Mexican Wolf Experimental Population Area
Initial Release and Translocation Proposal for 2019

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 2019. The initial releases and translocations outlined in this document are consistent with:

(1) *the 2014 Final Environmental Impact Statement (EIS) for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (*Canis lupus baileyi*)*,

(2) *the 2015 Record of Decision for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf (*Canis lupus baileyi*)*,

(3) *the 2015 Final Rule - Revisions to the Regulations for the Nonessential Experimental Population of the Mexican Wolf.*

(4) *the 2017 Mexican Wolf Recovery Plan, First Revision.*

The above documents analyzed the potential environmental and socioeconomic impacts of a Mexican wolf population in the MWEPA, including initial releases and translocations. This document is the initial release and translocation planning proposal for 2019; thus, it is not a final agency action but rather an implementation planning document that may be changed during this planning period. From 1998-August of 2018, the IFT has conducted 35 initial release events (114 wolves) and 72 translocations events (125 wolves). Cross-foster events can be considered translocations (wild to wild movement of pups) or initial releases (captive to wild) and are included in the overall number of translocations (four cross-fosters) and initial releases (18 cross-fosters) above. Detailed information on cross-foster efforts is presented in this document.

With seven unrelated founders, the Mexican wolf has experienced a genetic bottleneck necessitating management actions to retain remaining gene diversity. Specifically, the captive population is carefully managed in an effort to maintain gene diversity by establishing breeding pairs through a process that considers mean kinship[1] (MK) and avoidance of inbreeding[2]. 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 probability that wolves pairing naturally have a low MK.

[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.

The wild population's MK is approximately 0.25. This means that, on average, individuals within the population are as related to one another as full siblings. All current known wild breeding pairs are producing pups related to the Bluestem Pack, specifically breeding female AF521 (Figure 1). Most of these pups (17 out of 24) will be more distantly related (i.e., less than 50% of the genetic material was from direct offspring of the Bluestem Pack). However, of the approximately 77 Mexican wolves in the wild for which individual genetics are known (or highly suspected for 2018 pups of the year), analyses indicate only three (AM1038, AM1471, and f1578) are not descendants of AF521. Thus, there is very little potential for natural pair formation among wild wolves to have a low MK now or in the future which naturally leads to inbreeding accumulation. 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 2017 Mexican Wolf Recovery Plan, First Revision. In addition, we will consider preventing production of highly inbred wolves 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) Cross-foster pups from captivity into wild wolf packs throughout the MWEPA. Our goal is to cross-foster up to 12 pups throughout the MWEPA during 2019, recognizing the actual number will depend on synchrony of litters among the captive and wild population. Our intent is to aggressively achieve cross-fostering goals in 2019.
(2) Temporarily remove any female wolf that is paired with a full sibling during the helicopter capture in January/February to prevent a brother/sister mating event. During the temporary period of time 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) 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 paring(s), if documented, through the methods described above.
(3) Provide for the translocation of wolves for management purposes as needs arise during 2019 (primarily wolves that disperse outside of the MWEPA, onto tribal lands and removal is requested, or if other packs are determined to be brother/sister 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 agency laws, rules, regulations, and land-use patterns (e.g. higher and more complex 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 health of the wolf population by addressing critical genetic issues. In March of 2018, the Service, New Mexico Department of Game and Fish, and the Arizona Game and Fish Department entered into a Memorandum of Agreement to clarify that 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 under the 2017 Mexican Wolf Recovery Plan, First Revision and the 2015 Final Experimental Population Rule, with the intent of facilitating the recovery of the species and eventual transition from federal management to state management. In 2019, the agencies are considering only cross-fostering of captive born pups into wild dens (no initial releases of adult wolves) and to allow for translocations of wolves on a case by case basis. The combinations of strategies within the MWEPA that are outlined in this plan represent an effort to manage gene diversity in the wild population. Gene diversity can continue to be managed through additional initial release and cross-fostering efforts in future years. 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 2017 Mexican Wolf Recovery Plan, First Revision recognizes the importance of managing gene diversity and specifically identifies a delisting criteria based on gene diversity. The criteria reads that "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 2017 Mexican Wolf Recovery Plan, First 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 not all released wolves surviving to breeding age will contribute offspring in the population).

