

Mexican Wolf Experimental Population Area
2024 Initial Release and Translocation Proposal

This document was developed by the Mexican Wolf Interagency Field Team (IFT) and outlines management options for initial release(s) and translocation(s) of Mexican wolves into the Mexican Wolf Experimental Population Area (MWEPA) in Arizona and New Mexico in 2024. The initial releases and translocations outlined in this document are consistent with:

- (1) *the 2022 Final Supplemental Environmental Impact Statement (FSEIS) for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (Canis lupus baileyi),*
- (2) *the 2022 Record of Decision for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (Canis lupus baileyi),*
- (3) *the 2022 Final Rule - Revisions to the Nonessential Experimental Population of the Mexican Wolf.*
- (4) *the 2022 Mexican Wolf Recovery Plan, Second Revision.*

The above documents analyzed the potential environmental and socioeconomic impacts of establishing a Mexican wolf population in the MWEPA, including initial releases and translocations. This document is the initial release and translocation planning proposal for 2024; thus, it is not a final agency action but rather an implementation planning document that may be changed during this planning period. From 1998 through September of 2023, the IFT has conducted 66 initial release events (195 wolves) and 88 translocations events (151 wolves). Foster events are classified as translocations (the IFT has fostered 11 wild-born pups to other wild dens) or initial releases (the IFT has fostered 99 captive-born pups to the wild) and are included in the overall numbers above. Detailed information on foster efforts is presented in this document.

With seven unrelated founders, the Mexican wolf has experienced a genetic bottleneck necessitating management actions to retain, maintain or enhance gene diversity. Specifically, pairing within the captive population is carefully managed by the Mexican Wolf Saving Animals From Extinction (SAFE) Program (formally the Species Survival Program (SSP) to maintain gene diversity by establishing breeding pairs through a process that considers mean kinship¹ (MK) and avoidance of inbreeding². Conversely, breeding pairs in the wild population are not prescribed, but typically establish through natural dispersal and pack formation. Thus, to manage gene diversity in the wild population, it is important to ensure the population as a whole is genetically diverse, increasing the

¹ Mean kinship (MK) is an individual's degree of relatedness to the population. A wolf with low MK is less genetically represented in the population, and a breeding event by this animal would decrease the overall relatedness of the population. A wolf with higher MK is genetically well represented in the population, and a breeding event by this animal would increase the overall relatedness of the population. Because MK of an individual animal is relative to the current population, it is constantly changing. For example, an individual's MK will increase each time that animal successfully produces and raises offspring in the population.

² Inbreeding is the mating of closely related individuals, which tends to increase the number of individuals in the population that are homozygous for a trait which can reduce adaptive potential.

probability that wolves pairing naturally are less related to one another resulting in offspring with lower inbreeding coefficients.

The SAFE Program monitors several genetic parameters for the captive and wild populations, including: Founder Genome Equivalents (FGE; increasing levels of FGE are considered positive for the population), Gene Diversity (GD; increasing levels of GD are considered positive for the population), Mean Inbreeding (Mf ; declining levels of Mf are positive for the population) and Population Mean Kinship (Pop MK; declining levels of MK are considered positive for the population). These monitored genetic parameters have improved for the wild population since the nadir of gene diversity in 2018 likely because of fostered pups surviving and becoming incorporated into the population (Table 1). Since 2018, FGE increased from 1.96 to 2.09, GD increased from 74.54 to 76.09, Mf declined from 0.2201 to 0.2114, and Pop MK declined from 0.2546 to 0.2391. Release of wolves from the more genetically diverse captive population is necessary to decrease the overall relatedness among wolves in the wild population and to meet the objectives of the 2022 Mexican Wolf Recovery Plan, Second Revision. In addition, we may consider preventing the mating of full sibling wolves to avoid the production of highly inbred pups or remove wolves from the wild to reduce MK. The following release and translocation actions are proposed in consideration of the current genetic status of the wild population.

