Mexican Wolf Recovery Program:
Progress Report #15

Reporting Period: January 1 – December 31, 2012

Prepared by: U.S. Fish and Wildlife Service

Cooperators: Arizona Game and Fish Department, USDA-APHIS Wildlife Services, US Forest Service, and White Mountain Apache Tribe

Table of Contents

Foreword

The U.S. Fish and Wildlife Service (Service) is the lead agency responsible for recovery of the Mexican wolf *(Canis lupus baileyi),* pursuant to the Endangered Species Act. The Mexican Wolf Recovery Program has two, interrelated components: 1) Recovery – includes aspects of the program administered primarily by the Service that pertain to the overall goal of Mexican wolf recovery and delisting from the list of threatened and endangered species, and 2) Reintroduction – includes aspects of the program implemented by the Service and cooperating States, Tribes, and other Federal agencies that pertain to management of the reintroduced Mexican wolf population in the Blue Range Wolf Recovery Area (BRWRA), which consists of the entire Apache and Gila National Forests in Arizona and New Mexico. This report details all aspects of the Mexican Wolf Recovery Program. The reporting period for this progress report is January 1 – December 31, 2012.

Background

The Mexican wolf, or "lobo," is the smallest, rarest, southernmost occurring, and most genetically distinct subspecies of the North American gray wolf. Mexican wolves were extirpated from the wild in the southwestern United States by 1970, primarily as a result of a decades long concerted effort to eradicate them due to livestock conflicts. Recovery efforts for the Mexican wolf began when it was listed as an endangered species in 1976. A captive breeding program was initiated and saved the Mexican wolf from extinction with the capture of the last five remaining Mexican wolves in the wild in Mexico from 1977 - 1980.

A Mexican Wolf Recovery Team was convened in 1979 to write a recovery plan, which was approved by the Service in 1982. The recovery plan contains objectives for maintaining a captive population and reestablishing Mexican wolves within their historic range. In June 1995, with the captive population numbers secure, the Service released a draft Environmental Impact Statement (EIS) entitled: *Reintroduction of the Mexican wolf within its Historic Range in the Southwestern United States*. After an extensive public review and comment period, the Final EIS was released in December 1996.

In March 1997, the Secretary of the Interior signed a Record of Decision approving the Service's preferred alternative in the EIS to release captive-reared Mexican wolves into a portion of the BRWRA. The Mexican wolf Final Rule - Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico (Final Rule) - was published in the Federal Register on January 12, 1998, and provided regulations for how the reintroduced population would be managed (US Fish and Wildlife Service 1998). On March 29, 1998, the first Mexican wolves were released into the wild. All wolves within the BRWRA are designated as a nonessential experimental population under section 10(j) of the Endangered Species Act which allows for greater management flexibility to address potential conflicts such as livestock depredations and nuisance behavior. An Interagency Field Team (IFT) comprised of members from the Service, Arizona of Game and Fish Department (AGFD), White Mountain Apache Tribe (WMAT), US Forest Service, and U.S. Department of Agriculture-Wildlife Services (USDA-WS) monitors and manages the reintroduced population.

Mexican wolf from the Maverick pack taken during the 2012 end of year population survey. Mexican wolf Interagency Field Team photo.

PART A: RECOVERY ADMINISTRATION

1. Mexican Wolf Captive Breeding Program

a. Mexican Wolf Species Survival Plan

The 1982 Mexican Wolf Recovery Plan contains the objective of establishing and maintaining a captive breeding program as an essential component of recovery (US Fish and Wildlife Service 1982). A captive breeding program was initiated in 1977 through 1980 with the capture of the five remaining wild Mexican wolves in Mexico. The captive breeding program is managed for the Service and SEMARNAT (Mexico's Secretary of Environment and Natural Resources) under the American Zoological and Aquarium Association's (AZAA) Mexican Wolf Species Survival Plan (SSP) program. The SSP is a bi-national (United States and Mexico) captive breeding program. Its mission is to reestablish the Mexican wolf in the wild through captive breeding, public education, and research. The SSP designation is significant because it indicates to AZAA member facilities the need for the species to be conserved, and triggers internal support to member facilities to help conserve such imperiled species. Wolves in these facilities are managed in accordance with a Service approved standard protocol. The SSP is the sole source population to reestablish the species in the wild, thus, without the SSP recovery of the Mexican wolf would not be possible. The SSP has steadily expanded throughout the years to approximately 258 captive Mexican wolves managed in 52 facilities in the United States and Mexico in 2012. SSP members routinely transfer Mexican wolves between participating facilities to promote genetic exchange and maintain the health and genetic diversity of the captive population.

The SSP's goal of housing a minimum of 240 wolves with a target population size of 300 ensures the security of the species in captivity and produces surplus animals for reintroduction. In the United States, potential Mexican wolf release candidates are sent to one of three Service approved pre-release facilities (see below) where they are evaluated for release suitability and undergo an acclimation process. All wolves selected for release are genetically redundant to the captive population, meaning their genes are already well represented. This minimizes any adverse effects to the genetic integrity of the captive population, in the event that wolves released to the wild do not survive.

Each July, the SSP holds a bi-national meeting to plan and coordinate wolf breeding, transfers and related activities among facilities. The location of these meetings alternates between Mexico and the United States. In 2012, the annual SSP meeting was held in Olympia, Washington, and hosted by Wolf Haven International.

b. Mexican Wolf Pre-Release Facilities

Mexican wolves are acclimated prior to release to the wild at these Service-approved facilities, which are designed to house wolves in a manner that fosters wild characteristics and behaviors. These facilities are the Ladder Ranch and Sevilleta Wolf Management Facilities, located in New Mexico near the BRWRA, and Wolf Haven International, located in Tenino, Washington. At these facilities, wolves are managed with minimal exposure to humans for the purpose of

minimizing habituation to humans and maximizing pair bonding, breeding, pup rearing, and healthy pack structure development. Wolves are evaluated and selected for release to the wild based on genetic makeup, reproductive performance, behavior, physical suitability, and overall response to the adaptation process. These facilities have been successful in breeding wolves for release and are integral to Mexican wolf recovery efforts. To further minimize habituation to humans, public visitation to the Ladder Ranch and Sevilleta facilities is not permitted.

Release candidates are sustained on a zoo-based diet of carnivore logs and a kibble diet formulated for wild canids. Diets of release candidates are supplemented with carcasses of road-killed ungulate species, such as deer and elk, and scraps from local game processors (meat, organs, hides, and bones) from wild game/prey species only. Release candidates are given annual examinations to vaccinate for canine diseases (e.g., parvo, adeno2, parinfluenza, distemper and rabies viruses, etc.), are dewormed, have laboratory evaluations performed, and have their overall health condition evaluated. Animals are treated for other veterinary purposes on an as-needed basis.

Sevilleta Wolf Management Facility (SWMF)

The SWMF is located on the Sevilleta National Wildlife Refuge (SNWR) near Socorro, New Mexico and is the only Mexican wolf pre-release facility managed entirely by the Service. There are a total of eight enclosures, ranging in size from 0.25 acre to approximately 1.25 acres, and a quarantine pen. In 2012 the staff of SNWR continued to assist in the maintenance and administration of the SWMF. Through the course of the year, 28 individual wolves were housed at the SWMF. Of these, five wolves were transferred to Wildlife West in New Mexico, two were transferred to Mesker Park Zoo in Indiana, one to the California Wolf Center, and one to the Southwest Wildlife Conservation Center in Arizona. No births or deaths occurred at the SWMF. At year's end, the SWMF housed 16 wolves.

Ladder Ranch Wolf Management Facility (LRWMF)

The LRWMF, owned by R. E. Turner, is located on the Ladder Ranch near Truth or Consequences, New Mexico. There are a total of five enclosures, ranging in size of 0.25 acre to 1.0 acre. The LRWMF is maintained by an employee of the Turner Endangered Species Fund (TESF), though the facility is managed and supported financially by the Service to keep it operating and available for housing and pre-conditioning release candidates. During 2012, 5 individual wolves were housed at the LRWMF. However, in order to perform necessary maintenance to the pens, three of the wolves were transferred to the SWMF and the other two were temporarily housed at the Living Desert State Park in New Mexico. From August, 2012 through January, 2013, the facility was empty. This enabled staff and volunteers to install erosion features, fix permanent fences and repair the water system without significantly disturbing the wolves. No births or deaths occurred at the LRWMF. At year's end, the LRWMF remained empty.

Wolf Haven International (WHI)

The WHI is located in Tenino, Washington. There are 2 Mexican wolf pre-release enclosures at the facility, each just over 0.50 acre in size. Management and funding is supported entirely by WHI. The pre-release enclosures are entirely off exhibit, though WHI does house other gray wolves on display for viewing and educational purposes. During 2012, WHI housed 5 individual

Mexican wolves in the pre-release enclosures. No births and one death of pre-release candidates occurred at the WHI. At year's end, WHI housed 4 Mexican wolves in the pre-release enclosures.

Mexican wolf pre-release enclosure at Wolf Haven International. Photo courtesy of Wolf Haven International.

2. Recovery Planning

The Service published the Mexican Wolf Recovery Plan in 1982. The plan recommends a two-pronged approach to recovery that includes establishment of a captive breeding program and reintroduction of wolves to the wild. This plan, however, did not provide objective and measurable recovery criteria for the recovery and delisting of the Mexican wolf as required by the Endangered Species Act; instead, it recommended the establishment of a wild population of at least 100 wolves. Although substantial progress in implementing the 1982 Mexican Wolf Recovery Plan has been achieved, a revised recovery plan has never been developed to establish recovery criteria specific to the Mexican wolf subspecies or the gray wolf in the Southwest Region.

In December, 2010, the Service invited participants to a new Mexican Wolf Recovery Team. The team currently consists of four subgroups – Science and Planning, Tribal Liaisons,

Stakeholder Liaisons, and Agency Liaisons. The Science and Planning subgroup is tasked with assisting the Service in writing the recovery plan, working together to update the scientific background and develop recovery strategies that include goals, objectives, criteria that promote successful Mexican wolf recovery and delisting. The Tribal and Agency Liaison subgroups provide applied management perspectives during recovery plan development in natural resource expertise and their understanding of their respective communities and constituents. The Stakeholder Liaison subgroup provides a diverse source of expertise in wolf recovery including human, social, and economic considerations. A draft plan will be submitted for public and peer review prior to the publication of the final recovery plan.

3. Reclassification

On August 11, 2009, the Service received a petition from the Center for Biological Diversity requesting that the Mexican wolf be listed as an endangered subspecies or DPS and critical habitat be designated under the Endangered Species Act. On August 12, 2009, we received a petition dated August 10, 2009, from WildEarth Guardians and The Rewilding Institute requesting that the Mexican wolf be listed as an endangered subspecies and critical habitat be designated under the Endangered Species Act. On August 4, 2010, the Service announced a 90-day finding on the two petitions, stating the petitions presented substantial scientific or commercial information indicating that the Mexican wolf subspecies may warrant listing such that reclassifying the Mexican wolf as a separate subspecies may be warranted. On October 9, 2012, the Service announced a 12-month finding on the two petitions, stating the petitioned action was not warranted because all of the individuals that comprise the petitioned entity already receive the protections of the Endangered Species Act. The Service also stated that it continues to review the appropriate conservation status of all gray wolves that comprise the 1978 gray wolf listing, as revised, and it may revise the current listing based on the outcome of that review. At the end of 2012, the review was still underway.

4. Blue Range Wolf Reintroduction Project Structure

Beginning in 2003, the BRWRA Reintroduction Project was managed jointly by the AGFD, NMDGF, USDA-Forest Service, USDA-WS, WMAT, and the Service. These agencies and additional cooperating counties worked together under a Memorandum of Understanding (MOU) and developed Standard Operating Procedures to guide the IFT in providing management for the free-ranging population (see the Arizona Game and Fish Department website at *http://www.azgfd.gov/w_c/wolf/sop.shtml*).

In 2010, the Service worked with its partners and cooperators to prepare and establish a new MOU. At the end of 2012, the signatories to this MOU included AGFD, USDA-Forest Service, USDA-WS, WMAT, and the Service, as well as the cooperating counties of Graham, Greenlee, and Navajo in Arizona. A copy of this MOU can be found at *http://www.fws.gov/southwest/es/mexicanwolf*

On December 2, 2011, the Arizona Game and Fish Commission voted to continue both its financial and infrastructure support of Mexican wolf conservation in the state, but voted not to support the release of any new wolves until the Service completes a new recovery plan,

management plan, and a new 10(j) rule is in place. Previously, all initial releases of captive Mexican wolves in the U.S. have occurred in Arizona with the concurrence and support of the Game and Fish Department. On January 13, 2012, the Arizona Game and Fish Commission amended this policy stating the AGFD Director has the authority to approve a wolf release to effectively replace an animal(s) lost from the population due to an unlawful act, and when a wolf is lost to any other cause of mortality the Arizona Game and Fish Commission must approve a release.

Each year the IFT produces an Annual Report, detailing Mexican wolf field activities (e.g., population status, reproduction, mortalities, releases/translocations, dispersal, depredations, etc.) in the BRWRA. The 2012 report is included as PART B of this report. Monthly BRWRA project updates are available at *http://www.fws.gov/southwest/es/mexicanwolf* or you may sign up to receive them electronically by visiting *http://azgfd.gov/signup*. Additional information about the BRWRA Reintroduction Project can be found on the Service's web page at: *http://www.fws.gov/southwest/es/mexicanwolf* or AGFD's web page at: *http://azgfd.gov/wolf*.

5. Cooperative Agreements

In 2012, the Service funded cooperative agreements with AGFD, Mexican Wolf Fund, National Fish and Wildlife Foundation, San Carlos Apache Tribe (SCAT), TESF, The Living Desert, University of New Mexico and WMAT. Agreements with AGFD have been matching agreements where the Service provides 75% of costs and each state agency provides 25%.