Initial Release and Translocation Strategies:

Translocations: Involve moving a wolf for management purposes from one location to another location within the MWEPA. 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 guidance of Phase 1 (see 2015 10(j) Rule). Decisions for translocations on tribal land within the MWEPA will be at the discretion of the individual tribe and is not specifically covered in this document. 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, and (e) the wolf or wolves potential genetic contribution to the overall recovery program prior to recommending a translocation.

Most translocations will be single animals and can occur anywhere within Zone 1 or Zone 2 as a hard release (i.e., a release from a crate). The IFT may recommend that translocations be conducted at a previously established release site. If a previously established release site will be considered, the IFT will recommend the best available site based on site ranking. Translocated wolves may spend a period of time in captivity (note: time spent in captivity did not 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. Entering 2019, the U.S. Fish and Wildlife Service (Service) has one eligible translocation candidate (M1336) available in captivity. M1336 was captured during the 2014 helicopter count (January of 2015) to prevent breeding

between full siblings. M1336 does not have a depredation or nuisance history in the approximately three years spent in the wild. The IFT does not have a specific translocation recommendation for M1336 during 2019, but the animal is available in captivity should a need arise (e.g., breeding vacancy). Any translocation recommendation for this animal will undergo the assessment described above.

In 2019, the IFT is recommending the following management action as an option to prevent reproduction by full sibling pairs. If a full sibling pair is documented, the preferred management action will be to remove the female wolf from the pair to potentially be impregnated in captivity by a captive male wolf, or through artificial insemination (pending additional coordination and logistics), and then returned to the same area in the wild as the removal. However, other management actions may be necessary depending on the ability to catch the female and the availability of personnel to perform AI or male wolves in captivity. The preferred action would be considered a translocation. Other wolves may be translocated for management purposes as needs arise in 2019. Options will be evaluated to determine if, where, and how a translocation should proceed based on SOP 6.1 (Wolf Translocations) and a full evaluation by the IFT.

Initial Releases: Involve the release of wolves from captivity without wild experience. Originally, initial releases were necessary to establish a wild population and subsequently augment population growth. Now, initial releases are a management option (one option of several other management options) to reduce MK of the wild population (see Figure 1). Captive wolves are selected for release based on their genetic value relative to both the captive and wild Mexican wolf populations, as well as other desirable characteristics (e.g. fear of humans). Artificial insemination may also be utilized to further increase the genetic benefit of release actions.

Both initial releases and translocations are more successful when young pups are present and when they occur in areas with adequate native prey. For instance, from 1998-2015 (note: initial releases or translocations of breeding animals has not occurred since 2015), we have documented that 66% (n = 9) of the initial released breeding animals with dependent pups in areas of adequate native prey have been successful, versus 29% success (n = 17) of the initial released breeding-aged animals without dependent pups in similar conditions. The pattern observed for initial released wolves also holds for translocated animals with 77% success (n = 13) with pups versus 32% (n = 38) without pups under similar conditions. Success, as we are using this term, means any released wolf that survives and produces pups in the population in the future. Breeding pairs that meet this definition of success tend to persist and produce pups in successional years, continuing to increase gene diversity (note: successful initial released wolves recruit an average of 6.5 pups/wolf). Initial-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. Survival of adult Mexican wolves released from captivity has been substantially lower during the first year following a release compared to the average adult survival rate of wild wolves (adult survival rate first year after release of 0.28 [note: this includes adults released without pups] versus an average adult survival rate of 0.8 using data from 2009 through 2015). Initial release wolves require intensive, sustained management by IFT staff including supplemental feeding, monitoring, and potential hazing from human occupied areas until the pack has acclimated to wild behavior. No initial releases of adults or packs are currently proposed during 2019. The IFT will focus on cross-fostering (considered an initial release) in 2019 because initial efforts have been promising (see below) and

present an opportunity to accomplish genetic goals of the 2017 Mexican Wolf Recovery Plan, First Revision, while eliminating nuisance behavior observed during initial release of adult wolves. Initial releases of packs of wolves may still be necessary in the future based on the continued evaluation of cross-fostering.

Cross-fostering (a specific technique of initial releases): Involves placing captive-born pups (<14 days old) into wild dens with similarly aged pups, and is another method to increase gene diversity in the wild population. Cross-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 cross-fostered from captive facilities as far away as Missouri and Illinois). Cross-fostering has been utilized since 2014 in the Mexican Wolf Recovery Program, and therefore its overall efficacy as a genetic management tool is not yet fully known. However, recent successes within the Mexican Wolf Recovery Program and the more in-depth experience of the red wolf program in North Carolina suggest that cross-fostering can be an effective genetic management tool. These expectations are tempered 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 cross-fostered pups would survive to breeding age (two years old) should cross-fostered 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.