The proposed actions within the MWEPA are to:

- (1) Foster pups from captivity into wild wolf packs. Our goal is to foster as many pups as logistically feasible (up to 12 in Arizona) during 2024, recognizing the actual number will depend on synchrony of litters among the captive and wild population.
- (2) Temporarily remove any female wolf that is paired with a full sibling prior to or during the annual helicopter survey and capture operation in January/February, or other times and methods deemed appropriate by the IFT, to prevent the production of highly inbred pups. During the temporary period in captivity, the female may be allowed to breed naturally with a captive male. Artificial insemination of the female may be considered pending additional planning and logistics (see below). Following a complete estrous cycle (likely late March), the IFT could translocate the female wolf back into its home range to maintain pack dynamics, and potentially produce pups with increased genetic diversity and lower inbreeding coefficients. Full sibling pairs are not known to exist in the recovery area at this time. However, the IFT will have the option of managing a full sibling pairing(s), if documented, through the methods described above.
- (3) Provide for the translocation of wolves for management purposes as needs arise (primarily wolves that disperse outside of the MWEPA, occupy tribal nations and removal is requested, or if other packs are determined to be full sibling pairings).

Background

Initial Release and Translocation Restrictions and Land Use:

Initial release and translocation strategies differ throughout the MWEPA to reflect various state, federal, and tribal nation laws, rules, regulations, and land-use patterns (e.g., multiple land-use areas vs. wilderness). To the extent possible, agency direction and land-use patterns are addressed in these initial release and translocation strategies while still promoting the recovery of the wolf population by

addressing critical genetic issues. In March of 2018, the U.S. Fish and Wildlife Service (Service), New Mexico Department of Game and Fish (NMDGF), and the Arizona Game and Fish Department (AZGFD) entered into a Memorandum of Agreement to clarify the commitment of the Service and States to work cooperatively to determine the timing, location, and circumstances of releases of Mexican wolves into the wild in Arizona and New Mexico, with the intent of facilitating recovery of the subspecies and eventual transition from federal management to state management. In 2024, the agencies are considering fostering captive-born pups into wild dens and to allow for translocations of wolves on a case-by-case basis. The combinations of strategies that are outlined in this plan represent an effort to increase gene diversity in the wild population. However, 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.

The 2022 Mexican Wolf Recovery Plan, Second Revision recognizes the importance of managing gene diversity and specifically identifies delisting criteria based on gene diversity. The criteria read, “Gene diversity available from the captive populations has been incorporated into the United States population through scheduled releases of a sufficient number of wolves to result in 22 released Mexican wolves surviving to breeding age in the United States population. “Surviving to breeding age” means a pup that lives two years to the age of breeding or an adult or subadult that lives for a year following its release.” The 2022 Mexican Wolf Recovery Plan, Second Revision did not require a released or translocated wolf to produce offspring in the population as the basis for recovery criteria, but rather used a metric (i.e., number of animals that survived to breeding age) that coupled model performance with performance of the wild population (i.e., the model takes into consideration that not all released wolves surviving to breeding age will contribute offspring in the population).

Initial Release and Translocation Strategies:

Translocations: Involve moving a Mexican wolf for management purposes from one location to another. Mexican wolves that travel outside of the MWEPA or require translocation for management purposes will be considered for translocation onto federal land within Zones 1 and 2 of the MWEPA in accordance with the 2022 10(j) Rule. Decisions for translocations on tribal nations within the MWEPA will be at the discretion of the individual tribal nation and is not specifically covered in this document. In some instances, a wolf or wolves may be translocated to Mexico to assist with ongoing recovery efforts in Mexico.

Most translocations will be single animals and can occur anywhere within Zone 1 or 2 as a hard release (i.e., a release from a transport crate). The IFT may recommend that translocations be conducted at a previously established release site. Translocated wolves may spend a period in captivity (note: time spent in captivity did not significantly impact success or removal probability for animals that had at least six months of wild experience [$n = 24$, $df = 4$, $\chi^2 = 6.0$, $p = 0.19$]) prior to being translocated in a new location in the wild.