Cooperator	**USFWS/Mexican Wolf Project Funds Provided in 2012**
AGFD	$ 165,000
Mexican Wolf Fund	$ 67,000
National Fish and Wildlife Foundation	$ 40,000
SCAT	$ 40,000
TESF	$ 69,000
The Living Desert	$ 30,000
University of New Mexico	$ 10,000
White Mountain Apache Tribe	$ 205,000

In addition to the above agreements, the Service also provided funding for several miscellaneous contracts for veterinary and other services. For more information on Program costs to date visit *http://www.fws.gov/southwest/es/mexicanwolf/*

6. Research

a. Mexican Wolf Captive Breeding Program

The Mexican Wolf SSP program conducts a variety of research projects on behalf of the conservation of captive Mexican wolves as well as the reintroduction program.

Dr. Cheryl Asa and the Research Department at the Saint Louis Zoo and J. Arturo Rivera at San Juan de Aragon Zoo in Mexico City continued reproductive research on generic gray and Mexican wolves in 2012. In 1991, the Mexican Wolf Recovery Team selected the Saint Louis Zoo to establish and maintain a semen bank to preserve germplasm of genetically important

males. Since that time the lab has been collecting, evaluating and freezing semen samples from individual Mexican wolves as directed by the Service and the SSP. In 2008, oocyte vitrification (freeze drying of eggs) was added so that female Mexican wolf gametes could be preserved. As part of their ongoing reproductive research efforts, several projects were conducted during 2012. These included semen collection and freezing, oocyte vitrification, utilizing generic gray wolves to test two new semen extenders, examination of the female wolf ovulatory cycle hormone profiles to diagnose female infertility, and the efficacy and potential side effects of deslorelin (Suprelorin) as a contraceptive.

Dr. Cheryl Asa and Karen Bauman at the Saint Louis Zoo, and Anneke Moresco with the University of California, Davis, examined the identification of factors related to uterine endometrial hyperplasia (EH) and incidence of pyometra (a potentially fatal uterine infection) in canids. The research surveyed several canid SSPs for historic incidence of EH and pyometra, and also looked retrospectively at factors associated with the risk of EH and pyometra. Results indicated the risk of EH or pyometra was highest based on the number of years a female was treated with deslorelin only. An intermediate risk was associated with females that were not contracepted but also not reproducing, and the number of years a female was treated with megestrol acetate implants. The lowest risk of EH or pyometra was associated with the number of years a female gave birth, and the number of years a female was treated with deslorelin plus megestrol acetate to prevent the initial deslorelin stimulation phase. The study showed that separating females from males to prevent reproduction as well as some contraceptive products can result in infertility. Maintaining fertility can be supported by giving females regular opportunities to reproduce or use of an alternative protocol when reproduction must be prevented.

Dr. Melanie Culver and Ph.D. candidate Robert Fitak with the University of Arizona are examining the effects of extirpation and reintroduction on the Mexican wolf through genome-wide association. The study has the potential to characterize the genetic loci responsible for any lost adaptive and accrued detrimental variation. The results will potentially aid in optimizing the management strategies of captive and wild populations of Mexican wolves to protect against concerns like inbreeding. A final report submitted for publication is expected in 2013.

In 2008, Dr. Dan Moriarty, University of San Diego, and Lowell Nicolaus, Northern Illinois University, began work analyzing thiabendazole as an aversion agent for use in Mexican wolves. This research focused on the potential to mitigate wolf conflicts with domestic livestock via conditioned taste aversion. A captive application of the study was completed at the California Wolf Center near Julian, CA in October 2008. This study was performed on generic gray wolves and had the support of the Humane Society of the United States. Results demonstrated the safety and efficacy of thiabendazole-based aversions in a captive setting. During 2010, the Service made preparations to replicate this effort on several Mexican wolves at the SWMF, and conducted two trials during 2011 that resulted in the treatment of 8 animals. The trials were replicated in 2012 and resulted in the treatment of an additional 5 wolves. Also in 2012, two wolves that had successfully undergone treatment in 2011 were re-tested, both wolves continued to demonstrate an aversion.

The USDA-APHIS-Wildlife Services has initiated a canine measurement study in order to provide scientific information useful for potentially identifying the species of predator involved in a depredation. In 2012, the Service requested that SSP facilities capable of measuring wolf canine tooth spread during annual handling events do so to increase the reliability of identifications that would otherwise rely on qualitative evidence.

Dr. Carlos Sanchez initiated a multi-institutional project to determine the historic and current prevalence of nasal neoplasms in Mexican wolves. This effort may provide guidance for the diagnosis and management of nasal neoplasms in Mexican wolves.

Mexican wolf F1108 during a conditioned taste aversion trial at Sevilleta in 2011. US Fish and Wildlife Service photo.

b. Blue Range Wolf Recovery Area

Sarah E. Rinkevich received her Ph.D. from the University of Arizona's School of Natural Resources and the Environment in 2012. Her objectives were as follows: (1) obtain a population estimate of wolves on the Fort Apache Indian Reservation; (2) use DNA analyses to obtain an accurate assessment of Mexican wolf diet and; (3) investigate the cultural significance of the wolf in Apache culture. Ms. Rinkevich sampled the eastern portion of the Fort Apache Indian Reservation from June 19 to August 8 in 2008 and from May 6 to June 19 in 2009 using detection dogs to find wolf scat. Her estimate of the population of wolves on the reservation was 19 individuals (95% CI = 14 – 58; SE = 8.30) during 2008 and 2009 combined. Percent biomass

of prey items consumed by Mexican wolves included 89%, 8%, and 3% for elk, mule deer, and coyote, respectively. Results of the ethnographic study showed evidence of shared knowledge about the wolf within Western Apache culture as well as knowledge about the wolf prior to the existence of the reservation (i.e., Traditional Ecological Knowledge). Lastly, Ms. Rinkevich provided an historical perspective of wolves throughout Arizona, an assessment of their historical abundance, and documents a possible mesocarnivore release. The results identified a negative correlation between the numbers of wolves and coyotes destroyed in Arizona between 1917 and 1964 ($r = -0.40$; $N = 46$; $p = 0.01$) suggesting a possible mesopredator release of coyotes with the extirpation of wolves in Arizona.

John K. Oakleaf, senior wolf biologist with the Service and Ph.D. candidate at Texas Tech University, in collaboration with Dr. Warren Ballard, Dr. Stewart Breck, Dr. James Cain, and Dr. Phil Gipson, continued looking at the population dynamics and reintroduction characteristics of Mexican wolves in the BRWRA. The objective of this study is to investigate: 1) habitat colonization preferences of Mexican wolves and the distribution of preferred wolf habitat across the southwestern United States, 2) factors that promote successful initial releases and translocations of Mexican wolves, 3) factors that contribute to increased reproduction rates, 4) survival of Mexican wolves, and 5) dispersal patterns of Mexican wolves. Mr. Oakleaf is expected to complete this work in 2015.

7. Litigation

a. WildEarth Guardians and Center for Biological Diversity

The Service submitted to the U.S. District Court for the District of Columbia a multi-year listing work plan that will enable the agency to review and address the needs of more than 250 species listed on the 2010 Candidate Notice of Review. The multi-year listing work plan was first developed through an agreement with the plaintiff group WildEarth Guardians and filed in the U.S. District Court for the District of Columbia on May 10, 2011. On July 12, 2011, the Service reached an agreement with plaintiff Center for Biological Diversity that reinforced the multi-year work plan.

On August 4, 2010, the Service announced in the Federal Register a positive 90-day finding on two petitions to list the Mexican wolf as a subspecies. Pursuant to the court-approved settlement agreements, on October 9, 2012, the Serviced announced a 12-month finding on the two petitions, stating the petitioned action was not warranted because all of the individuals that comprise the petitioned entity already receive the protections of the Endangered Species Act. However, it was also stated that the Service continues to review the appropriate conservation status of all gray wolves that comprise the 1978 gray wolf listing, as revised, and may revise the currently listing based on the outcome of that review.

Also on October 9, 2012, the Center for Biological Diversity notified the Service of their intent to sue for violations of the Endangered Species Act in connection with the Service's not-warranted finding. On December 10, 2012, the Center for Biological Diversity filed a complaint for declaratory and injunctive relief challenging the determination made by the Service that

listing the Mexican wolf as a subspecies or "distinct population segment" is not warranted. This case was ongoing at the end of 2012.

b. WildEarth Guardians

On November 14, 2012, WildEarth Guardians filed a complaint for declaratory and injunctive relief to compel the Service to produce documents and records in connection with two Freedom Of Information Act requests. This case was ongoing at the end of 2012.

c. Center for Biological Diversity

On November 28, 2012, the Center for Biological Diversity filed a complaint for declaratory and injunctive relief seeking to compel the Service to conclude a formal rulemaking to amend a federal regulation promulgated in 1998 under the Endangered Species Act that governs the Service's Mexican wolf reintroduction program. This case was ongoing at the end of 2012.

On December 26, 2012, the Center for Biological Diversity notified the Service of their intent to sue alleging violations of the Endangered Species Act in connection with the renewed and amended Research and Recovery Permit for the Mexican Wolf Recovery Program and the associated Intra-Service Biological and Concurrence Opinion.

Sevilleta Wolf Management Facility. US Fish and Wildlife Service photo.

8. Rule Amendment and Environmental Impact Statement

On August 7, 2007, the Service issued a notice of scoping meetings and intent to prepare an EIS and socio-economic assessment for the proposed amendment of the rule establishing a nonessential experimental population of the Arizona and New Mexico population of the gray wolf (72 Federal Register 44065-44069). The Service held scoping meetings in 12 Arizona and New Mexico communities in 2007, and received approximately 13,500 written comments from the public, non-governmental organizations and government agencies at the local, state and federal levels.

9. Mexican Wolf Interdiction Fund and Stakeholder Council

The Service, in cooperation with the National Fish and Wildlife Foundation, established the Mexican Wolf /Livestock Interdiction Trust Fund (Interdiction Fund) on September 23, 2009. The objective of the Interdiction Fund is to generate long-term funding for prolonged financial support to livestock operators within the framework of conservation and recovery of Mexican gray wolf populations in the Southwest. Funding will be applied to initiatives that address management, monitoring, and other proactive conservation needs for Mexican gray wolves as they relate to livestock, including alternative livestock husbandry practices, grazing management alternatives, livestock protection, measures to avoid and minimize depredation, habitat protection, species protection, scientific research, conflict resolution, compensation for damage, education, and outreach activities.

In 2011, the Service appointed an 11-member Interdiction Fund Stakeholder council (ISC), which has the authority to identify, recommend, and approve conservations activities, identify recipients, and approve the amount of the direct disbursement of funds to qualified recipients. The ISC has developed an interim program to compensate livestock producers for wolf depredations and paid $27,775 to producers in 2012. In addition, the ISC continued working toward a long-term strategic interdiction plan that focuses more on incentives rather than direct compensation for livestock losses. The long-term plan is expected to be completed in 2013.

10. Literature Cited

US Fish and Wildlife Service. 1982, Mexican Wolf Recovery Plan 1982, US Fish and Wildlife Service, Albuquerque, New Mexico.

US Fish and Wildlife Service. 1996, Reintroduction of the Mexican wolf within its Historic Range in the Southwestern United States, US Fish and Wildlife Service, Albuquerque, New Mexico.

US Fish and Wildlife Service. 1998, Final Rule - Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 *Federal Register* 1752-1772.

US Fish and Wildlife Service. 2003, Final Rule To Reclassify and Remove the Gray Wolf From the List of Endangered and Threatened Wildlife in Portions of the Conterminous United States; Establishment of Two Special Regulations for Threatened Gray Wolves, 68 *Federal Register* 15803-15875.

US Fish and Wildlife Service. 2006, Proposed Rule, Western Great Lakes Population of Gray Wolves, 71 *Federal Register* 15265-15305.

US Fish and Wildlife Service. 2007, Final Rule Designating the Western Great Lakes Populations of Gray Wolves as a Distinct Population Segment; Removing the Western Great Lakes Distinct Population Segment of the Gray Wolf From the List of Endangered and Threatened Wildlife, 72 *Federal Register* 6051-6103.

PART B: REINTRODUCTION

Mexican Wolf Blue Range Reintroduction Project
Interagency Field Team Annual Report
Reporting Period: January 1 – December 31, 2012

Prepared by:
Arizona Game and Fish Department, U.S. Department of Agriculture - Animal and Plant Health Inspection Service - Wildlife Services, U.S. Forest Service, U.S. Fish and Wildlife Service, and White Mountain Apache Tribe.

Lead Agencies:
Arizona Game and Fish Department (AGFD)
USDA-APHIS Wildlife Services (USDA-WS)
U.S. Fish and Wildlife Service (USFWS)
U.S. Forest Service (USFS)
White Mountain Apache Tribe (WMAT)

The 2012 annual report reflects the 2011 population parameters published in the 2011 annual report addendum (http://www.fws.gov/southwest/es/mexicanwolf/documents.cfm).

1. Introduction

This report summarizes results of Mexican Wolf Interagency Field Team (IFT) activities during 2012. The Mexican Wolf Blue Range Reintroduction Project (Reintroduction Project) is part of a larger recovery program that is intended to reestablish the Mexican wolf (*Canis lupus baileyi*) within its historical range.

The Reintroduction Project is conducted in accordance with a nonessential experimental population Final Rule (USFWS 1998) that established the 6850 mi^2 (17,740 km^2) Blue Range Wolf Recovery Area (BRWRA) (Fig. 1). The BRWRA lies within the Alpine, Clifton, and Springerville Ranger Districts of the Apache-Sitgreaves National Forests (ASNF) and the Gila National Forest (GNF) in west-central New Mexico. In 2000, the White Mountain Apache Tribe (WMAT) agreed to allow free-ranging Mexican wolves to inhabit the Fort Apache Indian Reservation (FAIR). The FAIR is adjacent to the BRWRA in east-central Arizona, and adds 2440 mi^2 (6319 km^2) of area that wolves may occupy.

