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Dear Recovery Coordinator McGee, Division Chief Liley and Coordinator deVos,

This letter from 30 conservation and animal protection organizations is to point out the deterioration for the fourth year in a row of the genetic status of the wild Mexican gray wolf population in the U.S., and to make specific requests, as described below, to improve science-based management with a goal of moving toward recovery.

## **The genetic plight of the U.S. reintroduced population of Mexican gray wolves is worsening.**

The four genetic metrics that scientists track for Mexican wolves in Arizona and New Mexico reveal more inbreeding, more relatedness between wolves, less genetic diversity, and less retention of the genes from the seven original wild-born wolves who were successfully bred in captivity, in a steady deterioration from 2021 to the present, as shown in the following chart:

| Year | Average inbreeding | Average relatedness | Percent gene diversity retained | Founder genome equivalents |
|---|---|---|---|---|
| 2021 | 0.2062 | 0.2377 | 76.23 | 2.10 |
| 2022 | 0.2090 | 0.2380 | 76.20 | 2.10 |
| 2023 | 0.2114 | 0.2391 | 76.09 | 2.09 |
| 2024 | 0.2141 | 0.2392 | 76.08 | 2.09 |
| 2025 | 0.2146 | 0.2404 | 75.96 | 2.08 |

The metric called “founder genome equivalents” connects the dry and frankly unemotive numbers to a terrifying reality. The 2.08 current figure for this metric shows that the genetic diversity derived from the seven founders of the population has been reduced in the U.S. reintroduced population to genetic diversity which would normally derive from a little over two founders.

If the founder genome equivalents were exactly two, instead of 2.08, it would be as if every wolf in the population, on average, had the same two parents – i.e., as if they were full siblings. The figure 2.08 is only marginally better.

Analysis by the Mexican wolf captive-breeding program revealed that the erosion in genetic diversity continued in 2024 and this year – hence the updated figures for those two years in the chart above.

As explained in a June 25, 2024 letter to the Fish and Wildlife Service that was signed by many of the same organizations that have signed this letter, genetic diversity in the U.S. reintroduced population of Mexican wolves peaked in 2008. That reflected the maturation and successful breeding of some of the wolves who had been released as pups with their parents and siblings from 1998 through 2006. Since 2006, due to a demand by the livestock industry, there have been no releases into the wild of well-bonded, captive-born, male/female pairs with their pups – i.e., family packs.

**Significantly more genetic diversity remains in the captive population.**

As laid out in the captive breeding program's figures, the founder genome equivalents in the captive population stand at 2.84, which is still dangerously low but nevertheless represents 37% more genetic diversity than can be found in the U.S. reintroduced population. Similarly, the 0.1759 figure for mean kinship in the captive population reveals 37% less relatedness among the captive wolves than among wolves in the reintroduced population. And the 0.1536 figure for inbreeding in the captive population is 40% lower than the inbreeding in the U.S. reintroduced population.

The significant number of genes found in the captive population that are absent or very rare in the wild have long rendered it imperative to successfully introgress all of that genetic material into the genetically depauperate U.S. reintroduced population.

Accordingly, and in response to growing alarm by independent scientists, in 2016, ten years after the last family pack release, the Service began removing captive-born, neonatal pups from their parents and inserting them into the dens of wild wolves, strikingly – and entirely needlessly – seeking to avulse and then through deceit re-establish with someone new the deeply rooted maternal-pup connections in a species of mammal that is justly famous for its tight-knit family bonds.

**Releases of captive-born pups taken from their parents result in very low known-survival rates.**

Of the 126 captive-born pups who were separated from their mothers and released into the wild between 2016 and 2024, just 27 were ascertained to be alive in their first winter or at any time thereafter. That represents just a 21% known-survival rate in such releases.

In contrast, the Service has reported "that 66% . . . of the initial released breeding animals with dependent pups in areas of adequate native prey have been successful." Moreover, the Service defined success for released, paired adult wolves as a "released wolf that survives and produces pups in the population in the future,"[1] which is a far more stringent standard than merely staying alive from the moment of their release as neonates in May until December of the same year.

[1] Mexican Wolf Interagency Field Team. 2020. Mexican Wolf Reintroduction Project Initial Release and Translocation Proposal for 2021, p. 6.