Initial Releases: Involve the release of wolves from captivity without prior wild experience and include fostering pups from captivity. The IFT will focus on fostering (considered an initial release) in 2024 because past efforts (2014-2023) have been successful (see below) and present an opportunity to accomplish genetic goals of the 2022 Mexican Wolf Recovery Plan, Second Revision, while eliminating nuisance behavior that could be observed during initial release of adult wolves. No initial

release of adults or packs are proposed during 2024. Originally, initial releases were necessary to establish a wild population and subsequently augment population growth. Currently, fostering captive-born pups into wild dens is the preferred management option to reduce MK of the wild population (Figure 1).

Fostering or cross-fostering (a specific technique of initial releases): Involves placing captive-born pups (<15 days old) into wild dens with similarly aged pups to increase gene diversity in the wild population. Fostering opportunities require synchronicity between captive and wild born litters produced during a short time window (within days of one another) and can be logistically challenging as these litters are often a considerable distance apart (e.g., we have previously fostered from captive facilities as far away as New York, Missouri, and Illinois). Fostering does not appreciably change the distribution or population of wolves on the landscape. Captive-born pups placed into wild Mexican wolf dens, however, will be of a different genetic profile than existing wolf packs and can increase the gene diversity of the wild wolf population. Fostering will occur in April and/or May and within packs that den in Zones 1 and 2 of the MWEPA, in accordance with the 2022 10(j) Rule. Decisions for fostering on tribal land within the MWEPA will be at the discretion of the individual tribe and is not specifically covered in this document.

Fostering has been used since 2014 in the Mexican Wolf Recovery Program. Successes within the Mexican Wolf Recovery Program and the experience of the red wolf program in North Carolina show that fostering is an effective genetic management tool. These expectations are grounded by data from the wild population suggesting that from 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 fostered pups would survive to breeding age (two years old) should fostered pups perform similarly to other wild-born pups and be accepted upon placement in the den. This survival rate would likely be considered a minimum estimate because packs that receive fostered pups are also provided a supplemental food cache to increase pup survival. Thus, we would expect a minimum of 33 pups ($0.34 * 99$) to survive to breeding age from the captive fostering ($n = 99$) efforts conducted through 2023. Results thus far demonstrate that fostering is successful in releasing captive wolves that survive to breeding age. The IFT has conducted fostering on 46 occasions, totaling 110 pups with 99 of these being moved from captive litters into wild dens.

Collectively, our results indicate that:

- (1) in all but one of the 46 fostering events, human disturbance at the den site resulted in the adult wolves moving the den a short distance but did not result in abandonment of the pups. The one failed den was noted in 2021 when pups were fostered into the Leon pack and the den failed within 2 weeks. Consequently, this failure was attributed to human caused disturbance.
- (2) a minimum of 28 (4 wild-to-wild and 24 captive-to-wild) of the 89 fostered pups survived to December 31 of their first year (2023 fosters are excluded since final data are unknown),
- (3) a minimum of 19 (4 wild-to-wild and 15 captive-to-wild) of the 78 fostered pups that would be old enough to be considered breeding age (born prior to 2022) survived to breeding age.
- (4) 14 (4 wild-to-wild and 10 captive-to-wild) of the minimum of 19 fostered pups that have reached

breeding age have produced pups in the wild. An additional three of these animals are currently monitored but have yet to produce pups.

(5) a minimum of 7 offspring of captive-to-wild fosters have been documented producing a minimum of 12 litters of genetically valuable pups in the wild.

Collectively, these results are encouraging and support the decision that the Mexican Wolf Recovery Program should continue to utilize fostering as a strategy to manage genetic diversity of the wild population.