In March 1998, the first release of Mexican wolves occurred on the Alpine and Clifton Ranger Districts of the Apache-Sitgreaves National Forest, Arizona. At the end of 1998, the wild population in Arizona and New Mexico consisted of four wolves in two packs. The wild population grew to its highest minimal count of 75 wolves in 2012 through natural reproduction, translocations, and initial releases. No translocations or initial releases occurred in 2012. At the end of 2012, the wild population totaled a minimum of 75 wolves, four breeding pairs (one of which was an operational breeding pair) and 14 packs. More information on population statistics can be found at http://www.fws.gov/southwest/es/mexicanwolf/ and http://www.azgfd.gov/w_c/es/wolf_reintroduction.shtml

Wolf age and sex abbreviations used in this document:
A = alpha
M = adult male (> two years old)
F = adult female (> two years old)
m = subadult male (one - two years old)
f = subadult female (one - two years old)
mp = male pup (< one year old)
fp = female pup (< one year old)

2. Methods

The IFT followed Standard Operating Procedures (SOPs) approved by the Lead Agencies. These SOPs can be found at http://azgfd.gov/wolf. Note: In December 2009 the USFWS finalized a settlement agreement and in a Consent Decree agreed to make no further decisions that relate to the Mexican Wolf Recovery Program pursuant to SOP 13.0: Control of Mexican Wolves. For guidance on control of Mexican wolves the USFWS continues to follow relevant portions of the 1998 Interagency Management Plan. All other SOPs are considered valid and continue to be utilized by the IFT in conducting wolf management operations. The following definitions apply to the SOPs and to this report:

Breeding pair: an adult male and an adult female that have produced at least two pups during the previous breeding season and which survived until December 31 of the year of their birth (USFWS 1998).

Operational breeding pair: an adult male and an adult female that have produced at least two pups during the previous breeding season and of which at least 2 pups survived until December 31 of the year of their birth, despite the loss and replacement of at least one biological parent of the offspring. This is a modification of the "Breeding pair" definition per the Final 10j Rule, to include pairs where alphas (one or both of the breeding adults in a pack) have been replaced but are functioning as a biological unit with a high probability of breeding success in the subsequent year.

Wolf pack: two or more wolves that maintain an established territory. In the event one of the two alpha (dominant) wolves dies, the remaining alpha wolf, regardless of pack size, retains the name.

Releases: wolves released directly from captivity, having no previous free-ranging experience. These "initial releases" may only occur in the Primary Recovery Zone, which is entirely within Greenlee County, Arizona (see Fig. 1 and Fig. 2).

Translocations: free-ranging wolves that are captured and moved to a location away from their site of capture; this includes captured free-ranging wolves that have been temporarily placed in captivity. Unlike initial releases, translocations can occur in the Primary Recovery Zone or in the Secondary Recovery Zone (Fig. 1). The Secondary

Recovery Zone contains portions of Apache and Greenlee counties in Arizona, and portions of Catron, Sierra, and Grant counties in New Mexico (Fig. 2).

Depredation: confirmed killing or wounding of lawfully-present domestic livestock by one or more wolves.

Depredation incident: means the aggregate number of livestock killed or mortally wounded by an individual wolf or by a single pack of wolves at a single location within a one-day (24 hr) period, beginning with the first confirmed kill, as documented in an initial IFT incident investigation pursuant to SOP 11.0.

Mexican wolf yearling associated with the Luna Pack. US Fish and Wildlife Service photo.

Releases and Translocations

Initial release candidates are genetic surpluses to the captive breeding program. Translocation candidates are wolves with prior wild experience, which are re-released into the wild from captivity or another location in the wild. Once selected, and prior to release, wolves are acclimated in USFWS-approved facilities. Pre-release facilities in New Mexico include the Ladder Ranch Wolf Management Facility, managed by the Turner Endangered Species Fund, and the Sevilleta Wolf Management Facility, managed by the USFWS at Sevilleta National Wildlife Refuge. A third pre-release facility, located at WolfHaven International in Washington, is managed by WolfHaven International.

In pre-release facilities, contact between wolves and humans is minimized. Carcasses of road-killed native prey species, primarily deer (*Odocoileus* spp.) and elk (*Cervus canadensis*), supplement the routine diet of processed canine food supplied to wolves. Genetically and

socially compatible breeding pairs are established and evaluated for physical, reproductive, and behavioral suitability for direct release into the wild. Single wolves are also evaluated for release and potential pairing with wolves in the wild.

Prior to release, wolves may be adversely conditioned to food types (i.e., domestic livestock) and human presence. As close to release as possible, wolves may be subjected to taste aversion conditioning in efforts to deter their use of domestic livestock as a food source. Separately, or in addition to taste aversion conditioning, wolves in pre-release facilities may be hazed (purposefully harassed) prior to release in efforts to increase their avoidance of humans and/or inhabited areas.

Wolves are released or translocated using either a soft release or a hard release method. The soft release method holds wolves at the release site for one day to several months to acclimate them to the specific area. Soft release pens are constructed of chain link and are approximately 0.30 acres (0.0005 m^2) in size. A modified soft release consists of placing the wolves in an acclimation pen approximately 0.13 acres (0.0002 m^2) in size and built of nylon mesh, with electric fencing interwoven into the structure. Flagging is also attached to the pen walls approximately every two feet, as a visual barrier to discourage wolves from running into pen walls. Wolves generally self-release within a few days. A hard release is a direct release of a wolf (or wolves) from a crate into the wild or into an enclosure built of fladry (flagging hanging on a rope surrounding a small protected area; sometimes the fladry "fence-line" is electrified).

Radio Telemetry Monitoring

In 2012, all radiocollared wolves were monitored by standard radio telemetry from the ground and once weekly from the air as opportunity allowed. Visual observations, wolf behavior, evidence of a kill site, associated uncollared wolves, and fresh sign were also noted when possible. Location data were entered into the project's Access database for analysis.

Aerial locations of wolves were used to develop home ranges (White and Garrott 1990), which were calculated based on the definition in the Final Rule (USFWS 1998). Home ranges were calculated using $\geq$20 individual aerial locations on a pack, pair, or single wolf exhibiting territorial behavior over a period of $\geq$ six months. To maximize sample independence, individual radiocollared wolf locations were included in home range calculations only if individual wolf locations were spatially or temporally separated from other radiocollared pack members. This limited pseudo-replication of locations. Home range polygons were generated at the 95% confidence level, using the minimum convex polygon (MCP) method (White and Garrott 1990) in the animal movement extension in the program ArcView (Hooge et al. 1999; ESRI, Redlands, CA, USA). Home ranges were not calculated for wolves that had <20 aerial radio locations, displayed dispersal behavior, or exhibited non-territorial behavior during 2012.

Occupied Range

Occupied wolf range was calculated based on the definition in the Final Rule (USFWS 1998) and using the following criteria: (1) a five mi (eight km) radius around all locations of non-radio monitored wolves and wolf sign occurring in an area consistently used over a period of at least one month; (2) a five mi (eight km) radius around radio locations of resident wolves when < 20 radio locations are available (for radio monitored wolves only); (3) a five mi (eight km) radius

around radio monitored wolf locations (for wolves exhibiting dispersal or non-territorial behavior); and (4) a three mi (five km) radius around the minimum convex polygon developed from ≥20 radio locations of a pack, pair, or single wolf exhibiting territorial behavior.

Predation and Depredation Investigations

Throughout the year, project personnel investigated ungulate carcasses as they were discovered to determine sex, age, general body condition, and whether the carcass had been scavenged or was a wolf kill. USDA-WS wolf specialists investigated suspected wolf depredations on livestock within 24 hours of receiving a report. Not all dead livestock were found, or found in time to document cause of death. Accordingly, depredation numbers in this report represent the minimum number of livestock killed by wolves.

The 1996 Final Environmental Impact Statement (FEIS) predicted 1-34 confirmed killed cattle per year with a population of 100 Mexican wolves. This represents <0.05 % of all cattle present on the range (USFWS 1996). The Mexican Wolf Blue Range Reintroduction Project 5-year Review (AMOC and IFT 2005) reported, between 1998 and 2003, the mean number of cattle confirmed killed per year by wolves was 3.8, which extrapolates to 13.8 cattle killed per year from a population of 100 Mexican wolves. From 2005 to 2009, the number of confirmed cattle killed by wolves exceeded the predicted rate by the FEIS, and ranged between 36.5 depredations per 100 wolves in 2008 to 50 depredations per 100 wolves in 2007. From 2010 to 2012, the number of confirmed cattle killed by wolves was within the rate predicted by the FEIS and averaged 24 cattle killed per 100 wolves.

Mexican wolf from the Hawks Nest pack. Mexican wolf Interagency Field Team photo.

Wolf Management

The IFT hazed wolves on foot or by vehicle in cases where wolves localized near areas of human activity, or were found feeding on, chasing, or killing livestock. When necessary, the IFT used rubber bullets, cracker shells, and fladry to encourage aversive response to humans and to discourage nuisance and depredation behavior. The IFT captured wolves with leg hold traps to collar, translocate, or remove (temporary or permanent) wolves from the wild for specific management purposes. In addition, while it did not occur in 2012, wolves that establish themselves outside the BRWRA are captured and brought back into the BRWRA or temporarily held in captivity, per the Final Rule (USFWS 1998).

Proactive Management Activities

The IFT utilized various proactive management activities in an attempt to reduce wolf-livestock conflicts in the BRWRA. Proactive management approaches and tools available to the IFT include:

Turbo Fladry: electric fence with red flagging installed around livestock holding pastures and private property designed to discourage wolf utilization inside the perimeter of the fencing.

Hay and Supplements: feed and mineral supplements purchased for livestock owners who opt to hold livestock on private property during livestock calving season or wolf denning periods.

Range Riders: contract employees with radio telemetry equipment to assist stakeholders in monitoring wolf movements in relation to livestock on USFS grazing allotments, providing human presence and light hazing to move wolves away from cattle. Range Riders without telemetry equipment provided additional human presence to deter wolves.

Altering Livestock Grazing Rotations: moving livestock between different pastures within USFS grazing allotments in order to avoid areas of high wolf use that may correspond to den and rendezvous sites.

Exclusionary Fencing: eight-foot-high fence enclosing areas of private property for the purposes of protecting especially vulnerable animals or to address other specific property protection purposes.

Radio Telemetry Equipment: monitoring equipment used by the IFT, and in some cases issued to stakeholders, to facilitate their own proactive management activities and aid in the detection and prevention of wolf depredations.

Diversionary Food Cache: road-killed native prey carcasses or carnivore logs provided to wolves in areas so as to reduce potential conflicts with livestock.

Supplemental Food Cache: road-killed native prey carcasses or carnivore logs provided to wolves in order to assist a pack or remnant of a pack in feeding young of the year

when extenuating circumstances reduce their own ability to do so. Supplemental food caches also serve to reduce potential conflicts between wolves and livestock.

Population Estimation

The year-end population estimate is derived from information gathered through a variety of methods that are deployed annually by the IFT from November 1st through the year-end helicopter count. The IFT continued to expand upon more comprehensive efforts initiated in 2006 to make the 2012 year-end population estimate more accurate. Management actions implemented included increased surveys and focus on trapping for uncollared wolves, greater coordination and investigation of wolf sightings provided through the public and other agency sources, deployment of remote trail cameras (blind and scented), and utilizing howl surveys and food caches in conjunction with remote cameras in areas of suspected uncollared wolf use.

Wolf sign (i.e. tracks, scats) was documented by driving roads and hiking canyons, trails, or other areas closed to motor vehicles. Confirmation of uncollared wolves was achieved via visual observation, remote cameras, howling, scats, and tracks. Ground survey efforts for suspected packs having no collared members were documented using global positioning system (GPS) and geographical information systems (GIS) software and hardware. GPS locations were recorded and downloaded into GIS software for analysis and mapping. Survey data were also recorded daily on forms and compiled in an Access database.

In 2012, the IFT developed a draft protocol for the systematic search of uncollared wolves within the BRWRA. The draft protocol incorporates the use of track/scat surveys and remotely deployed rub/scent stations positioned within gridded subsections of the BRWRA to document wolf presence in areas outside of known pack territories. In May 2012, the IFT tested several rub station prototypes to determine which were the most successful at collecting canine guard hairs for genetic-based species identification. In November 2012, the IFT implemented a test of this method in the Blue Range Primitive Area, dividing the identified search area into a 1386 km^2 grid. Grid units (36 km^2) were assigned a uniform search effort measured in miles surveyed by foot or vehicle and hours of rub station deployment. Scat and hair samples were collected and stored for future analysis and species identification. Search efforts were recorded on a hardcopy form and electronic database. In coming years, the IFT plans to increase the efficiency and use of this survey method, expanding its application in order to document uncollared wolves in the BRWRA. In 2012, this increased effort successfully resulted in the documentation of two uncollared wolves in Arizona.

In January 2013, aircraft were used to document free-ranging wolves for the end-of-year 2012 population count and to further capture wolves, as necessary, to affix radio collars. Including January data in the December 31 end-of-year count (and in this 2012 annual report) is appropriate, because wolves alive in January were also alive in the preceding December (i.e. whelping does not occur in mid-winter, and any wolf added to the population via initial release or translocation after December 31 and before the end of the survey is not counted in the year-end minimum population count). Fixed-wing aircraft were used to locate wolves and assess the potential for darting wolves from the helicopter. A helicopter was used to more accurately count the number of uncollared wolves associated with collared wolves in all areas and to capture

target animals (e.g. uncollared wolves, injured wolves, wolves with old collars, or wolves outside the 10j boundary) where the terrain allowed.

As part of the 2012 population year-end count, the IFT coordinated with and surveyed members of the local public to identify possible wolf sightings. Ranchers, private landowners, wildlife managers, USFS personnel, and other agency cooperators were contacted to increase wolf sighting data for the database. All such sightings were analyzed by the IFT to determine those that most likely represented unknown wolves or packs for purposes of completing the year-end count.

Documentation of wolves or wolf sign, obtained through the above methods, was also used to guide IFT efforts to trap uncollared single wolves or groups. The IFT objective was to have at least one member of each pack collared. Through these various methods, the IFT was able to count the number of uncollared wolves not associated with collared wolves.

Mexican wolf, M1155. US Fish and Wildlife Service photo.

Mortality

Wolf mortalities were identified via telemetry and public reports. Mortality signals from radio collars were investigated within 12 hours of detection to determine the status of the wolf. Carcasses were investigated by law enforcement agents and necropsies were conducted to determine proximate cause of death. Causes were summarized for all known wolf deaths.