Even assuming that there were more than the three known pup survivors among the 27 pups released from captivity without their parents in 2024 – and we fervently hope that is the case – the overall record of survival when these newborn pups have been released without their parents remains abysmally low.

**The Fish and Wildlife Service, Arizona Game and Fish, New Mexico Game and Fish, and U.S.D.A. Wildlife Services persist in actively destroying remnants of genetic diversity.**

Genetic diversity in the U.S. reintroduced Mexican wolf population declined not just because of the cessation of family pack releases after 2006, but also due to government removals of genetically valuable wolves from the wild in the form of live captures as well as fatal shootings.

Those cruel and reckless management actions continue this year and may even be accelerating. On April 14, U.S.D.A. Wildlife Services shot and killed the genetically valuable Bear Canyon Pack's alpha female notwithstanding that Fish and Wildlife Service's kill order for a (random) uncollared wolf in that pack had directed Wildlife Services to spare her because "[i]t is expected the breeding female will soon den and whelp a new litter of pups."[2]

On May 27, the Arizona Game and Fish Department with Fish and Wildlife Service authorization removed alive the two parents and two of their pups from the genetically valuable Manada del Arroyo Pack and deliberately killed a third pup. (Arizona Game and Fish then lied to the media by stating that that pup was sick and consequently euthanized, whereas in truth as revealed in text messages between both agencies that day, Arizona Game and Fish was unable to reach the pup in the den after removing its parents and killed it for that reason.)

The Manada del Arroyo Pack's adults were the southernmost breeding wolves in the U.S., and the female had previously traveled back and forth across the international border where there is still no wall. Had the pack remained unmolested by the Arizona Game and Fish Department, they could have contributed not only to enhancing the genetic diversity of the U.S. reintroduced population but also of the Mexico reintroduced population, which consists of fewer than three dozen wolves and is also not genetically viable. Instead, the survivors of the Manada del Arroyo Pack remain in captivity today.

On August 12, Wildlife Services shot and killed a three-month-old female pup from the Dillon Mountain Pack. The killing of an uncollared wolf from the genetically valuable Dillon Mountain Pack had been ordered by the Fish and Wildlife Service and supported by the New Mexico Department of Game and Fish.

The Fish and Wildlife Service also ordered Wildlife Services to kill an adult son of the likely-pregnant Bear Canyon Pack's female who was killed in April.[3] The Arizona Game and Fish Department supports killing this wolf. Nevertheless, as of the most recent publicly

[2] Brady McGee, Mexican Wolf Decision Memorandum, Bear Canyon Pack, April 4, 2025.
[3] Brady McGee, Mexican Wolf Decision Memorandum, Bear Canyon Pack M3008, July 16, 2025.

available map of radio-collared wolf locations, he is shown as still alive. The Center for Biological Diversity and others among the signatories on this letter have already communicated our request to rescind the kill order for this genetically valuable wolf.

**Government agencies continue to prevent the natural and beneficial mixing of Mexican gray and northern gray wolves.**

Since reintroduction of the Mexican wolf to the U.S. Southwest in 1998, the Fish and Wildlife has pledged to capture from the wild wolves who cross arbitrary boundaries, in what can only be described as efforts to limit recovery, and contrary to how the Service manages all other endangered animals whose movements are not constrained by politically-derived lines on a map.

At first, with very limited exceptions, wolves were confined to the Gila and Apache National Forests and the Fort Apache Indian Reservation. Then in 2015, in response to a Center for Biological Diversity petition for rulemaking and two follow-up lawsuits, the area in which the wolves were free to roam was expanded almost twentyfold to include (after a phase-in period) all of Arizona and New Mexico south of Interstate 40.