Fostering has contributed towards meeting the 2022 Mexican Wolf Recovery Plan, Second Revision criteria such that:

- (1) Fifteen wolves released from captivity after December 2015 (AM1471, AF1578, F1692, AM1693, M1710, AF1712, AM1953, AF1865, AF1866, M1888, AF1889, AF1890, AF2503, M2545, AM2597) have survived to breeding age and contribute to the number of released wolves from captivity needed (22) to survive to breeding age for downlisting or delisting. Fifteen wolves surviving to breeding age exceeds the timeframe projections within the Recovery Plan.
- (2) Additional fosters need to be captured to fully document progress towards this recovery goal. A minimum of four fostered pups from the 2022 and 2023 cohorts have been captured and collared by the IFT and are alive in the wild. The IFT will continue capture efforts to document and collar other fostered pups and subadults in fall of 2023 and end-of-year capture operations.
- (3) A minimum of 19 fostered pups survived to breeding age (these totals include 4 wild-to-wild fosters) out of 78 fostered pups between 2014 and 2021 therefore a minimum rate of foster survival to breeding age is 0.24. This average survival rate is based on a small sample size and year to year survival can vary widely (2014: 1.00, 2015: N/A, 2016: 0.167, 2017: 0.25, 2018: 0.40, 2019: 0.15, 2020: 0.29, 2021: 0.05). Documenting survival is dependent on both survival to breeding age and identification and monitoring of fostered wolves. Identification and monitoring via radio collars cannot occur until ~ 4 months after the pups are placed in the den.
- (4) The benchmark established in the 2022 10(j) Rule for 2023 is 11 captive born wolves that survive to breeding age. The IFT has documented 15 captive-born fostered pups surviving to breeding age. Therefore, we have exceeded the interim release targets identified in the 2022 Mexican Wolf Recovery Plan, Second Revision (9 captive born wolves that survive to breeding age by 2022), and the benchmarks in the 2022 10(j) Rule. If this level of success is maintained for the 27 captive-born fostered pups in 2022 and 2023, we would expect an additional 7 fostered pups from these years to survive to breeding age ($0.24 * 27$), which would allow the Program to meet recovery objectives of the genetic criteria for the US population. It remains important, however, to continue aggressive fostering efforts to improve genetic metrics of the Mexican wolf.

Adult or Pack Initial Releases: No initial releases of adults or packs are proposed during 2024. The IFT will continue to focus on fostering in 2024 because these efforts (2014-2023) have been effective

(see above) in helping to achieve the genetic goals of the 2022 Mexican Wolf Recovery Plan, Second Revision, while eliminating nuisance behavior observed from adult or pack initial releases.

Initial Releases and Translocations

The IFT proposes to conduct the following actions.

Action 1 – Foster Mexican Wolf Pups Produced in Captivity into Wild Mexican Wolf Pack Dens.

The IFT proposes to foster captive-born pups into wild dens in authorized portions of the MWEPA. Our goal is to foster as many pups as logistically feasible (up to 12 in Arizona) in 2024, recognizing that the actual number will depend on the synchrony of litters between captive and wild packs and captive litter sizes. Fostering will occur within packs that den on federal land within Zones 1 and 2 of the MWEPA, in accordance with the 2022 10(j) Rule. Figures 1 and 2 give a general distribution of existing packs where fostering is likely to occur. As many as 57 current packs or pairs (20 in Arizona and 37 in New Mexico) are potential breeding pairs for fostering in 2024.

Associated Management Actions

Prior to the 2024 breeding season, the IFT will prepare a fostering priority ranking for all wild breeding pairs that will be considered for fostering using predicted whelp dates and other parameters (e.g. past reproductive successes, locational logistics, availability of GPS collars on breeders) in an effort to increase success and recruitment of wild and fostered pups; a similar analysis is conducted on captive breeding pairs, resulting in a ranking of pups produced and potential genetic contribution to the wild population. These rankings guide decisions on which wild packs to consider when captive pups become available, and in deciding how many captive pups to foster into a specific wild litter. The IFT will develop specific operational plans in the spring of 2024 for each foster event after a match between a captive and wild litter is identified. The operational plans document the following circumstances and considerations:

- Wild Mexican wolf packs display denning in Zone 1 or Zone 2 of the MWEPA.
- Donor pack(s) in captivity produce available pups based on the demographic and genetic needs of the wild and captive populations.
- Wild and donor pups are <15 days old.
- Whelping dates of wild pups and donor pups must be within 10 days of one another with less age difference preferred.
- Donor litter size needs to be large enough to contribute pups to the wild population. Typically, this is four or more, such that at least two pups can be fostered to a wild litter and at least two pups can remain in the captive litter. However, this will be evaluated on a case-by-case basis and will consider the benefits/risks associated with transporting or leaving fewer pups in the captive litter, the age and relative genetic value of the breeding pair in captivity, previous rearing success of both donor and recipient litter dams, and pack structure in captivity.
- The IFT will not know the recipient litter size prior to conducting the operation. Thus, a contingency plan will be developed to include an additional wild den (or dens) to consider wild-to-wild fostering and/or return wild-born pups to the captive litter if the addition of the captive born pups creates a wild litter that is too large (>10).

- The primary limiting factor in fostering efforts is the synchrony required between wild and captive litters. Experience has shown the last two weeks of April and the first two weeks of May to be the primary period of overlap between wild and captive whelp dates. The Service and SAFE are exploring options (e.g., induced ovulation and/or artificial insemination) to alter breeding and whelp dates of pups in captivity to coincide within the expected timing of wild wolf whelp dates where possible.

Favorable Attributes of Action 1:

1. Fostering allows for the integration of genetically diverse Mexican wolves into areas already occupied by wolves.
2. Fostering allows captive-born wolf pups to be raised in the wild by experienced wolves and eliminates the potential for nuisance wolf interactions that are often associated with the release of naïve captive adult wolves.
3. Fostering provides for continued progress towards the genetic criterion of the 2022 Mexican Wolf Recovery Plan, Second Revision.
4. Fostering has broader acceptance among the impacted public than initial releases of adults or packs of wolves from captivity.

Less Favorable Attributes of Action 1:

1. Fostering requires significant disturbance of the targeted wild pack(s) dens, and usually result in packs moving pups to another location. However, data from red wolves and Mexican wolves indicate that den movement has minimal impact on survival of the pups.
2. Fostering requires a number of specific events to occur simultaneously (e.g., packs den in Zones 1 or 2 in the MWEPA, both the donor and wild packs have pups within 10 days of each other, the foster event occurs within the first 14 days of life, wild pack den sites are located within 10 days of whelping, is it logistically feasible to transport the donor pups to and from the wild den). Also, we cannot specify individual recipient or donor packs until the time that key information is available.

Action 2 – Prevent the Mating of Full Siblings

This action provides the option to prevent the production of highly inbred pups resulting from the breeding of a full sibling pair of wild wolves; at this time, no full sibling pairs are known to exist. If a sibling pair is documented prior to or during the January/February helicopter count and capture operations, the preferred actions are to temporarily remove the female wolf of the pair prior to or in January/February and hold the female in captivity with a captive male to breed naturally. Artificial insemination of the female may also be considered if feasible and preferred. The female would be released back into the area it was removed from following a completed estrous cycle (~ end of March). The Mexican Wolf Recovery Program has temporarily removed breeding animals during previous helicopter surveys to treat injuries, and subsequently released the wolf back into the territory to maintain the original pairing. Pairs/packs were maintained during this process despite the disturbance.

Although the preferred action is outlined above, several options may be used to prevent the breeding of full siblings. For instance, the female may be too difficult to capture with the helicopter. Thus, a male may be removed and translocated to as far away from the established territory as possible (e.g., from one state to another, removed to captivity or transferred to Mexico), either following a stay in captivity or immediately. Should a full sibling pair successfully produce pups, fostering including removal of the entire wild litter (with or without fostering) will be considered.

Favorable Attributes of Action 2:

1. The action would prevent the known production of pups with undesirable genetic traits in the wild due to a full sibling pairing.
2. If a temporarily removed female is impregnated while in captivity, this would integrate genetically different Mexican wolves into the wild via the survival of any pups produced. Pups that survive two years from this action would count towards the genetic criterion in the 2022 Mexican Wolf Recovery Plan, Second Revision.
3. The temporary removal of a female or male would prevent a potential recommendation to maintain highly inbred wild-born pups in the captive management program.
4. The action should not alter the distribution of wolves.