For radiocollared wolves, mortality, missing, and removal rates were calculated using methods presented in Heisey and Fuller (1985). Wolves not located or documented alive for 3 or more months are considered missing or "fate unknown". These wolves may have died, dispersed, or have a malfunctioned radio collar.The IFT calculated annual cause-specific mortality rates (i.e.

human-caused versus natural/unknown mortality) for the population. Management removals can have an effect equivalent to mortalities on the free-ranging population of Mexican wolves (see Paquet et al. 2001). Thus, the IFT also calculated yearly cause-specific removal rates for radiocollared wolves. Wolves are removed from the population for four primary causes: (1) dispersal outside the BRWRA, (2) cattle depredations, (3) nuisance to humans, and (4) other (principally to pair with other wolves or to move a wolf to a more appropriate area without any of the other causes occurring first). Each time a wolf was moved, it was considered a removal, regardless of the animal's status later in the year (e.g. if the wolf was translocated or held in captivity). The IFT calculated an overall failure rate of wolves in the wild by combining mortality, missing (only those wolves that went missing under questionable scenarios), and removal rates to represent the overall yearly rate of wolves affected (i.e. dead, missing, or managed) in a given year.

Public Outreach

The IFT outreach efforts affirm the project's commitment to engage in effective communication, identify various outreach mechanisms, and standardize certain outreach activities. These goals help ensure timely, accurate, and effective two-way communication between and among cooperating agencies and the public. Project personnel conducted outreach activities on a regular basis, as a means of disseminating information to stakeholders, concerned citizens, and government and non-government organizations. This was facilitated through weekly and monthly updates, field contacts, handouts, informational display booths, web page updates, and phone contacts. The IFT provided formal presentations at local livestock producer meetings and conducted one public meeting in 2012 to gather comment on proposed Mexican wolf initial release actions within the BRWRA.

The IFT conducted outreach activities by continuing to utilize the Mexican Wolf Blue Range Reintroduction Project Outreach Plan developed during 2007. This plan provides an outline of activities the IFT uses to inform various target audiences about the reintroduction project and stimulate productive dialogue between stakeholders and cooperating agencies involved in the project.

During 2012, the IFT posted Mexican wolf reintroduction project updates within the BRWRA once each month, at places such as USFS offices, US post offices, and libraries, as well as on the AGFD Mexican wolf web site at http:// www.azgfd.gov/w_c/es/wolf_reintroduction.shtml and the USFWS Mexican wolf web site at http://www.fws.gov/southwest/es/mexicanwolf. Interested parties could sign up to receive the update electronically by visiting the AGFD web site at http://azgfd.gov/signup. The IFT faxed monthly project updates to primary cooperating agencies, stakeholders and interested citizens.

The IFT also produced a wolf location map to inform cooperators and the public of areas occupied by wolves, with the map being updated quarterly and reflecting the previous three months of wolf aerial locations. The map was posted on the AGFD web site at www.azgfd.gov/w_c/es/wolf_reintroduction.shtml. In addition to the map, a description of wolf locations from weekly flights was posted to this web site within 48 hours of each flight per SOP 26. This information was also available through the USFWS Mexican wolf web site via a link at http://www.fws.gov/southwest/es/mexicanwolf. IFT personnel further augmented these efforts

by conducting routine/weekly contacts of individual grazing permittees to provide general locations of wolves on or adjacent to their grazing allotments or private lands.

Project personnel made contact with campers, hunters, and other members of the public within the BRWRA and provided them with information about the wolf project. These contacts focused on advising the public of the potential for encountering wolves, providing general recommendations for recreating in wolf-occupied areas and explaining legal provisions of the non-essential experimental population rule. The IFT also utilized these contacts to collect information on wolf sightings, tracks and scat from the public.

Mexican wolf yearlings associated with the Middle Fork pack. US Fish and Wildlife Service photo.

3. Results

Specific information regarding wolves on the FAIR and the San Carlos Apache Reservation (SCAR) is not included in this report in accordance with Tribal agreements.

a. Population Status

At the end of 2012, the minimum population estimate was 75 wolves and four breeding pairs; one of which was an "Operational Breeding Pair". Pups comprised 27% of this population which is a decrease from the previous year (31%).

At the beginning of 2012, the collared population consisted of 34 wolves among 13 packs and three single/unaffiliated wolves. At the end of 2012, the deployment of more intensive and focused trapping efforts resulted in an increase of the collared population to 47 wolves (22 adults, 10 subadults, and 15 pups) among 14 packs and five single wolves.

A total of 28 uncollared wolves were documented in the Mexican Wolf Nonessential Experimental Population Zone (MWNEPZ) at the end of 2012 (*note: uncollared wolves captured during the January 2013 helicopter operation would have been included as uncollared animals associated with known packs above*). Ten of the 28 uncollared wolves were associated with six radiocollared packs (Table 1).

The IFT observed wolf sign and other information indicating the potential existence of one uncollared pair in Arizona and four uncollared single wolves (one in Arizona, three in New Mexico) not being associated with known collared packs. Additional uncollared animals were found on the FAIR and on the SCAR in 2012, and these areas will be priorities for IFT trapping efforts in the spring and summer of 2013.

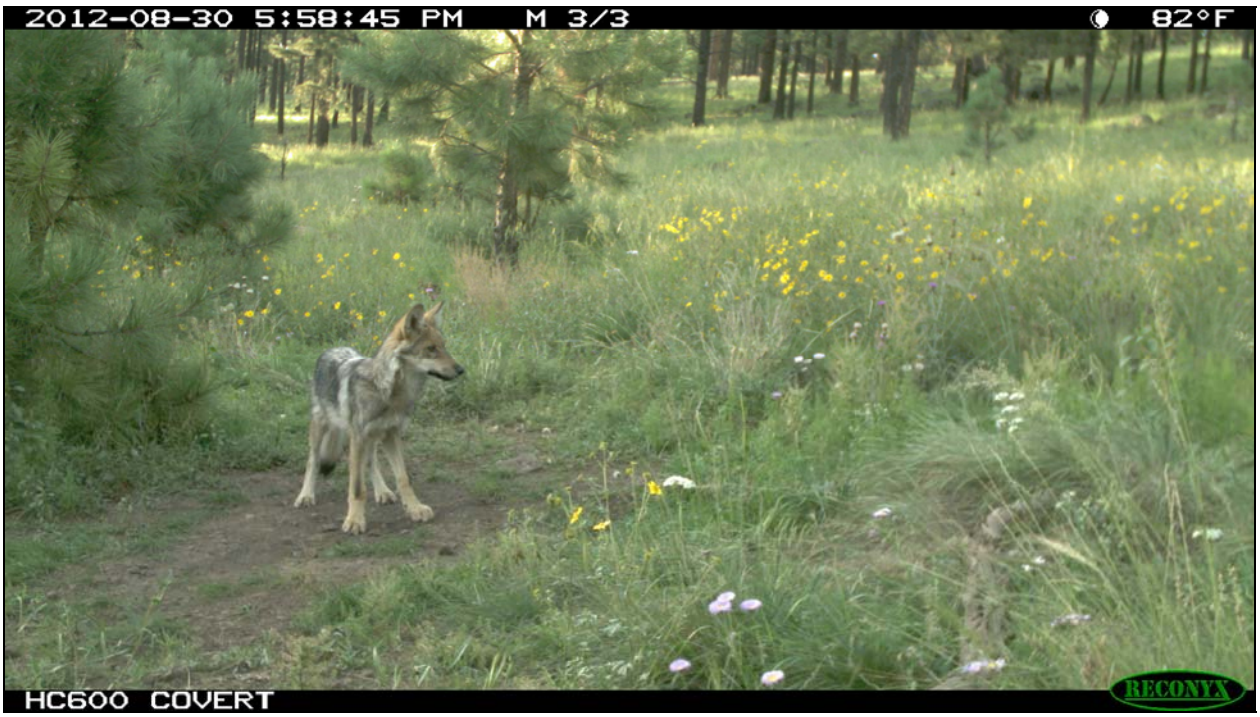
Four natural pairings of breeding age wolves in the BRWRA population occurred in 2012. The natural pairings of F1212 and M1287, and F1246 and M1248 resulted in the new designations of the Elk Horn pack and Canyon Creek pack, respectively. With respect to the Fox Mountain pack, AF1212 of the Elk Horn pack replaced AF1188 following her permanent removal from the wild (2012). For the Canyon Creek pack, M1252 replaced M1248 after the IFT lost contact with the latter's radio collar in 2012.

A total of seven radiocollared single wolves (m1240, mp1241, m1244, m1243, m1245, f1251, M1252) were part of the population for a portion of the year. Six of these wolves (m1240, m1244, m1243, m1245, f1251 and M1252) were confirmed to be alive at the end of the year. M1252 joined the Canyon Creek pack during 2012 and is no longer considered a single animal (Table 1). The five remaining single wolves began dispersing in the fall and were all located away from their natal packs during the 2012 population count; f1251 was located with an uncollared wolf during the count. Approximately 96% (45 of 47) of the radiocollared wolves alive at the end of the year and 97% (73 of 75) of all documented wolves at the end of the year were born in the wild.

b. Reproduction

In 2012, a total of 13 packs exhibited denning behavior. Five of the 13 packs were located in Arizona (Bluestem, Hawks Nest, Maverick, Rim, and Tsay-O-Ah) and the remaining eight packs were located in New Mexico (Canyon Creek, Dark Canyon, Elk Horn, Fox Mountain, Luna, Middle Fork, San Mateo, and Willow Springs). All but the Canyon Creek, Rim, Middle Fork, and Willow Springs packs were confirmed to have produced wild-conceived and wild-born litters in 2012. The IFT documented a population minimum of 28 pups born, with a minimum of 20 pups (9 in Arizona, 11 in New Mexico) being confirmed to survive in the wild to the year-end count. This marked the eleventh consecutive year in which wild-born wolves in the BRWRA population successfully bred and raised pups in the wild. Of the 14 known packs in the

population at the end of 2012, all were formed naturally and all but one (Middle Fork pack) was composed of at least one wild-born breeding wolf.



Mexican wolf pup associated with the Luna pack. US Fish and Wildlife Service photo.

c. Releases and Translocations

The IFT conducted zero soft release and zero hard release translocations or initial releases in 2012.

d. Home Ranges and Movements

The IFT calculated home ranges for 14 packs exhibiting territorial behavior. The MCP method produced an average home range size of 122 mi^2 (315 km^2), with home ranges varying from 50 mi^2 to 210 mi^2 (131 km^2 to 543 km^2) (Fig. 4; Table 3). Home ranges were not calculated for six wolves (m1240, m1243, m1244, m1245, f1251 and M1252) that dispersed, traveled alone during all or portions of 2012 or had less than 20 aerial locations by the end of 2012 (see Appendix A for detailed summaries of these individuals).

Mexican wolves occupied 5268 mi^2 (13,643 km^2) of the Mexican Wolf Nonessential Experimental Zone (MWNEPZ) during 2012 (Fig. 5). Within the BRWRA there were 3287 mi^2 (8513 km^2) of occupied range. On the SCAR there were 164 mi^2 (424 km^2) of occupied range. Outside of the BRWRA 991 mi^2 (2566 km^2) of occupied range was documented. Occupied wolf range occurred and was documented on the FAIR; however, this information is not displayed on

the map nor are specific area values provided, as requested by the WMAT. In comparison, Mexican wolves occupied 4434 mi^2 (11,484 km^2) of the MWNEPZ during 2011.

e. Mortality

The IFT has documented 92 wolf mortalities in the wild since 1998 (Table 4), four of which occurred in 2012 (Table 5). All of the documented wolf mortalities in 2012 were due to illegal shooting, and they reflect the deaths of individuals: fp1247, fp1250, AM806 and AF1208. This should be considered a minimum estimate of mortalities, since some pups and uncollared wolves may die without those mortalities being documented by the IFT. One wolf from New Mexico (m1241) was listed as "fate unknown" during 2012.

The IFT monitored 48 individual radiocollared wolves for a total of 12,498 radio days during 2012. A total of six radiocollared wolves were considered removed (n = 1), dead (n = 4), or missing (n = 1). The overall survival rate was 0.84, or a corresponding failure rate of 0.16. The overall failure rate was composed of the human caused mortality rate (0.11; n = 4), natural mortality rate (0.00; n = 0), unknown/awaiting necropsy mortality rate (0.00; n = 0), boundary removal rate (0.00; n = 0), missing radiocollared wolves rate (0.03; n = 1), cattle depredation removal rate (0.03; n = 1), nuisance removal rate (0.00; n = 0), and other removal rate (0.00; n = 0).

f. Wolf Predation

A total of 47 carcasses (40 elk, five mule deer, one pronghorn, and one black bear) were investigated opportunistically from areas occupied by three wolf packs in Arizona. Of the carcasses investigated by the IFT, 85% were elk and 11% were mule deer. Age determinations of investigated elk carcasses revealed: 28 adults, four yearlings, six calves, and one of unknown age. Sex determinations of investigated elk carcasses revealed: 24 females, seven males, and nine of unknown sex.

Of the total 47 carcasses investigated by the IFT, 30 (26 elk and four mule deer) were classified as confirmed or probable wolf kills and 10 elk were classified as possible wolf kills.

g. Wolf Depredation

USDA-WS members of the IFT completed a total of 50 investigations involving 53 animals during 2012 having potential Mexican wolf involvement. Of these 50 investigations, 47 involved cattle (n = 50), one involved horses (n = 1), one involved mules (n = 1) and one investigation involved dogs (n = 1). Average IFT response time between the reporting of an incident to the initiation of an on-site investigation was < 24 hours.

Of the 50 investigations completed in 2012, 20 (40%) were confirmed as being wolf related. Eighteen cattle deaths and one mule death were confirmed as wolf depredations, zero cattle deaths were probable wolf depredations, and one injured cow was confirmed as being wolf related. Seventy percent (n = 14) of the 20 investigations confirmed as wolf related occurred in New Mexico and 30% (n = 6) occurred in Arizona (Table 7). Sixty percent of the total

investigations (*n* = 30) were determined to be unknown or non-wolf related. These mortality causes included: unknown (*n* = 15), black bear (*n* = 6), coyote (*n*=5), dogs (*n* = 1), intestinal (*n* = 1), prolapse (*n* = 1), and scours (*n* = 1).