Initial results from the Mexican Wolf Recovery Program have demonstrated that cross-fostering can be successful in releasing captive wolves that survive to breeding age. The IFT has conducted cross-fostering on 11 occasions, totaling 22 pups with 18 of these being moved from captive litters into wild dens. In 2014, the IFT fostered two pups from one wild litter (note: this litter was the result of a captive female breeding with a wild male and subsequent release in the spring; the male and female separated prior to the production of pups) to another wild litter. Both of the pups (AF1346 and AM1347) survived to breeding age, paired, and produced pups with other wolves in the wild. In 2016, the IFT fostered six pups from three captive litters into three wild litters (two pups into each wild litter) and documented that a minimum of two survived (mp1471 and an uncollared pup) to the end of the year. Male 1471 survived to breeding age and is currently raising pups. In 2017, the IFT fostered four pups from two captive litters into two wild litters (two pups into each wild litter). One cross-fostered pup, fp1578, was radio-collared in 2017 and continues to travel with the wild pack; pups from the other cross-fostered pack did not survive to the end of the year. Similar results are expected for the ten pups (eight cross-fostered from captive litters and two from wild-to-wild litters) cross-fostered in 2018; however, data are still being collected. Collectively, these results indicate that: (1) in all 11 cross-fostering events (inclusive of 2018), 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, (2) a minimum of five of the 12 cross-fostered pups survived to the end of the year (excluding 2018 since final data are unknown), (3) three of eight cross-fostered animals that would be old enough to be considered “breeding age,” are known to be surviving, and (4) all three cross-fostered animals that have reached breeding age have formed packs have successfully contributed genetically to the population (bred and raised pups), which is the ultimate goal of all release strategies. Collectively, these results are encouraging and suggest that the Mexican Wolf Recovery Program should continue to utilize cross-fostering as a strategy to manage genetic diversity of Mexican

wolves in the wild. In addition, the results are consistent with expectations based on Mexican wolf pup survival rates.

Cross-fostering has also contributed towards meeting the 2017 Mexican Wolf Recovery Plan, First Revision criteria such that one wolf (AM1471) survived to breeding age and reduced the number of released wolves from captivity needed to survive to breeding age for downlisting or delisting to 21 wolves. In addition, f1578 is actively monitored, enabling the IFT to document her survival. Assuming this wolf survives to breeding age, this will further reduce the number of wolves required. Based on our experience to date and assuming that f1578 survives, survival to breeding age is expected to be similar (a minimum of four wolves surviving to breeding age out of 12 cross-fostered pups) to the 0.34 expected from survival rate projections. If this level success is maintained and the project continues to cross-foster at least eight pups (preferably more) from captivity in 2019 and 2020, it is likely that we will meet the interim release targets (nine animals surviving to breeding age by 2022) established in the 2017 Mexican Wolf Recovery Plan, First Revision through only cross-fostering efforts. However, such projections depend on at least three of the eight pups that were fostered from captivity surviving in 2018 and f1578 surviving to breeding age. Thus, we should continually reevaluate cross-fostering success and ability to reach the interim recovery targets.

Cross-fostering does not appreciably change the distribution of wolves on the landscape, and depends on coordination of logistics between captive facilities and the wild population (see SOP 31.0) to succeed. Captive-born pups placed into wild Mexican wolf dens will be of a different genetic profile than existing wolf packs in the MWEPA and, if successfully established, can increase the gene diversity of the wild wolf population. Cross-fostering will occur in April and/or May and occur within packs that den on Federal land within Zones 1 and 2 of the MWEPA, in accordance with the guidance of Phase 1 (see 2015 10(j) Rule). Decisions for cross-fostering on tribal land within the MWEPA will be at the discretion of the individual tribe and is not specifically covered in this document.

Initial Releases and Translocations
The IFT proposes to conduct the following actions.

Action 1 – Cross-foster Mexican Wolf Pups Produced in Captivity into Wild Mexican Wolf Pack Dens in the MWEPA.

