then, as noted, the genetic status of the Mexican wolf population has deteriorated. Its viability relies more than ever on future connectivity. At the same time, a wall now severs connectivity to wolves in Mexico, as shown in the November 2017 blockage of a (originally cross-fostered) wolf in the U.S. who traversed the border for 5 days without being able to cross, according to geographic data obtained by the Center from the Service under FOIA, and represented here:

[69] 80 FR 2551



Those few dozen wolves in Mexico certainly need connectivity to the U.S. population for their own viability. It would likely become extirpated with no connectivity, and may still go extinct. If the U.S. population of the Mexican wolf were to be extirpated, it would not be reconstituted through natural migration. The demographics of the captive population, with disproportionately many aging and otherwise non-reproducing wolves, do not favor successful establishment of a replacement population. The proposed rule and draft supplemental EIS provide no information from the species survival program or captive breeding facilities indicating continued breeding and releases could be continued

Because the current U.S. population could not be re-constituted in the wild, it must be re-designated as essential.

IV. It is Not Too Late To Promulgate a Science-based, Lawful Final Rule.

The Fish and Wildlife Service should promulgate a final rule that truly eliminates the cap on wolf numbers and does not propose to manage wolves at an arbitrary number or an arbitrary average number. The final rule should facilitate continued population growth and genetic improvement for as long as the Mexican wolf remains an endangered (or threatened) species.

The final rule should permanently end the provision that would removing wolves in response to their predation on native ungulates, if proposed by state game agencies. Temporary removal of this provision is not enough.

The final rule should eliminate or constrain 'take' provisions as described above.

The population should be designated as essential.

Mexican wolves should be allowed to roam outside the experimental population area. The commitment by FWS to remove wolves outside the boundary is directly at odds with conservation. Similarly, wolves should be allowed to roam anywhere within the experimental population area even in circumstances in which private or tribal land-owners demand their removal. The final rule should remove the 2015 pledge that the Service would accede to those demands.

The final rule should call for releases of well-bonded male/female pairs with pups (i.e. family packs) from captivity to the wild as the primary means to enhance genetic diversity.

The final rule should require livestock owners to clean up or render unpalatable the carcasses of stock that die of non-wolf causes, to prevent wolves from scavenging and thereby placing them in situations conducive to conflicts. If wolves scavenge on non-wolf-killed livestock, those animals should not be penalized in any way for their subsequent predations on livestock. Livestock owners who allow such scavenging should not have wolves removed as a result of losses to their stock. The final rule should also require the Service and coopearating agencies to completely document the scavenging of wolves on carrion from non-wolf-killed livestock carcasses when such scavenging is suspected or known.

Telemetry receivers and GPS codes that provide real-time locations for collared wolves should only be made available to government biologists and to scientists engaged in research, and to no one else, given the extremely high level of unsolved illegal killings of wolves, and given the plea bargains admitting guilt in illegally killing wolves on the part of two people who had received such receivers. The final rule should prohibit dispensation of such technology to all other persons and to entities not engaged in recovery or research, such as Catron County.

Thank you for your consideration.

Sincerely,

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