Eighty percent (*n* = 40) of the 50 investigations conducted were in response to reports from ranchers and the public and the remaining 20% (*n* = 10) were in response to reports from the IFT. Twenty-five percent (*n* = 5) of the confirmed or probable wolf-caused livestock mortalities were found and reported by the IFT (Table 7).

In total, nine of the 19 (47%) confirmed depredations, resulting in the death of livestock, involved uncollared wolves (Table 7). One wolf (AF1188) was permanently removed in 2012 for repeated depredations.

The confirmed killed cattle rate for 2012 extrapolates to 24 depredations/100 wolves using the number of confirmed killed cattle (*n* = 18; Table 7) compared to the final population count (*n* = 75). This projected number of depredations is within the 1-34 confirmed killed cattle per 100 wolves predicted in the FEIS and reflects a decrease from the 2011 extrapolation.


Willow Springs alpha pair. US Fish and Wildlife Service photo.

h. Management Actions

In 2012, 19 different wolves were captured and/or removed a total of 21 times. Fifteen wolves were captured, collared, processed, and released on site for routine monitoring purposes (Table 8). One wolf, AM1155 was captured, re-collared and released during coyote removal efforts conducted by WS. Four wolves were captured a total of five times during efforts to implement a permanent removal order for AF1188. One of which, AF1188, was captured and permanently

removed from the wild pursuant to an approved removal order for this individual. Two wolves, mp1274 and m1276, were caught and released twice.

Routine trapping efforts were initiated in late July 2012 to capture and collar wolf pups in the population. A total of 11 pups, one subadult, and three adults were captured and collared during these efforts. The IFT, from all management related trapping, successfully added thirteen wolves to the collared population in 2012: two pups (mp1274, fp1281) and one subadult (m1276) from the Fox Mountain pack, three pups (mp1275, mp1277, fp1280) from the Bluestem pack, three pups (mp1284, mp1285, mp1286) from the Luna pack, one pup (mp1282) from the San Mateo pack, one pup (fp1278) from the Dark Canyon pack, one adult (F1279) from the Willow Springs pack and one adult (AM1287) from the Elk Horn pack. Trapping was also conducted on the FAIR, however, wolf numbers on the FAIR are not provided at the request of the WMAT.

One wolf, AF1188, was permanently removed from the wild and placed in captivity in 2012, due to habitual livestock depredations. No wolves were translocated in 2012.

The IFT conducted investigations in response to 11 cases of nuisance wolf behavior in 2012 (Table 9). Only one of the incidents involved collared wolves, the Bluestem pack, in a private yard on the edge of Alpine, AZ. Ten nuisance reports concerned possible uncollared wolves; however, IFT personnel were able to confirm only one as a probable Mexican wolf. Trail cameras, tracking, telemetry, and howling were used by IFT members during investigations to gather evidence of wolf involvement on reported nuisance problems.

i. Proactive Management Activities

The IFT, working with Non Governmental Organizations (NGO), used proactive management to assist in eliminating or reducing wolf-livestock conflicts in the BRWRA (Table 10). The Reintroduction Project and NGOs spent approximately $100,250 on proactive management activities affecting an estimated 5,480 livestock (2930 in Arizona, 2550 in New Mexico). The large drop in the number of livestock that benefitted from these measures from 2011 to 2012 is due to the conversion of a large sheep operation to cattle in Arizona, and non-use of a large yearling allotment in New Mexico. The IFT, agency contract employees, and NGO contract employees spent approximately 9000 hours implementing proactive management activities during 2012.

The agencies and NGOs purchased hay and supplements during the calving season for four stakeholders in Arizona and New Mexico. One of these measures was in direct response to livestock depredations occurring on one of these ranches. No known depredations occurred on the other three ranches. The project assisted another rancher in the purchase of water, which allowed livestock grazing in an allotment away from an active wolf den in New Mexico. No depredations are known to have occurred on the allotment during 2012.

Project personnel met with Forest District Rangers, biologists and range staffs, to discuss livestock management during the wolf denning season. The IFT coordinated with the Alpine, Clifton, Springerville, Black Range, Quemado, and Reserve Ranger Districts and stakeholders in Arizona and New Mexico to address potential conflicts between livestock and wolves. In several

of these cases, livestock were scheduled to graze in or near pastures where wolves were denning. In pursuing efforts to reduce interactions between livestock and denning wolves, the Districts and ranchers changed pasture rotations and moved livestock into alternate pastures during the denning season, where possible. A total of three depredations occurred on two of the seven alternate pastures; however, there would likely have been additional depredations if livestock had been placed in pastures closer to the den-sites.

During 2012, the Reintroduction Project and NGOs contracted 11 range riders (five in Arizona, six in New Mexico) to assist 13 stakeholders (five in Arizona, eight in New Mexico) in monitoring wolves in proximity to cattle. Range riders monitored approximately 5275 livestock within seven wolf pack home ranges, and provided additional oversight of livestock and light hazing of wolves when they were among livestock. Five depredations occurred on allotments (two in Arizona, three in New Mexico) while ranger riders were under contract in 2012.

The IFT issued radio telemetry equipment to stakeholders (five in Arizona, seven in New Mexico) in areas where wolf-livestock conflicts were prevalent. Equipment loans were provided in response to past conflicts between livestock and wolves on specific allotments. The IFT trained stakeholders to use the telemetry equipment to monitor wolves in the vicinity of cattle or residences, and instructed them on non-injurious hazing techniques. Stakeholders were encouraged to contact the IFT for assistance and were required to report any wolf-livestock conflicts requiring hazing efforts. These measures resulted in stakeholders increasing their vigilance over livestock when wolves were in the vicinity and may have helped reduce the potential for livestock depredations.

Supplemental food caches were utilized to assist a pack or remnant of a pack in feeding young of the year when extenuating circumstances (such as a death of one of the adults) reduce their own ability to do so. Supplemental food caches also served to reduce potential conflicts between wolves and livestock. Supplemental food caches were utilized for the Bluestem pack in 2012. The Bluestem breeding adult male wolf (AM806) was found dead on July 6, leaving AF1042 as the only breeding animal in the pack providing for five pups. The IFT established a supplemental food cache within a reasonable distance of the den and rendezvous sites to help the remaining adult and subadult wolves feed the young of the year and to reduce the likelihood of livestock depredations. No known livestock depredations involving the Bluestem pack occurred in 2012, and all five pups survived to year-end.

Diversionary food caches are utilized to reduce potential conflicts between wolves and livestock, primarily in areas where depredations have occurred in the past. Diversionary food caches were established for three packs during the 2012 denning season (April-May): the Luna pack, Elk Horn pack, and Fox Mountain pack. Between May and September, two depredations were assigned to members of the Luna pack, one depredation was assigned to members of the Elk Horn pack, and two depredations were assigned to members of the Fox Mountain pack. Prior to establishment of a diversionary food cache, members of the Fox Mountain pack were involved in additional depredations. Due to the number of depredations assigned to members of the Fox Mountain pack, some of which occurred outside the BRWRA, a permanent removal order for AF1188 was issued by the USFWS.

j. Non-IFT Wolf Sighting Reports

In 2012, the IFT received a total of 65 wolf sighting reports from the public, which included 44 reports from Arizona and 21 reports from New Mexico (Appendix B). The IFT determined 32 reports were non-wolf sightings (coyote, dogs, etc.), seven reports were sightings of known wolves within established territories (Arizona n = 5, New Mexico n = 2), two reports were likely uncollared/unknown wolves (Arizona n = 0, New Mexico n = 2), and two reports being probable wolf sightings (wolves located in area; however, weak sighting descriptions cannot be proven) (Arizona n = 1, New Mexico n = 1), and 22 reports did not have enough information to make a determination. The public is encouraged to report Mexican wolf sightings to help the IFT locate undocumented packs and track movements of wolves within and around the BRWRA, and are provided the 1-888-495-WOLF (9653) number to report Mexican wolf sightings.

k. Uncollared wolf sign

The IFT analyzed unoccupied range, uncollared wolf sign and sighting reports to target 13 core areas (Fig. 6) in an effort to document and/or radio collar unknown wolves in and around the BRWRA. The IFT searched a total of 5680 mi (9141 km) of roads and trails in 2012. One single wolf and a pair of wolves were documented in Arizona and three single wolves were documented in New Mexico (Fig. 7) as a result of these efforts.

l. Public Outreach

The IFT and other project personnel provided a total of 18 presentations and status reports to approximately 1,108 people in federal and state agencies, conservation groups, rural communities, schools, wildlife workshops, and various other public and private institutions throughout Arizona, New Mexico and White Mountain Apache Tribal lands. Ninety-seven percent of the presentations were for the BRWRA target audience. In addition, 4004 weekly contacts were made to cooperating agencies and stakeholders. Project updates were faxed to, or posted at, 41 different individuals/locations on a monthly basis across the BRWRA. Endangered Species Updates containing current project and recovery program information also went out to an average of 12,700 people a month. The AZGFD Mexican wolf website was visited 9237 times throughout 2012. Outreach presentations can be scheduled by contacting the IFT at 1-888-495-WOLF (9653).

Utilizing available USFS kiosks and various road pullouts within the BRWRA, the IFT maintained metal signs and laminated posters that provide information on how to minimize conflicts with wolves. The IFT also maintained USFWS reward posters at USFS kiosks and local businesses in the BRWRA as necessary, to provide notice of a $10,000 reward for information leading to the apprehension of individuals responsible for illegal Mexican wolf killings.

Elk Horn alpha pair. US Fish and Wildlife Service photo.

4. Summary

The 2012 end-of-year count confirmed a minimum of 75 wolves, 47 (22 adults, 10 subadults, and 15 pups) of which were radiocollared. The population consisted of 14 packs (six in Arizona, eight in New Mexico). Twenty-eight uncollared wolves, including uncollared singles and groups were documented throughout 2012. Ten of the 28 uncollared wolves were associated with six radiocollared packs (Table 1). Five radiocollared single wolves (m1240, m1244, m1243, m1245, f1251) were still alive at year-end. There are likely more undocumented free-ranging wolves in the population, but most of these are likely single animals because wolf packs generally leave more sign and their existence/presence is easier to document.

The IFT conducted no releases or translocations of wolves in 2012.

Nine packs produced wild-conceived, wild-born litters. 2012 represents the eleventh consecutive year in which wild-born Mexican wolves bred and raised pups in the wild. In addition, 96% of radiocollared and 97% of all documented wolves in the population were wild-born.

The IFT documented four mortalities of free-ranging wolves in 2012, including two adults and two pups.

Home ranges were calculated for 14 packs exhibiting territorial behavior. The MCP method produced an average home range size of 122 mi^2 (315 km^2), with home ranges varying from 50 mi^2 to 210 mi^2 (130 km^2 to 543 km^2).

Native prey used by wolves consisted primarily of elk; however, there were also nineteen confirmed livestock depredations and zero probable livestock depredations. There was one confirmed livestock injury attributed to wolves.

The IFT captured 19 wolves a total of 21 times for routine monitoring (n = 15), management actions (n = 1), medical attention (n = 0), movement outside the BRWRA boundary (n = 0) and incidental catch (n = 5). One wolf, AF1188 was caught for a management action. One wolf, AM1155, was incidentally captured during coyote management conducted by WS. Two wolves, m1276 and fp1281, were incidentally caught while the IFT trapped to remove AF1188 from the wild for repeated livestock depredations. Two wolves, m1276 and mp1274, were incidentally re-captured while the IFT trapped to remove AF1188 from the wild.

In 2012, the IFT analyzed 65 reports of wolf sightings from the public; 49% of these reports were non-wolf sightings (coyote, dogs, deer, etc.), 11% were sightings of known wolves within established territories, 3% were probable wolf sightings, 3% were likely uncollared/unknown wolves, and the remainder was categorized as unknown due to insufficient information. In response to these sightings, the IFT searched 5680 mi (9141 km) of roads, trails, and canyons looking for unknown wolves in and around the BRWRA. As a result, the IFT was successful in documenting one single wolf and a pair of wolves in Arizona and three single wolves in New Mexico.

Project personnel provided 18 presentations and status reports to approximately 1108 people in federal and state agencies, conservation groups, rural and urban communities, guide/outfitter organizations, livestock associations, schools, fairs, and various other public and private institutions. In addition, 4004 weekly contacts were made to cooperating agencies and stakeholders. Endangered Species Updates containing current project and recovery program information went out to an average of 12,700 people a month.

The IFT acknowledges the assistance of all agency personnel and volunteers who provided data and support services for the operational field portion of the Mexican wolf reintroduction project during this reporting period. Individuals listed in Appendix C collected data or provided other information for this report.

5. Discussion

The IFT documented the Mexican wolf population at a minimum of 75 wolves in 2012 (Fig. 8; Table 1*)*. The minimum number of breeding pairs decreased from seven in 2011(including one "Operational Breeding Pair") to four in 2012, one of which was an "Operational Breeding Pair" (Fig. 4; Table 1). AF1188 from the Fox Mountain pack was permanently removed from the wild in October in an effort to alter pack behavior following repeated depredations. In December, the IFT determined AF1212 of the Elk Horn pack had joined the Fox Mountain pack, effectively replacing AF1188.