The IFT proposes to cross-foster pups into authorized portions of the MWEPA. Our goal is to cross-foster up to 12 pups into the MWEPA in 2019. Cross-fostering will occur within packs that den on Federal land within Zones 1 and 2 of the MWEPA, in accordance with the guidance of Phase 1 (see 2015 10(j) Rule).

Figures 2 and 3 give a general distribution of existing packs where cross-fostering is likely to occur. As many as 26 packs or pairs (12 in Arizona and 14 in New Mexico) are currently potential breeding pairs for cross-fostering in 2019 (Table 1). We have listed below the preferred wild pack candidates for 2019 cross-fostering, based on their past success with pup production and our expectation that the same experienced alpha females will reproduce in 2019. Other packs (Table 1) will be considered based on a full evaluation when pups from captivity are born. The preferred pack candidates are listed in chronological order by predicted whelp date based on previous years:

- *Mangas (NM) April 3 - 23
- Saffel (AZ) April 5 - 17
- Elk Horn (AZ) April 6 – 25
- Frieborn (NM) April 7 – 15
- Prime Canyon (AZ) April 10
- Maverick (AZ) April 10 – 30
- Hoodoo (AZ) April 13 – 22
- Pine Spring (AZ) April 15
- SBP (NM) April 16 – 26
- San Mateo (NM) April 20 – 24
- *Luna (NM) April 20 – 25
- *Prieto (NM) April 20 – May 4
- Dark Canyon (NM) April 21 – May 2
- Iron Creek (NM) April 24 – May 2
- Lava (NM) April 28 – May 1

* Prieto, Luna, and Mangas packs would be evaluated based on den location and depredations accumulated prior to the cross-fostering effort, since these packs had depredations prior to denning in 2018.

Associated Management Actions

After the 2019 breeding season, the IFT will prepare a cross-fostering priority ranking for all 2019 wild breeding pairs that will be considered for cross-fostering using predicted whelp dates and 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 cross-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 the IFT in deciding which wild packs to consider when captive pups become available, and the Service and captive management program in deciding how many captive pups can be made available for cross-fostering from a specific litter. The IFT will develop specific cross-foster operational plans for the 2019 breeding season after a match between available captive pups and a wild litter is identified. This management option requires the following circumstances and considerations:

- Wild Mexican wolf packs display denning in Zone 1 and 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 population.
- Wild and donor pups are <14 days old.
- Whelping dates of wild pups and donor pups must be within ten 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 two pups can be transported to the recovery area 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 only

one pup, 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.

- Wild litter size needs to be small enough to accept donor pups (i.e. approximately six or fewer, but dependent on other data [e.g., females that have a history of raising large litters may be pushed to seven or fewer]). The IFT will not know the recipient litter size prior to conducting the operation. Thus, a contingency plan will be developed to return wild-born pups to the captive litter in every cross-foster operation if the addition of the captive born pups creates a litter larger than eight pups). In addition, if the captive litter is large enough, the IFT will consider cross-fostering more pups into a wild litter (previously we have limited it to two pups per cross-foster attempt) based on our experience in 2017 of successfully cross-fostering pups from the wild to captivity. Another option to avoid creating too large of a litter size is to cross-foster wild pups from a large litter to a different predetermined wild den, where pups are similar age.
- The primary limiting factor in cross-fostering efforts is the synchrony required between wild and captive litters. Past 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 is 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. Cross-fostering allows for the integration of genetically diverse Mexican wolves into areas already occupied by wolves.
2. Cross-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. Cross-fostering provides for progress towards the genetic criterion of the Mexican Wolf Recovery Plan, First Revision.

Less Favorable Attributes of Action 1:

1. 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.
2. Cross-fostering requires a series 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 ten days of each other, the cross-foster event occurs within the first 14 days of life, wild pack den sites are located within ten days of whelping, it is logistically feasible to transport the donor pups to and from the wild den, etc.). Thus, we are limited in the number of opportunities to cross-foster within a whelping season, and we cannot specify individual recipient or donor packs until the time that key information is available.

<u>Action 2 – Prevent the Mating of Full Siblings.</u>

This action provides the option to prevent the production of pups by a full sibling pair of wild wolves; at this time, no known full sibling pairs are known to exist in the wild population. 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 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 should necessary personnel be available and fresh and/or frozen semen obtainable. 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 alpha animals during previous helicopter surveys to treat injuries, and subsequently released the wolf back into the territory to maintain the original pairing. Pairs were maintained during this process despite the disturbance. The expectation in this action is that pack dynamics would not change with the temporary removal of the female wolf.