Nevertheless, an interdisciplinary, peer-reviewed study published in 2014 – the year prior to the rule change that expanded the Mexican wolf's range but still limited Mexican wolf movements to south of I-40 – determined that establishing a population of Mexican wolves in the Rocky Mountains of northern New Mexico and southern Colorado, as well as establishing a population in the Grand Canyon ecosystem of northern Arizona and southern Utah, would be necessary for recovery.[4]

This year, the world's top experts on Mexican gray wolf genetics along with experts in wolf recovery concluded that the severe genetic depletion afflicting the Mexican wolf must be addressed through natural connectivity with northern gray wolves in Colorado to facilitate introgression of northern wolves' genes.[5]

Such connectivity was noted by early taxonomists who divided the gray wolf into subspecies and delineated their historic ranges based on morphological affinities, and also by modern geneticists who have studied DNA obtained from old remains of wolves.[6] That original intergradation between subspecies undoubtedly helped to maintain the genetic robustness of the southernmost subspecies, the Mexican gray wolf. Subspecific intergradation in the future will be even more vital, given the genetic impoverishment in today's Mexican wolf genome. The Fish and Wildlife Service's repeated orders to Wildlife Services and authorizations to Arizona Game and Fish to remove Mexican wolves for no other reason than that they have crossed I-40,

[4] Carroll, C., R.J. Fredrickson, and R.C. Lacy. 2014. Developing metapopulation connectivity criteria from genetic and habitat data to recover the endangered Mexican wolf. Conservation Biology, 28(1):76–86.
[5] Hedrick, P.W., M. Phillips, C. Carroll, R. Lacy, G. Anderson, R. Fredrickson, and D.W. Smith. 2025. Recovery and genetics of Mexican wolves: a comment on Clement et al. Journal of Wildlife Management, 89(3)
[6] Stanley P. Young and Edward A. Goldman, *The Wolves of North America, Part II: Classification of Wolves*. American Wildlife Institute, Washington, D.C., 1944; pp. 461, 465-466. Leonard, J.A., C. Villa, and R.K. Wayne. 2004. Legacy lost: genetic variability and population size of extirpated US grey wolves (*Canis lupus*). Molecular Ecology, 14(1):9-17.

actively hinders recovery. Similarly, the policy to automatically remove gray wolves originating from Colorado's reintroduced population who travel south or southwest into New Mexico or Arizona, will also serve to prevent new, much-needed genes from introgressing into the Mexican wolf population.

**Evidence points to inbreeding as the cause of worrisome physiological infirmities.**

In 2007 geneticists correlated inbreeding in wild Mexican gray wolves with smaller litters and/or low pup-survival rates,[7] an example of inbreeding depression whereby low gene diversity causes deleterious physiological anomalies. Five years later, in 2012, other researchers documented that over the previous decade, fourteen Mexican gray wolves contracted a rare form of cancer in their noses – diagnosed as nasal carcinoma – and believed to include a genetic component in its causation.[8] More recently, one and possibly additional Mexican wolves have been found with syndactyly, a genetically-caused birth defect in which paw digits (toes) are fused.[9]

There is no more time to waste in restoring as much genetic diversity to the U.S. reintroduced population as possible.

**Please undertake the following urgent management changes.**

To regain genetic diversity in the reintroduced U.S. population of Mexican gray wolves, we request implementation of three longstanding policy and management requests that your agencies have heretofore ignored:

(1) Resume the releases to the wild of captive-born, well-bonded, adult, male/female pairs with their pups.
(2) Stop removing genetically valuable wolves from the wild.
(3) Allow natural interactions including pair formation and matings between Mexican gray wolves and northern gray wolves in northern New Mexico and Arizona and southern Colorado and Utah, through allowing unconstrained movements of all wolves.

Thank you for your consideration of the urgent genetic plight of the Mexican gray wolf.

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[7] 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.
[8] Sanchez, C.R., Drees, R. , J. Dunnum, I.Y. Muñoz, P.M. Gaffney, M.M. Garner, and M.J. Kinsel. 2012. Nasal carcinoma in Mexican gray wolves (*Canis lupus baileyi*): prevalence determination using computed tomography. Proceedings AAZV Conference 176-177.
[9] Lara Díaz, N.E., C.A. López González, M.C. Carmen García Chávez, R. Juárez López, J.L. Reyes Díaz, J.A. Álvaro Montejo, M.G. Camargo Aguilera. 2023. Mexican wolf recovery Program: monitoring and conservation. Universidad Autónoma De Querétaro/Soluciones Ambientales Itzeni A. C. México. Robinson, J.A., J. Räikkönen, L.M. Vucetich, J.A. Vucetich, R.O. Peterson, K.E. Lohmueller, and R.K. Wayne. 2019. Genomic signatures of extensive inbreeding in Isle Royale wolves, a population on the threshold of extinction. Science Advances 5(5).

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