The minimum total number of pups alive at the end of the year was higher (n = 20; Table 1) than the previous year (n = 19) and the number of known mortalities decreased from eight in 2011 to four in 2012 (Table 4). Of the seven single wolves documented during 2012: one joined the

Canyon Creek pack and is no longer considered a single (M1252), one is fate unknown (m1241) and five remain in the wild with functioning radio collars (m1240, m1243, m1244, m1245, m1251). The five remaining single wolves began dispersing in the fall/winter and were all located away from their natal packs during the year-end population count; f1251 was located with an uncollared wolf during the January 2013 count. Four natural pairings occurred in 2012. The natural pairings of F1212 and M1287, and F1246 and M1248 resulted in the designations of the Elk Horn pack and Canyon Creek pack, respectively. In the Fox Mountain pack, AF1212 of the Elk Horn pack replaced AF1188 following her permanent removal from the wild. In the Canyon Creek pack; M1252 replaced M1248 after the IFT lost contact with M1248's radio collar. The formation of several new pairings in 2012, along with an estimated recruitment rate of 71% (20 pups alive out of 28 known produced) are positive indicators for the overall wolf population. Outside of the pairing of F1246 with M1248 and AF1212 with an uncollared wolf (AM1287) at the start of 2012, the remaining new pairings referenced above all involved previously collared wolves. This may indicate a low level of uncollared wolves available to form new pairings among existing members of the population. Several traditionally productive packs (Paradise, Rim, and Middle Fork) did not produce pups in 2012, likely due to the advanced age of one or more alpha animals in each pack.

Based on meta-analysis of gray wolf literature, Fuller et al. (2003) identified a 0.34 mortality rate as the inflection point of wolf populations. Theoretically, wolf populations below a 0.34 mortality rate would increase naturally, and wolf populations above a 0.34 mortality rate would decrease. The Mexican wolf population had an overall failure (mortality plus removal) rate of 0.16 in 2012, largely due to minimal (n = 1) management removals of wolves in the population. While the reduction in the number of management removals is encouraging, the majority of the population losses in 2012 were due to human-caused mortalities rather than management removals. In 2012, the IFT documented four human-caused mortalities (four illegal shootings) and zero natural mortality. Efforts to reduce the level of mortality, while replacing the individual animals lost through initial releases and translocations will continue to be a priority. The IFT will also continue to document the uncollared wolf component of the population.

The 2012 confirmed killed cattle rate extrapolates to approximately 24 depredations/100 wolves using the number of confirmed killed cattle (n = 18) compared to the final 2012 wolf population count (n = 75). This projected number of depredations was within the 1-34 confirmed killed cattle per 100 wolves predicted in the FEIS. It is important to note the standard for extrapolating the annual confirmed killed cattle rate/100 wolves uses the end of year wolf population count, which does not include wolves that died during 2012. Thus, the confirmed killed cattle rate per 100 wolves, as a matter of practice, underestimated the denominator which inflates the total rate.

A high number of mortalities may exceed growth from natural recruitment, translocations, and initial releases in a given year. Nonetheless, a combination of initial releases, translocations, natural pair formations, and reproduction in 2013 could result in another increase in the Mexican wolf population. The Reintroduction Project management objective for 2013 is a 10% increase in the minimum wolf population counts and/or the addition of at least two breeding pairs, while minimizing negative impacts of wolves. Suggested changes to the Mexican wolf reintroduction project are outlined in the Five Year Review and the IFT will continue to work on implementing these improvements in 2013.

6. Literature Cited

Heisey, DM and TK Fuller. 1985. Evaluation of survival and cause-specific mortality rates using telemetry data. Journal of Wildlife Management 49:668-674.

Hooge, PN, W Eichenlaub, and E Solomon. 1999. The animal movement program. USGS. Alaska Biological Science Center.

Fuller, TK, LD Mech, and JF Cochrane. 2003. Wolf population dynamics. Pages 161-191 *in* L. D. Mech and L. Boitani, editors. Wolves: behavior, ecology, and conservation. The University of Chicago Press, Chicago, Illinois, USA.

Mexican Wolf Blue Range Adaptive Management Oversight Committee and Interagency Field Team. 2005. Mexican Wolf Blue Range Reintroduction Project 5-year review. USFWS, Albuquerque, New Mexico, USA.

Paquet, PC, J Vucetich, ML Phillips, and L Vuetich. 2001. Mexican wolf recovery: three year program review and assessment. Prepared by the Conservation Breeding Specialist Group for the U.S. Fish and Wildlife Service, Albuquerque, New Mexico. USA.

Singer, F. J., W. Schreier, J. Oppenheim, and E. O. Garton. 1989. Drought, fires, and large mammals. BioScience. 39:716-722.

US Fish and Wildlife Service. 1996. Final environmental impact statement for the reintroduction of the Mexican wolf within its historic range in the southwestern United States. USFWS, Albuquerque, New Mexico, USA.

US Fish and Wildlife Service. 1998. The final Mexican wolf experimental rule. 63 Federal Register. Pp 1763-1772.

White, GC and RA Garrott. 1990. Analysis of wildlife radio-tracking data. Academic Press Incorporated, New York, New York, USA.

Table 1. Status of Mexican wolf packs in Arizona and New Mexico, as of December 31, 2012.

Pack	Wolf ID	Reproduction[a]	Pups at Year End[b]	No. Collared	No. Uncollared	Min pack Size[c]
Bluestem, AZ	AM806[e], AF1042, mp1275, mp1277, fp1280, fp1289	5	5	5	2	7
Canyon Creek, NM	F1246, M1248[k], M1252[h]	0	0	2	0	2
Dark Canyon, NM	AM992, AF923, f1250[e], fp1278, m1293	1	1	4	0	4
Elk Horn, NM	AM1287, f1294	1	0	2	0	2
Fox Mountain, NM**	AM1158, AF1188[g], AF1212[h], m1276, mp1274, fp1281	6	3	5	1	6
Hawks Nest, AZ	AM1038[j], F1208[e], f1247[e]	1	0	0	1	1
Luna, NM*	AF1115, AM1155, mp1284, mp1285, mp1286	3	3	5	0	5
Maverick, AZ*	AM1183, mp1290, fp1291	5	3	3	2	5
Middle Fork, NM	AM871, AF861	0	0	2	0	2
Paradise, AZ	AM795, AF1056	0	0	2	0	2
Rim, AZ	AM1107, AF858	0	0	2	0	2
San Mateo, NM*	AM1157, AF903, m1249, mp1282, fp1292	4	4	5	3	8
Willow Springs, NM	M1185, F1279	0	0	2	0	2
Radio collared wolf, AZ	m1240[i]	0	0	1	0	1
Radio collared wolf, AZ	m1244[i]	0	0	1	0	1
Radio collared wolf, NM	m1241[f]	0	0	0	0	0
Radio collared wolf, NM	m1243[i]	0	0	1	0	1
Radio collared wolf, NM	m1245[i]	0	0	1	0	1
Radio collared wolf, NM	f1251[i]	0	0	1	1	2
Steeple Creek, AZ	Uncollared wolves	0	0	0	2	2
Greens Peak, AZ	Uncollared wolf	0	0	0	1	1
Indian Peaks, NM	Uncollared wolf	0	0	0	1	1
Malpais, NM	Uncollared wolf	0	0	0	1	1
Datil, NM	Uncollared wolf	0	0	0	1	1
FAIR	Uncollared wolves	N/A[d]	N/A[d]	N/A[d]	N/A[d]	N/A[d]
SCAR	Uncollared wolves	N/A[d]	N/A[d]	N/A[d]	N/A[d]	N/A[d]
Totals[l]		28	20	47	28	75

[a] Reproduction-maximum number of pups documented in 2012.
[b] Pups at year end documented surviving until December 31, 2012.
[c] Min pack size-total number of wolves (collared, uncollared, pups) documented at year end.
[d] Wolf numbers on FAIR and SCAR are not displayed at the request of the tribes.
[e] Died during 2012.
[f] Fate unknown during 2012.
[g] Permanently removed from wild during 2012.
[h] Dispersed to join existing pack.
[i] Dispersed off and on throughout fall and/or winter; counted as single in table.
[j] Telemetry collar not functioning, counted as uncollared in table.

[K] Wolf last located October 9, 2012
[l] Totals include wolves occurring on FAIR and SCAR..
** A pack that meets the definition of an *operational breeding pair*.
*A pack that meets the definition of a breeding pair per the final rule.

Table 2. Mexican wolves translocated from captivity or the wild in Arizona and New Mexico during January 1 – December 31, 2012.

Wolf pack	Wolf #	Release Site	Release Date	Released or Translocated
N/A	N/A	N/A	N/A	N/A

Table 3. Home range sizes of free-ranging Mexican wolf packs in Arizona and New Mexico, January 1 – December 31, 2012.

Wolf ID	Home Range Size 95% Min. Convex Polygon mi^2 (km^2)	Number of Independent Aerial Locations	Duration of Time Radio Locations were Available during 2011
Bluestem	87 (225)	47	12 months
Canyon Creek	125 (325)	44	11 months
Dark Canyon	140 (363)	53	12 months
Elk Horn	103 (266)	46	11 months
Fox Mountain	167 (432)	55	12 months
Hawks Nest	155 (401)	51	12 months
Luna	83 (214)	49	12 months
Maverick	126 (326)	44	11 months
Middle Fork	50 (131)	46	12 months
Paradise	185 (479)	51	12 months
Rim	90 (232)	46	12 months
San Mateo	210 (543)	53	12 months
Tsay-O-Ah	123 (319)	47	12 months
Willow Springs	59 (152)	46	12 months
Average[a]	**122 (315)**	**48.4**	**11.8 months**

[a]Averages were based on packs with enough locations to calculate home ranges.

Table 4. Wild Mexican wolf mortalities documented in Arizona and New Mexico, 1998-2012.

Year	Illegal shooting	Vehicle collision	Natural[a]	Other[b]	Unknown	Awaiting necropsy	Annual Total
1998	4	0	0	1	0	0	5
1999	0	1	2	0	0	0	3
2000	1	2	1	0	0	0	4
2001	4	1	2	1	1	0	9
2002	3	0	0	0	0	0	3
2003	7	4	0	0	1	0	12
2004	1	1	1	0	0	0	3
2005	3	0	0	0	1	0	4
2006	1	1	1	1	2	0	6
2007	1	0	1	0	2	0	4
2008	6	2	2	1	2	0	13
2009	4	0	4	0	0	0	8
2010	5	0	1	0	0	0	6
2011	3	2	3	0	0	0	8
2012	4	0	0	0	0	0	4
Total	**47**	**14**	**18**	**4**	**9**	**0**	**92**

[a]Includes three wolves lost to predation, two to starvation, two to disease (canine parvovirus and chronic bacterial pleuritis), and one each to asphyxiation (snake bite), euthanasia, toxemia, and ingestion of a foreign object.
[b]Includes 2 capture-related mortalities and 1 legal public shooting.

Table 5. Mexican wolf mortalities documented in Arizona and New Mexico during January 1 - December 31, 2012.

Wolf ID	Pack	Age (years)	Date Found	Cause of Death
fp1247	Hawks Nest	<1	March 27	Illegal shooting
fp1250	Dark Canyon	<1	May 19	Illegal shooting
AM806	Bluestem	9	July 6	Illegal shooting
AF1208	Hawks Nest	2	December 9	Illegal shooting

Table 6. Mexican wolf depredations of livestock documented in Arizona and New Mexico during January 1 – December 31, 2012.

	Confirmed	Probable	Total
Fatal	19	0	19
Injury	1	0	1

Table 7. Investigations of confirmed and probable depredation and injuries caused by Mexican wolves to livestock during 2012 in New Mexico and Arizona. Depredation incidents are defined as the aggregate number of livestock confirmed killed or mortally wounded by an individual wolf or a single pack of wolves at a single location within a 1-day (24-hour) period, beginning with the first confirmed kill, as documented in the initial IFT incident investigation pursuant to SOP 11.0.

	Wolves in Area	Investigation Date	Located By IFT	Species	State	Killed/ Injured	Call	Wolves Responsible	Depredation Incident	No. of Incidents for 2012	Management Action
1	1241, 1155, and 1246	January 4	No	Cattle	NM	Killed	Confirmed	1241	Yes	1	Intensive Monitoring, food cache established
2	Unknown	February 7	No	Cattle	AZ	Killed	Confirmed	Uncollared	Yes	1	Set camera in area
3	Unknown	February 7	No	Cattle	AZ	Killed	Confirmed	Uncollared	Yes	1	Set camera in area
4	Unknown	February 11	No	Mule	NM	Killed	Confirmed	Uncollared	Yes	1	Monitoring
5	Middle Fork	February 26	No	Cattle	NM	Injury	Confirmed	871 or 861	No	0	Monitoring
6	Luna	March 5	No	Cattle	NM	Killed	Confirmed	Uncollared	Yes	1	Monitoring
7	Unknown	March 6	No	Cattle	NM	Killed	Confirmed	Uncollared	Yes	1	Monitoring
8	Fox Mountain	March 27	No	Cattle	NM	Killed	Confirmed	1158, 1188	Yes	1	Set traps in area
9	Paradise	April 24	Yes	Cattle	AZ	Killed	Confirmed	795, 1056, 1243	Yes	1	Monitoring, hazing of pack members
10	Fox Mountain	April 26	No	Cattle	NM	Killed	Confirmed	1158, 1188	Yes	2	Increased Monitoring
11	Fox Mountain	May 1	Yes	Cattle	NM	Killed	Confirmed	1158 or 1188	Yes	3	Second range rider, food cache
12	Luna	May 21	No	Cattle	NM	Killed	Confirmed	1155	Yes	2	Increased Monitoring
13	Luna	July 9	No	Cattle	NM	Killed	Confirmed	Either 1155 or 1115	Yes	3	Increased Monitoring
14	Fox Mountain	August 1	No	Cattle	NM	Killed	Confirmed	1158 or 1188	Yes	4	Intensive Monitoring, trapping for removal of 1188 initiated
15	Uncollared	August 9	No	Cattle	AZ	Killed	Confirmed	Uncollared	Yes	1	Trapping initiated
16	Maverick	August 28	Yes	Cattle	AZ	Killed	Confirmed	1183	Yes	1	Trapping initiated

Table 7. Continued.

Wolves in Area		Investigation Date	Located By IFT	Species	State	Killed/ Injured	Call	Wolves Responsible	Depredation Incident	No. of Incidents for 2012	Management Action
17	Elk Horn	September 29	Yes	Cattle	NM	Killed	Confirmed	Either 1212 or 1287	Yes	1	Establish food cache, monitoring
18	Uncollared	October 23	No	Cattle	AZ	Killed	Confirmed	Uncollared	Yes	0	Establish food cache, monitoring
19	Uncollared	December 15	No	Cattle	NM	Killed	Confirmed	Uncollared	Yes	0	Increased Monitoring, set camera in area
20	Fox Mountain, 1245, 1287	December 30	Yes	Cattle	NM	Killed	Confirmed	Either 1158, 1212, or 1274	Yes	5	Increased Monitoring

Table 8. Mexican wolves captured in Arizona and New Mexico from January 1 – December 31, 2012.