Although the preferred action is outlined above, several options may be utilized 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 (i.e. from on state to another), either following a stay in captivity or immediately. Should the project fail to prevent a full sibling pair from breeding and producing pups, cross-fostering with removal of all or some component of the wild litter should be fully evaluated.

Favorable Attributes of Action 2:

1. The action would prevent a known mating of full siblings resulting in the production of highly inbred pups in the wild.
2. Similar to cross-fostering, this action would allow for the integration of genetically different Mexican wolves without having to release naïve adults/packs. Pups that survive two years from this action would count towards the genetic criterion in the Mexican Wolf Recovery Plan, First Revision.
3. The action 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 slight chance the male pairs with another female or disperses while the female is being held in captivity. If this occurred, 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 whelps pups as an individual animal. The IFT would likely need to provide supplemental feeding to assist the female in raising the pups. In addition, if the timing works, the IFT may cross-foster some of the female's litter into another wild litter. Staff from the IFT will have to be involved in expending resources to manage this scenario.
3. If the sibling pair remains together, a similar action may need to be performed to prevent the sibling mating in 2020.
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 creates a burden on the captive population (e.g., pups are expected to survive in captivity for a long time but will not be bred).

<u>Action 3 - Translocate Wolves for Management Purposes During 2019 (primarily wolves dispersing outside of the MWEPA).</u>

The IFT will consider translocation onto Federal land inside the MWEPA in accordance with the 2015 10(j) Rule of Mexican wolves that travel outside of the MWEPA or that are removed for other management purposes (including removal from tribal lands at a Tribe's request). 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, and (e) the wolf or wolves potential genetic contribution to the overall recovery program prior to recommending a translocation. Most translocations under these scenarios will be single animals and can occur anywhere within Zone 1 or Zone 2 as a hard release. The IFT will recommend the best available site based on site ranking and current wolf distribution. The IFT will follow SOP 5.1 (Translocations) for communication with permittees and local officials in association with translocation events.

Favorable and Less Favorable Attributes of Action 3:

1. These wolves are maintained inside the MWEPA population as potential breeders.
2. Translocated wolves are radio-collared and could pair with an uncollared wolf.
3. Translocated wolves may travel widely and repeat the behavior causal to the translocation (e.g. leaving the MWEPA).

Table 1. Packs that could produce pups in the wild during 2019. Other packs are likely to pair and produce pups in 2019. These packs will be fully evaluated prior to cross-fostering efforts.

Pack	State	Previous Whelp Dates for Breeding Female	Minimum No. of Pups Produced[1]	Notes
Baldy	AZ	4/11/18, UK	Unknown/Failed Den	Transboundary pack with FAIR
Bluestem	AZ	4/15/18, <4/25/17, 4/19/16, 4/18-4/29/15	Unknown, 4, 6, 8	AF1042 will be 13 in 2019 and unlikely to produce pups
Copper Creek	NM	Unknown, 5/5/17	Unknown, Failed Den	Collar failed in 2018
Dark Canyon	NM	5/2/18, 4/21/17	6, Failed Den	2018 cross-foster
Datil Mountain	NM	5/10/18	Failed Den	First-time breeders in 2018
Eagle Creek	AZ	4/1/18	Failed Den	First-time breeders in 2018
Elk Horn	AZ	4/6/18, 4/16/17, 4/23/16, 4/22-4/25/15	5, 2, 5, Failed	2018 cross-foster, successful cross-foster pack in 2016
Frieborn	NM[2]	4/7/18, 4/10/17 – 4/17/17	6, Failed Den	2018 cross-foster
Hawks Nest (F1473)	NM	4/16/2018	Failed Den	First-time breeders in 2018
Hoodoo	AZ	4/13/18, 4/15/17, 4/22/16	3, 5, 6	
Iron Creek	NM	5/1/18, 5/1/17, 4/24/16, 5/2/15	5, 4, 5, 5	2018 cross-foster
Lava	NM	5/1/18, 4/28/17	5, 3	2018 cross-foster
Leopold	NM	Unknown, Unknown, 5/15/16	Failed Den, Failed Den, 3	Poor candidate for cross-fostering due to denning in the wilderness
Luna	NM	4/20/18, 4/25/17, 4/23/16	Unknown, 4, 5	Potential for depredations post cross-fostering should be considered

