

The Genetic Challenges of Mexican Wolf Recovery



BACKGROUND AND MAKING AN ENDANGERED SPECIES

Recovery of an endangered species is very challenging. Usually by the time it is recognized that a species is in danger, it is after the population declines and determining the causes of the decline is difficult.

Brown and his colleagues (2002) provide excellent background information on the early distribution of the Mexican wolf and further detail the near extinction of this subspecies. Early explorers describe a smaller form of wolf in southern Arizona, New Mexico and throughout the higher elevations of Mexico. Accounts from Mexico indicate that the Mexican wolf was much more abundant there than in the United States.

Brown followed the history of the near extermination of the wolf in Arizona.

The primary factor that led to the eventual listing on the Federal Endangered Species Act was widespread persecution as the American southwest was populated by Anglo-European settlers and their domestic livestock. Although Mexican wolves were being killed by stockmen as they settled in the region, from about 1910 to 1925 there was widespread trapping, shooting and the use of poisons intended to eradicate the Mexican wolf from both the United States and Mexico.

Supported by the U.S. Fish and Wildlife Service, Roy McBride sought to trap the last few wolves in Mexico. There were seven founders, three from McBride, two each from the Aragon and Ghost Ranch lineages that formed the nucleus of the binational breeding program. This program succeeded to the point that in 1998, 11 Mexican wolves were reintroduced to the wild in eastern Arizona. There

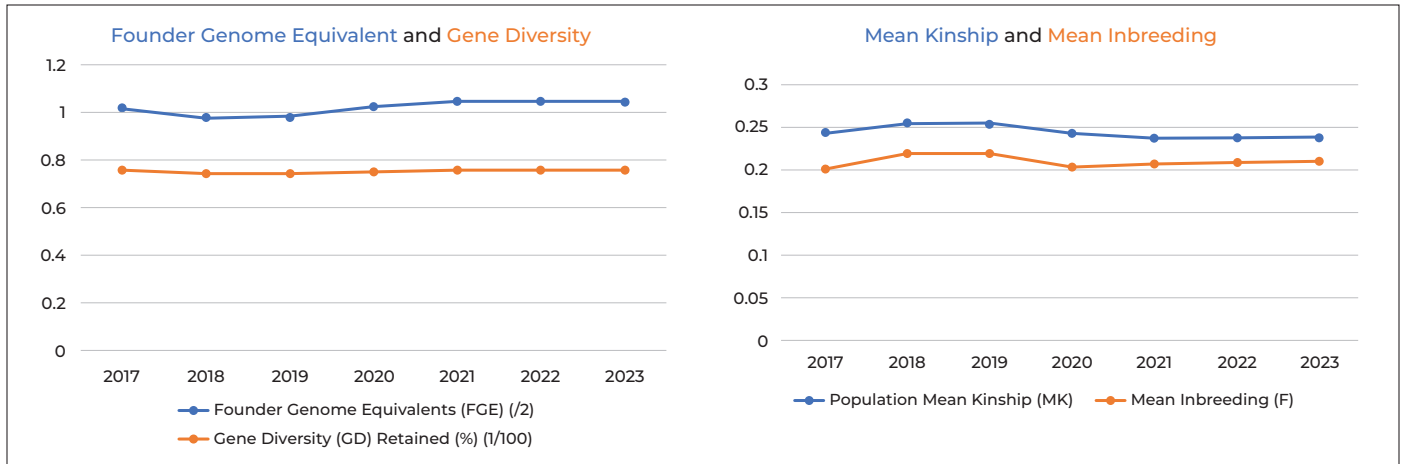
are many challenges in recovery, but managing genetic diversity remains the greatest recovery challenge given the founding population of only seven animals.

GENETIC MANAGEMENT WITH CAPTIVE-REARED ADULT WOLVES

Unless additional wolves are found in Mexico, which is quite unlikely, there are only two approaches to managing genetic diversity and both entail introductions from captivity into the wild population. One option is to release naive, captive-reared adult wolves into the wild, however, in recent years, this approach has not been successful in contributing to genetic diversity. Harding et al. (2016) reported that in the last nine cases where captive-raised wolves were released into the wild in the U.S., eight failed to produce offspring that lived at least one year. Of these nine, four were in bonded pairs when released.

Breck et al. (2023) evaluated releases of captive-reared adults into the wild. They concluded that releases of wolves from captivity and translocation of wolves into new territories likely make these animals more susceptible to accidental or illegal killing. They conclude that captive-reared animals have been influenced by human presence and feeding in captivity on a regular basis and do not have an appropriate flight response that wild wolves have. From both a demographic and





Managing genetic diversity is now and always will be a logistical challenge, but the effective fostering program offers hope for continued successful management of Mexican wolf genetics.

genetic management perspective, these results demonstrate the ineffectiveness of releasing captive-reared adult wolves and translocating wolves as genetic management tools.

FOSTERING MEXICAN WOLF PUPS INTO THE WILD

Another alternative is to foster genetically valuable newborn pups from captivity into wild-born litters. This is complex to be sure, however, trends in key genetic metrics attest to the usefulness of this method to improve the genetic health of the wild Mexican wolf population. This element of recovery is carefully planned by the Saving Animals From Extinction

(SAFE) program, which is guided by the expertise from the Association of Zoos and Aquariums. SAFE manages the entire binational captive program and selects the pairing of wolves to ensure that the best genetic outcome is achieved. Once those wolves are paired and pups produced, the next step is to use the radio-collared wild female wolves to identify a wild den that is within a few days of the same age as the captive litter so the captive-born pups can be introduced into the wild litter.

One goal of genetic management is that the introduced wolves are spread widely into the wild population. Fostering is accomplishing this as genetically valuable pups have been introduced to 40 dens in the wild with a total of 99 pups placed into wild dens to infuse critical genetic diversity. One of the questions raised about the effectiveness of fostering is whether these fosters are contributing to the gene pool by themselves having pups. Using radio collars, the field team has been able to document at least 14 instances where fosters are producing pups of their own. One fostered male (AM1471) has sired several litters and six of his pups have themselves had litters. In 2023, another male that is an offspring of a foster, sired a litter of pups creating a third generation of genetic infusion from fosters. Data from the SAFE program shows that not only is genetic diversity being retained, but more than that, the fostering program is contributing to the improvement of genetic diversity in the wild population as it grows toward recovery goals.

The SAFE program reports annually on four different genetic measures: Founder Genome Equivalents, Mean Kinship, Gene Diversity and Inbreeding Coefficient. Since the initiation of the fostering program, there has been a trend of slight improvement in Founder Genome Equivalent and Gene Diversity, which is a measure of success for fostering. The measures for Mean Kinship and Mean Inbreeding are slightly lower over the last five years and also reflect improvements in genetic management of the Mexican wolf.

Learn more: www.azgfd.gov/wolf



Arizona Game and Fish Department
5000 W. Carefree Highway • Phoenix, AZ 85086
602-942-3000

The Arizona Game and Fish Department receives Federal assistance from the U.S. Fish and Wildlife Service, and thus prohibits discrimination on the basis of race, color, religion, national origin, disability, age and sex pursuant to Title VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act of 1990. To request an accommodation or informational material in an alternative format or to file a discrimination complaint please contact the Director's Office at (602) 942-3000 or by mail at 5000 West Carefree Highway, Phoenix, AZ 85086. Discrimination complaints can also be filed with the U.S. Fish and Wildlife Service, Office of Diversity and Inclusive Workforce, Attention: Public Civil Rights and Disability Coordinator, 5275 Leesburg Pike, Falls Church, VA 22041.