Pack	Wolf ID	Capture Date	Reason for Capture
Rim	AM1107	January 26	Helicopter capture, re-collared and released on January 26.
Tsay-O-Ah	m1254	June18	Routine monitoring purposes. Captured, collared and released on site.
Luna	AM1155	July 22	WS captured wolf while coyote trapping. Re-collared and released on site.
Fox Mountain	mp1274	July 27	Routine monitoring purposes. Captured, collared and released on site. Slipped collar following release.
Bluestem	mp1275	August 13	Routine monitoring purposes. Captured, collared and released on site.
Fox Mountain	m1276	August 14	Captured during AF1188 removal effort. Collared and released on site.
Bluestem	mp1277	August 17	Routine monitoring purposes. Captured, collared and released on site.
Dark Canyon	fp1278	August 24	Routine monitoring purposes. Captured, collared and released on site.
Willow Springs	F1279	September 15	Routine monitoring purposes. Captured, collared and released on site.
Fox Mountain	mp1274	September 22	Captured during AF1188 removal effort. Re-collared and released on-site.
Fox Mountain	m1276	September 27	Captured during AF1188 removal effort. Released on site.
Bluestem	fp1280	September 29	Routine monitoring purposes. Captured, collared and released on site.
Fox Mountain	fp1281	October 2	Captured during AF1188 removal effort. Captured, collared and released on site.
Elk Horn	AF1212	October 5	Routine monitoring purposes. Re-collared and released on site.
San Mateo	mp1282	October 8	Routine monitoring purposes. Captured, collared and released on site.
Tsay-O-Ah	fp1283	October 9	Routine monitoring purposes. Captured, collared and released on site.
Fox Mountain	AF1188	October 10	Captured and removed from the wild in accordance with USFWS Permanent Removal Order.
Luna	mp1284	October 18	Routine monitoring purposes. Captured, collared and released on site.
Luna	mp1285	October 20	Routine monitoring purposes. Captured, collared and released on site.
Luna	mp1286	October 21	Routine monitoring purposes. Captured, collared and released on site.
Elk Horn	AM1287	October 22	Routine monitoring purposes. Captured, collared and released on site.

Table 9. IFT management actions resulting from Mexican wolf nuisance activities in Arizona and New Mexico during 2012.

Date	Wolf ID	General Location	Type of Activity	IFT Response	Mar
January 10	Uncollared	Porter Mountain, AZ	Wolf on private residence	IFT investigated the report	IFT located dog in area
January 28	Uncollared	Poverty, NM	Wolf along highway in proximity to people outside of vehicle	IFT investigated the report	IFT deter likely a documen vicinity. animal b
January 30	Bluestem	Alpine, AZ	Wolf in yard of private residence	IFT investigated the report	IFT monit pac
February 1	Uncollared	Pima, AZ	Wolf harassing cows	IFT investigated the report	No v
February 2	Uncollared	Vernon, AZ	Wolf on private property harassing horses	IFT investigated the report	IFT deter was not a coyote a present. wo
February 12	Uncollared	Marana, AZ	Wolf acting in an aggressive manner at a hiker	IFT investigated the report	IFT deter
February 15	Uncollared	Lakeside, AZ	Wolves on private property harassing goats	IFT investigated the report	IFT determ not wolves in area, no
May 1	Uncollared	Pinetop, AZ	Wolf reported in residential area	IFT investigated the report	No v
May 30	Uncollared	Alpine, AZ	Possible wolf bites on domestic dogs	WS investigated the report	WS measu could not c
September 21	Uncollared	Quemado, NM	Wolf reported in residential area	IFT investigated the report	IFT deter not a wolf. wolf or v
November 23	Uncollared	Datil, NM	Wolves reported on private property	IFT investigated the report	IFT set up wolf

Table 10. IFT proactive management activities in Arizona and New Mexico during 2012.

Proactive Management Activity	Purpose	Date	Location	Wolf ID	Management Result
Hay	Reduce predator depredations	June - December	NM	All wolves	2 confirmed depredations
Hay and Supplements	Reduce predator depredations during calving season.	January to March	Blue River, AZ	Uncollared Wolves	No confirmed depredations
Supplements	Reduce predator depredations	June-Aug	Springerville, AZ	Hawks Nest	No known depredations
Water and Feed	Use alternate allotment to reduce problems	2012	Glenwood, NM	Dark Canyon	No known depredations
Range Rider	Reduce predator depredations on free-ranging livestock.	5 months	Big Lake, AZ	Hawks Nest	No known depredations
Range Rider	Reduce predator depredations on free-ranging livestock.	4 months	Springerville AZ	Paradise	No known depredations
Range Rider	Reduce predator depredations on free-ranging livestock.	5 months	East Fork Black River, AZ	Bluestem	No known depredations
Range Rider	Reduce predator depredations on free-ranging livestock.	4 months	Springerville, AZ	Paradise, Uncollared	2 known depredations
Range Rider	Reduce predator depredations on free-ranging livestock.	5 months	Greens Peak, AZ	Paradise, Uncollared wolves	No known depredation
Range Rider	Reduce predator depredations on free-ranging livestock.	3 months	Quemado, NM	Fox Mountain	1 known depredation
Range Rider	Reduce predator depredations on free-ranging livestock.	5 months	Beaverhead NM	Middle Fork	No known depredations
Range Rider	Reduce predator depredations on free-ranging livestock.	3 months	Luna, NM	Fox Mountain	1 known depredation
Range Rider	Reduce predator depredations on free-ranging livestock.	3 months	Quemado, NM	Fox Mountain, Elk Horn	1 known depredation
Range Rider	Reduce predator depredations on free-ranging livestock.	4 months	Reserve, NM	Luna	1 known depredation
Range Rider	Reduce predator depredations on free-ranging livestock	4 months	Govina, NM	Willow Springs	No known depredation
Lease Alternate Pasture outside of BRWRA	Reduce predator depredations on free-ranging livestock.	January through March	Strayhorse, AZ	Uncollared wolves	No known depredations

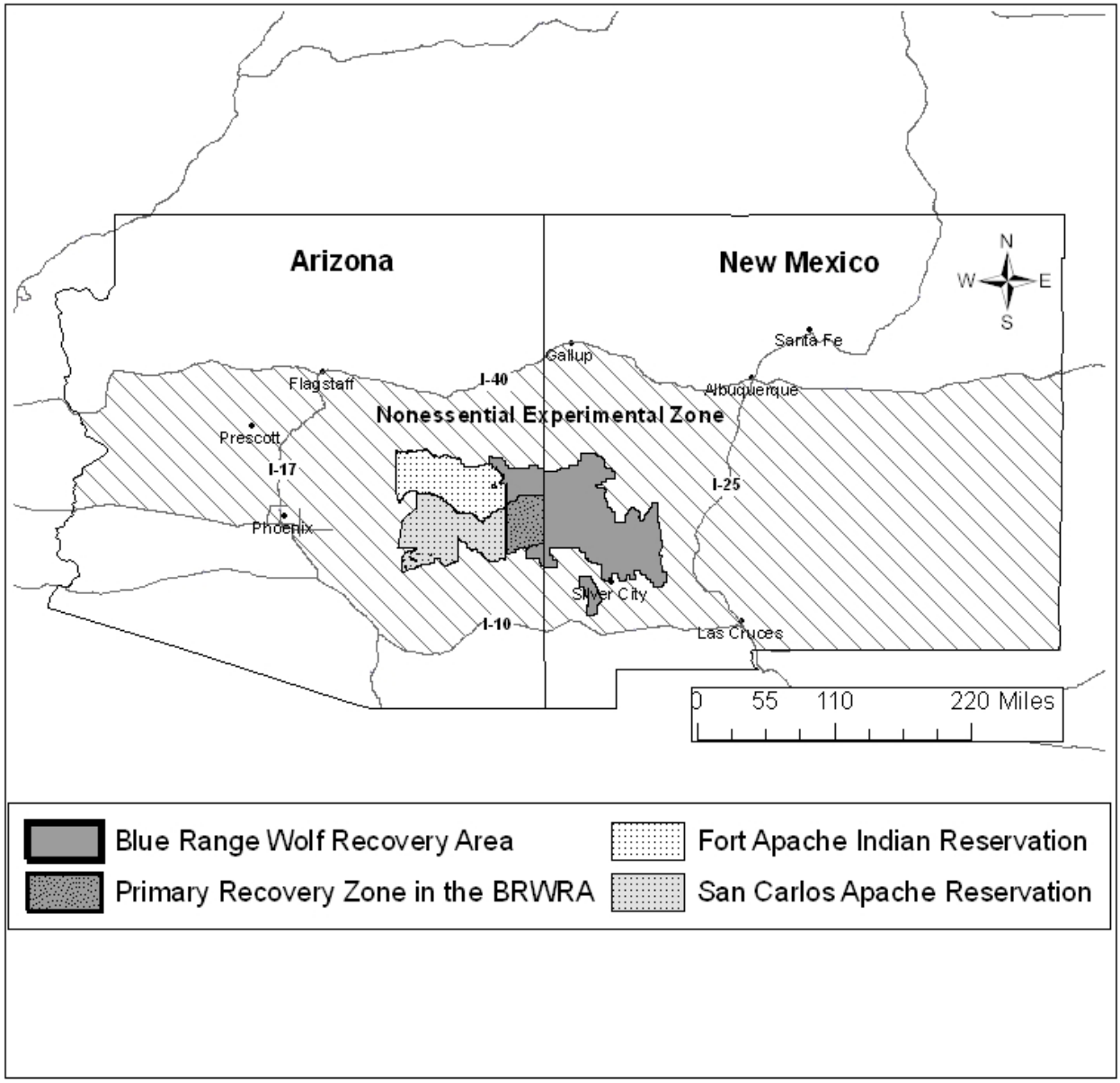


Figure 1. The Blue Range Wolf Recovery Area and Mexican wolf nonessential experimental zone (cross-hatched area) in Arizona and New Mexico.

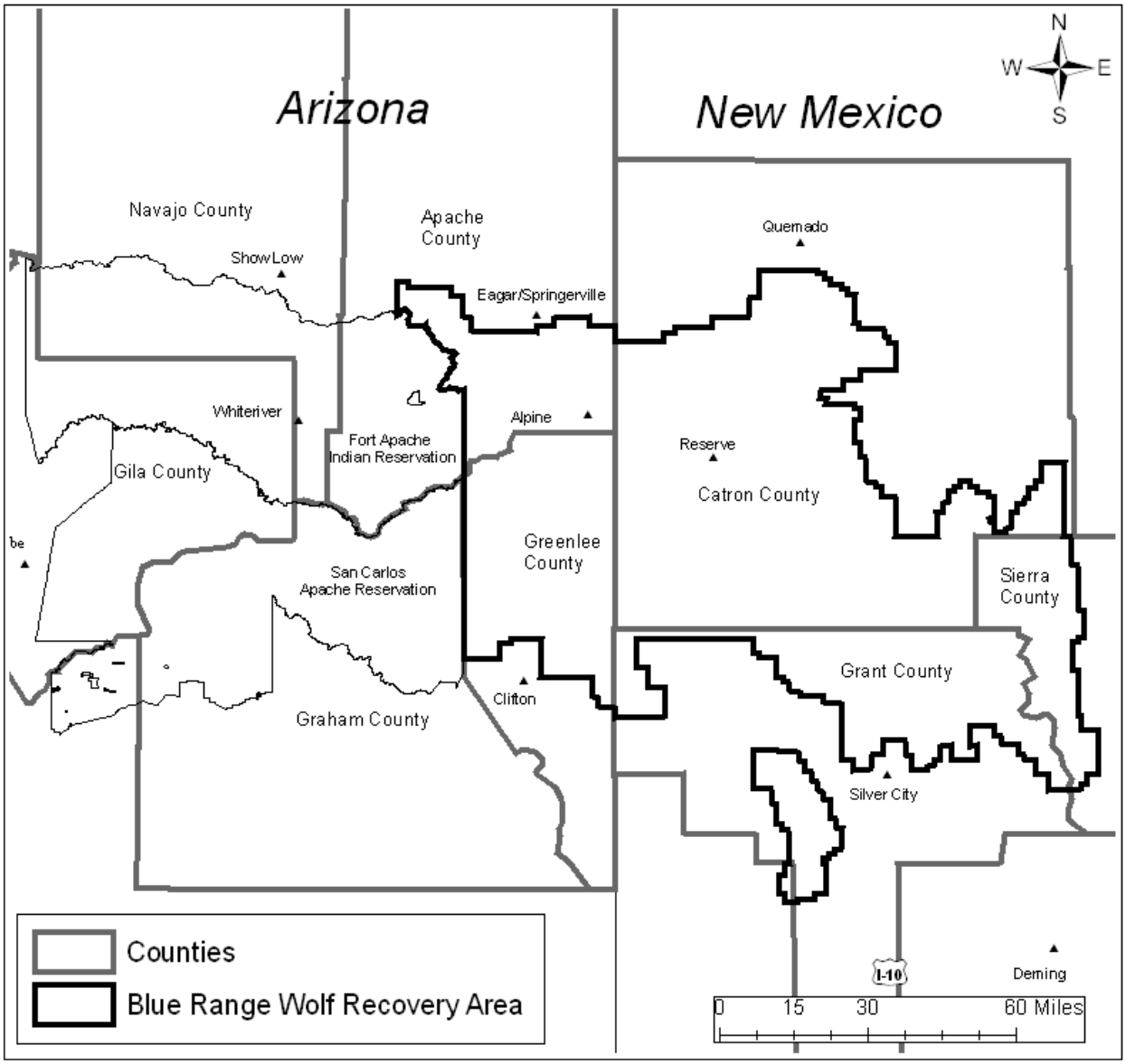


Figure 2. Counties that occur in or adjacent to the Blue Range Wolf Recovery Area in Arizona and New Mexico.