Less Favorable Attributes of Action 2:

1. There is a chance the male pairs with another female or disperses while the female is being held in captivity which increases the chance that the female does not pair prior to whelping. If this occurred, however, the female could be released and form a new pair with another male prior to whelping in May.
2. There is the potential that the female is released and does not form a pair and whelp pups as an individual animal. Supplemental feeding would be conducted, if logistically feasible, to assist the female in raising the pups. In addition, if the timing works, some of the female's litter could be fostered into another wild litter.
3. If the sibling pair remains together, a similar action may need to be performed to prevent the sibling mating in 2025.
4. If pups from a sibling mating are left in the wild and survive (only 0.34 are expected to live to breeding age and fewer from a first-time breeder), we can expect a negative impact on MK in the wild populations. Removal of these pups to captivity could create a burden on the captive population (e.g., pups are expected to survive in captivity for a long time but will not be bred).

Action 3 - Translocate Wolves for Management Purposes

The IFT will consider translocation of Mexican wolves that travel outside of the MWEPA or that are removed for other management purposes in accordance with the 2022 10(j) Rule. The Service will evaluate the wolf or wolves' contribution to recovery and may elect to translocate (potentially in combination with initially released animals) the animal(s) to Mexico, because successful establishment and growth of a second population of Mexican wolves is critical to recovery. Prior to recommending translocation within the MWEPA, the IFT will assess: (a) the specific reasons for a translocation, (b) previous behavior of the wolf or wolves, (c) the potential effects of the management action, (d) wolf distribution and breeding vacancies, (e) the wolf or wolves potential genetic

contribution to the overall recovery program, and (f) the best available site based on site ranking and current wolf distribution. The IFT will notify permittees within 10 miles of the selected release site and local officials.

Favorable and Less Favorable Attributes of Action 3:

1. Maintains wolves in the population as potential breeders.
2. Any previously uncollared translocated wolves would be radio-collared and subsequently assist in marking new pairs/packs.
3. Translocated wolves may travel widely and repeat the behavior causal to the translocation (e.g., leaving the MWEPA).

Table 1. Genetic parameters of the free-ranging population of Mexican wolves in the United States. These data are based on animals that have been handled and stud booked in the wild population and known to be alive. These data are taken from the Mexican Wolf Species Survival Plan and include: Founder Genome Equivalents (FGE; increasing levels of FGE are considered positive for the population), percent Gene Diversity retained (GD; increasing levels of GD are considered positive for the population), Population Mean Kinship (MK; declining levels of MK are considered positive for the population), and Mean Inbreeding (Mf; declining levels of Mf are positive for the population).

Year	FGE	GD	MK	Mf
2016	2.08	75.91	0.2409	0.1661
2017	2.04	75.48	0.2452	0.2000
2018	1.96	74.54	0.2546	0.2201
2019	1.97	74.59	0.2541	0.2190
2020	2.06	75.69	0.2431	0.2030
2021	2.10	76.23	0.2377	0.2062
2022	2.10	76.20	0.2380	0.2090
2023	2.09	76.09	0.2391	0.2114

Figure 1. Mexican wolf home ranges for 2022 in Arizona and New Mexico within the Mexican Wolf Experimental Population Area (MWEPA). Home ranges on tribal land are not displayed in this figure.