Pack	State	Previous Whelp Dates for Breeding Female	Minimum No. of Pups Produced[1]	Notes
Mangas	NM	4/3/18, 4/23/17	1, 4	Same depredation concerns as Luna
Maverick	AZ	4/30/18, 4/10/17, 4/21/16, 4/19/15	4, Failed, 2, 2	Transboundary pack with FAIR
Pine Spring	AZ	4/15/18	3	2018 was AF1562's first litter
Prieto	NM	4/20/18, 5/4/17, 5/2/16, 4/23/15	4, 2, 4, 6	Same depredation concern as Mangas and Luna
Prime Canyon	AZ	4/10/18	6	First-time breeders in 2018
Saffel	AZ	4/17/18, 4/5/17	5, 4	
San Mateo	NM	4/20/18, 4/24/17, 4/20/16	6, 8, 3	Cross-foster pack in 2017
SBP	NM	4/16/18, 4/26/17	3, 3	
Sierra Blanca	AZ	Did not breed in 2018	N/A	First-time breeders in 2019
Squirrel Springs	NM	Unknown	Failed Den	Likely first-time breeder in 2018
Tu Dil Hil	AZ	*	*	Dependent on White Mountain Apache Tribe's decisions/discussions
Tsay-O-Ah	AZ	*	*	Dependent on White Mountain Apache Tribe's decisions/discussions

[1]Number of pups will likely be refined during the 2018 population count. All data here-in should be considered preliminary. Final numbers will be reflected in the 2018 Annual Report.
[2]Boundary pack that occurs in both Arizona and New Mexico, but denned just on the New Mexico side of the border in 2017.
*Tribal data are considered proprietary and not displayed.

Table 2. Pairs that are planned to produce pups in captivity during 2019 and will be evaluated for their availability to contribute pups to cross-foster to the wild.

Pair	State	Previous Whelp Dates for Breeding Female	Minimum No. of Pups Documented	Estimated Drive Time to MWEPA[1]
M1478xF1540	Arizona	5/26/18	1	4 h 18 min
M1049xF1217	California	None	-	9 h 8 min
M1139xF1227	California	5/8/16, 5/9/17, 5/14/18	7, 6, 7	9 h 8 min
M1384xF1219	California	First-time breeder	-	9 h 8 min
M1537xF1128	Colorado	5/8/18	7	8 h 55 min
M1229xF1468	Illinois	First-time breeder	-	22 h 47 min
M968xF1479[2]	Indiana	4/12/18	2	21 h 7 min
M1344xF1530	Kansas	4/24/18	0	13 h 1 min
M1359xF1401	Michigan	First-time breeder	-	27 h
M1249xF1216	Missouri	5/18/18	4	17 h 59 min
M1297xF1300[2]	Missouri	5/7/16, 5/13/17, 5/7/18	4, 8, 8	17 h 59 min
M1298xF1374	Missouri	5/2/16, 4/2/17	4, 1	17 h 59 min
M1195xF1265[2]	Missouri	5/29/15, 4/25/16,4/22/17	4, 5, 5	17 h 59 min
M1558xF1508	New Mexico	First-time breeder	-	3 h 45 min
M1336xF1323	New Mexico	5/22/17, 5/15/18	4, 6	3 h 50 min
M1400xF1632	New Mexico	First-time breeder	-	4 h
M1177xF1266	New Mexico	4/17/15, 4/15/16, 4/9/18	3, 6, 8	3 h 50 min
M1506xF1402	New Mexico	First-time breeder	-	6 h 51 min
M1133xF1226[2]	New York	5/25/16, 5/22/17	3, 3	34 h
M1198xF1143[2]	New York	5/4/16, 5/8/18	1, 9	34 h
M1564xF1505	New York	4/30/18	3	34 h
M1059xF1435[2]	New York	First-time breeder	-	34 h
M1358xF1365	Ohio	None	-	25 h
M1396xF1129	Texas	4/18/18	2	12 h 17 min
M1360xF1422	Washington	5/11/17	4	22 h 45 min
M1458xF1633	Washington	First-time breeder	-	22 h 45 min

[1]Drive time estimated from originating captive facility to Alpine, AZ provided as guidance in determining whether to drive or fly pups to MWEPA.
[2]Female is considered for artificial insemination in 2019.