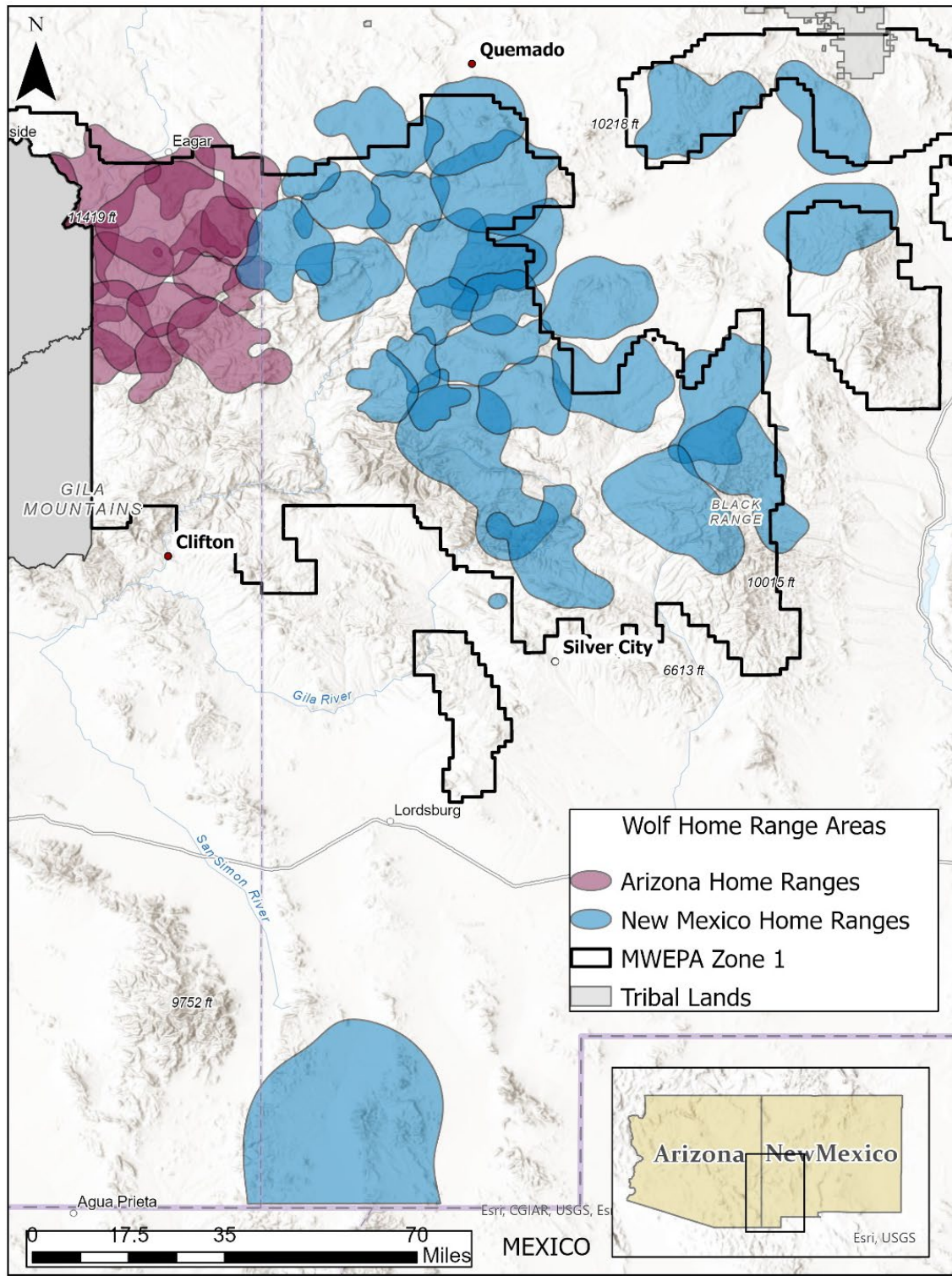


Figure 2. Mexican wolf occupied range in Arizona and New Mexico (2022) within the Mexican Wolf Experimental Population Area (MWEPA). Occupied wolf range was calculated based on the following criteria: (1) a ten-mile radius around all aerial locations or GPS locations of radio monitored wolves during 2022; (2) a ten-mile radius around all uncollared wolf locations and wolf sign over the past year; and (3) in accordance with the 2022 10(j) Rule, occupied range is calculated within the 10(j) boundary of the MWEPA and does not include tribal lands or areas in management Zone work.