Figure 1. Potential 2019 breeding pairs and their relationship to the Bluestem Pack. All packs are shaded according to the percentage of ancestors in the last three generations that were direct Bluestem Pack descendants. The percentage represents the proportion of their four maternal and four paternal great-grandparents that were direct offspring of the Bluestem Pack (n=8 great-grandparents; where a past breeder was not confirmed the denominator to calculate percent may be fewer than 8).

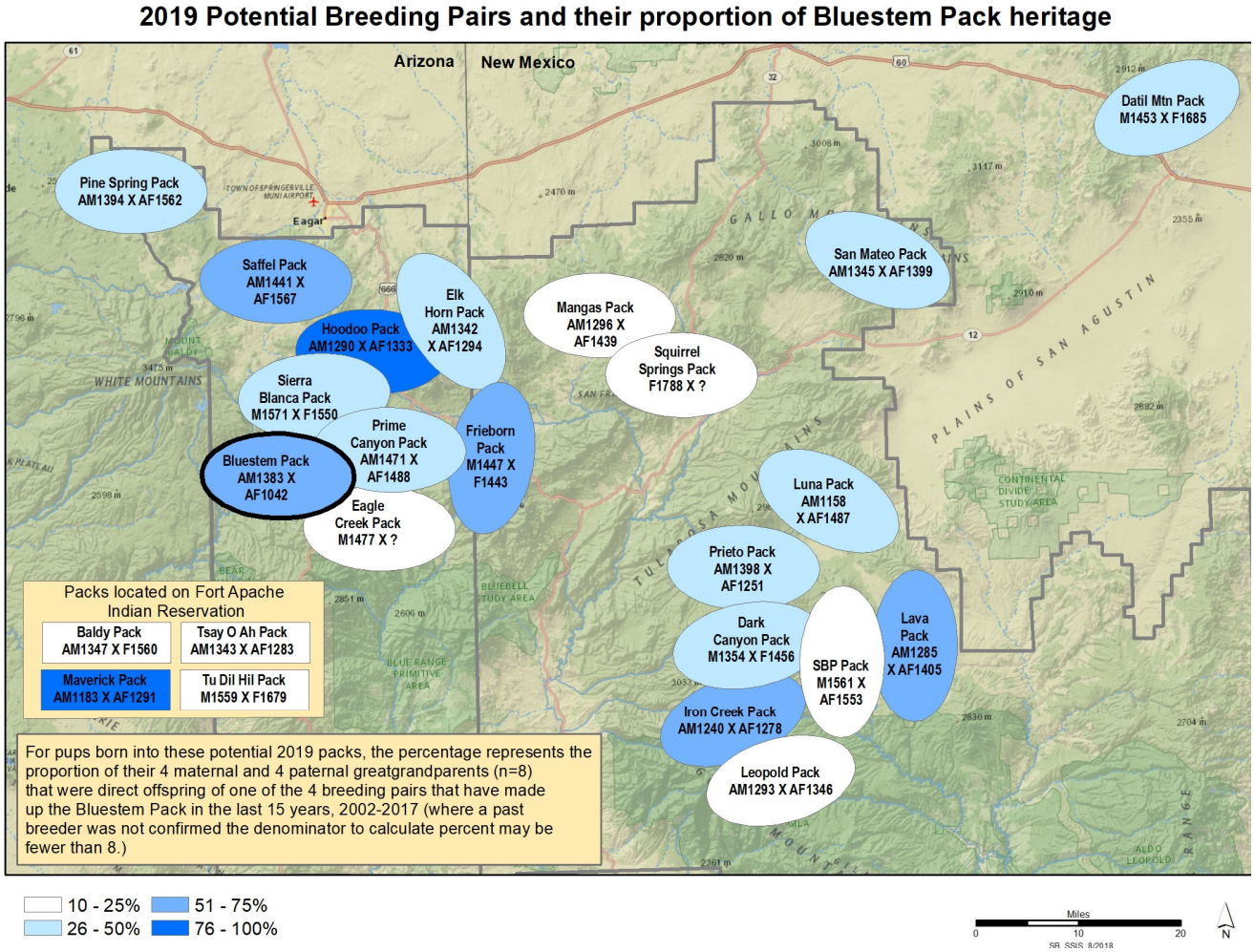

Figure 2. Mexican wolf home ranges for 2017 in Arizona and New Mexico within the Mexican Wolf Experimental Population Area (MWEPA). The shaded polygons on the map represent wolves having a minimum of 20 and a maximum of 3017 independent radio locations and exhibiting movement characteristics consistent with a home range during 2017.

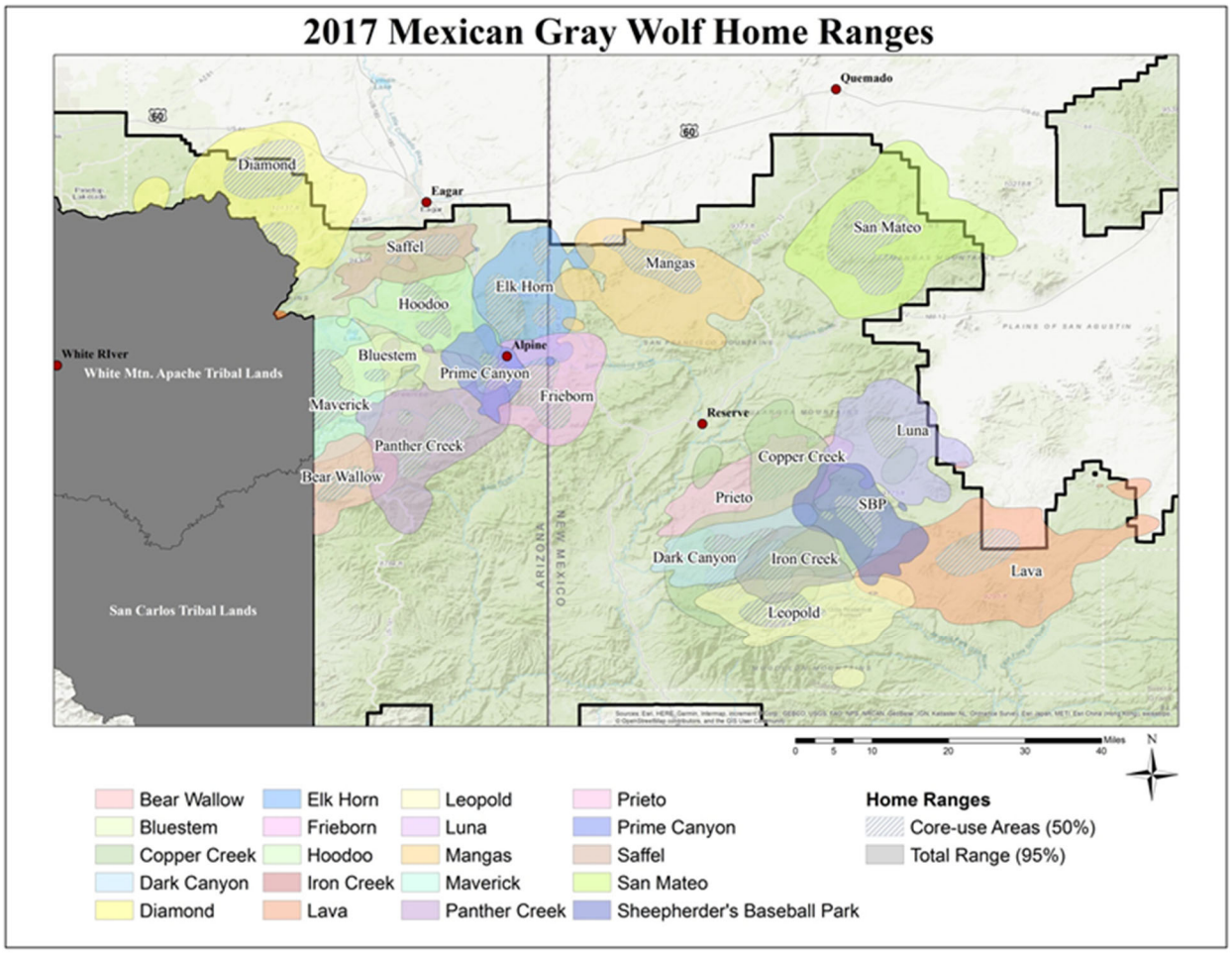

Figure 3. Mexican wolf occupied range in Arizona and New Mexico (2017) within the Mexican Wolf Experimental Population Area (MWEPA).