Figure 3. No translocation sites or release sites were used during 2012 in Arizona and New Mexico within the Blue Range Wolf Recovery Area.

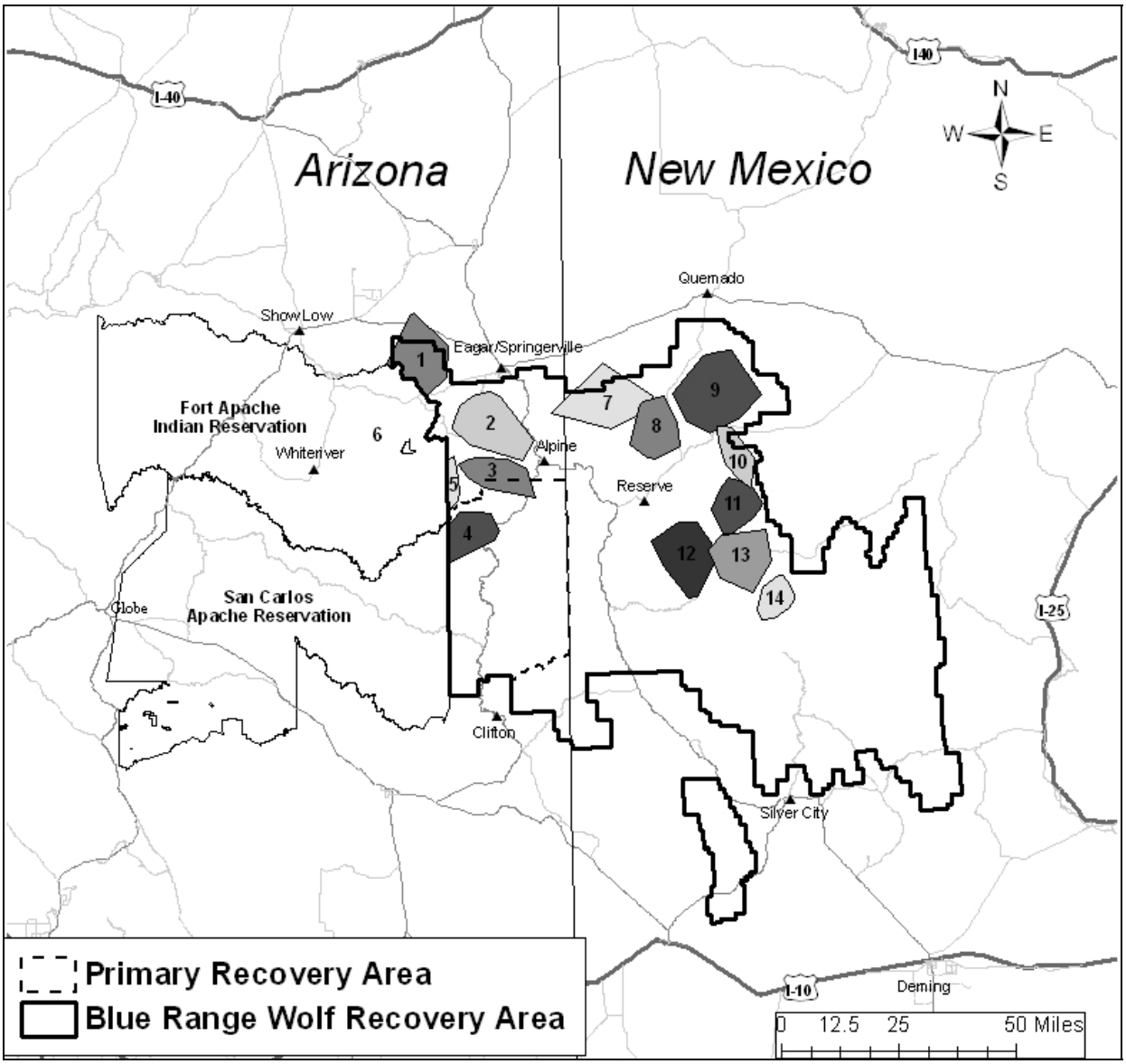


Figure 4. Mexican wolf home ranges for 2012 in Arizona and New Mexico. The shaded polygons and corresponding numbers on the map represent wolves having >20 independent radio locations and exhibiting movement characteristics consistent with a home range during 2012. See the following page for information regarding the wolf packs and home ranges.

Figure 4. Continued.

Map Number	Wolf Pack	Number of Wolves	Wolf Fate at the End of 2011	Breeding Pair Status	Home Range Size (mi^2)
1	Paradise	2	Free-ranging	No	185
2	Hawks Nest	1	Free-ranging	No	155
3	Bluestem	7	Free-ranging	No	87
4	Rim	2	Free-ranging	No	90
5	Maverick	5	Free-ranging	Yes	126
6	Tsay-O-Ah	N/A[a]	Free-ranging	No	123
7	Fox Mountain	6	Free-ranging	Yes[b]	167
8	Elk Horn	2	Free-ranging	No	103
9	San Mateo	8	Free-ranging	Yes	210
10	Willow Springs	2	Free-ranging	No	59
11	Luna	5	Free-ranging	Yes	83
12	Dark Canyon	4	Free-ranging	No	140
13	Canyon Creek	2	Free-ranging	No	125
14	Middle Fork	2	Free-ranging	No	50

[a] Wolf information (including numbers) on the Fort Apache Indian Reservation is not displayed at the tribe's request.

[b] This pack did not meet the strict definition of a breeding pair as per the definition in the 10j rule, however they did meet the definition of an "operational breeding pair."

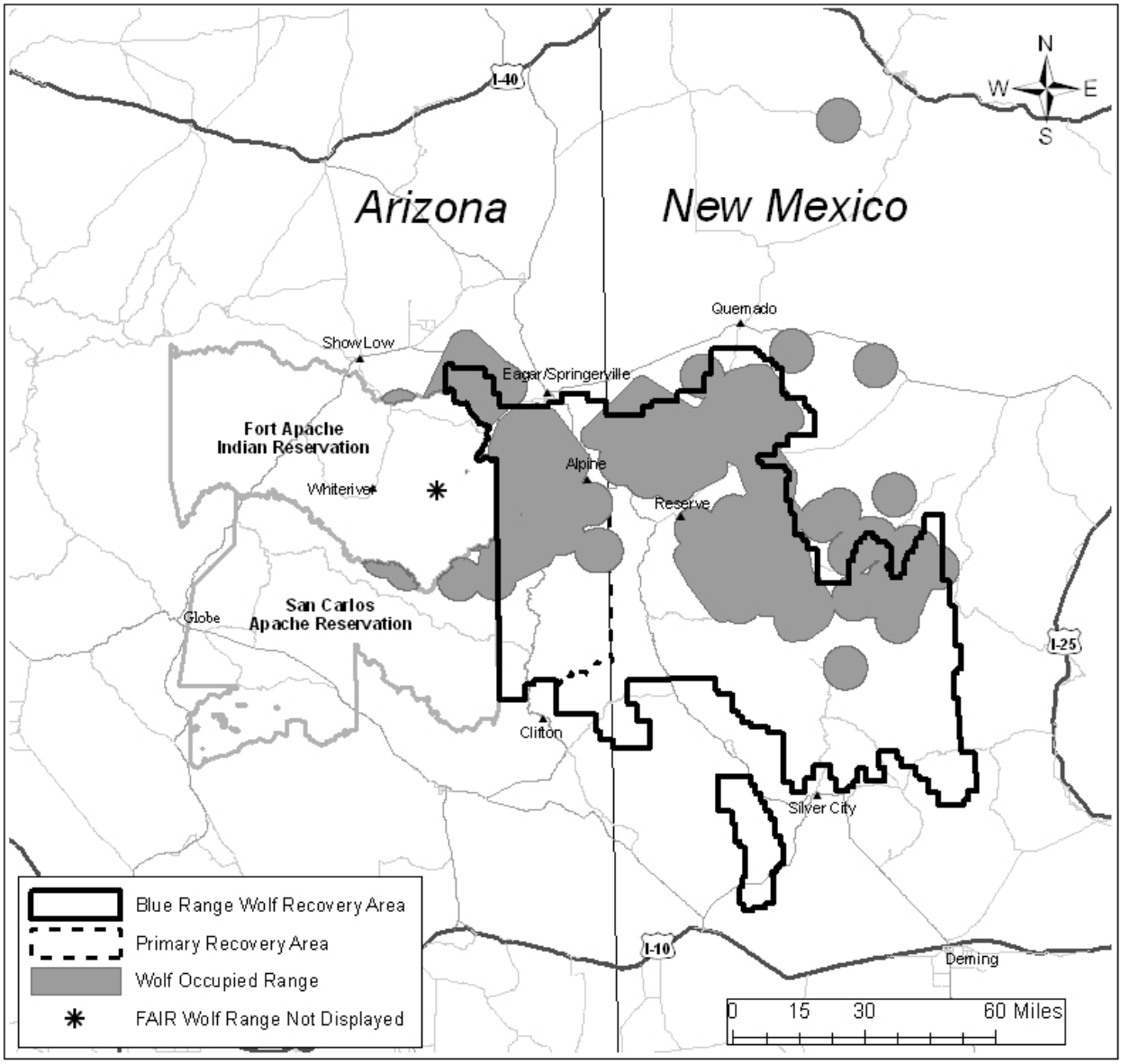


Figure 5. Mexican wolf occupied range in Arizona and New Mexico (2012) within the Mexican Wolf Nonessential Experimental Zone as defined in the Final Rule (USFWS 1998).

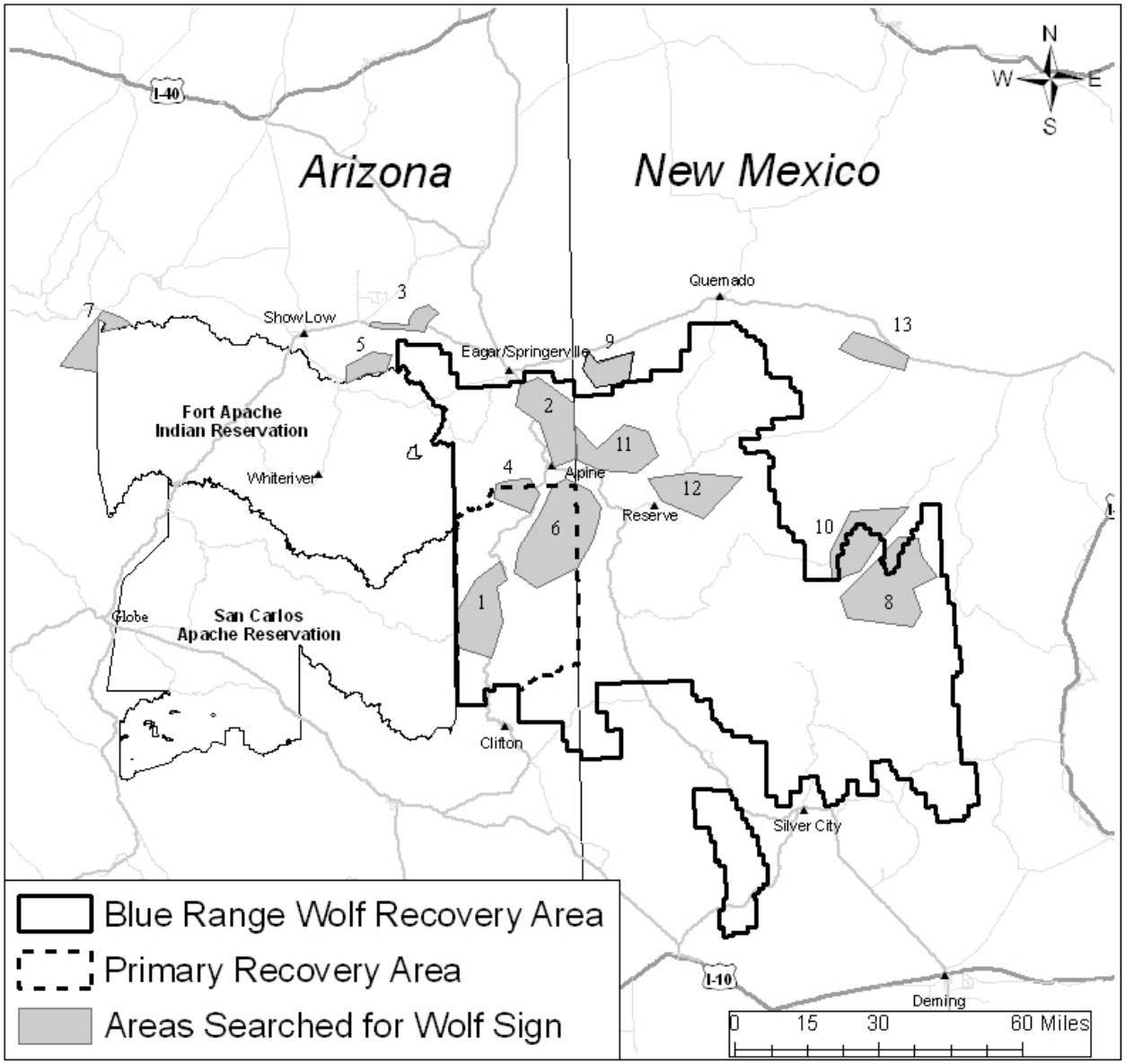


Figure 6. Areas searched and corresponding miles searched (driven or hiked) for uncollared wolf sign in Arizona and New Mexico during 2012. Search areas corresponding to "map numbers" as follows:

Figure 6. Continued.

Map Numbers	Search Area	Miles Searched in AZ	Miles Search in NM
1	Mud Springs	670	0
2	Escudilla	228	0
3	Mineral Creek	75	0
4	Campbell Blue	27	0
5	Little Brushy Mountain	55	0
6	Blue River	862	23
7	Canyon Creek	120	0
8	Poverty Flats	0	2507
9	Cow Springs	0	233
10	Indian Peaks	0	600
11	Centerfire	0	115
12	Eagle Peak	0	123
13	Datil Mountains	0	42
	Total	**2037**	**3643**
	Grand Total for AZ and NM	**5680**	

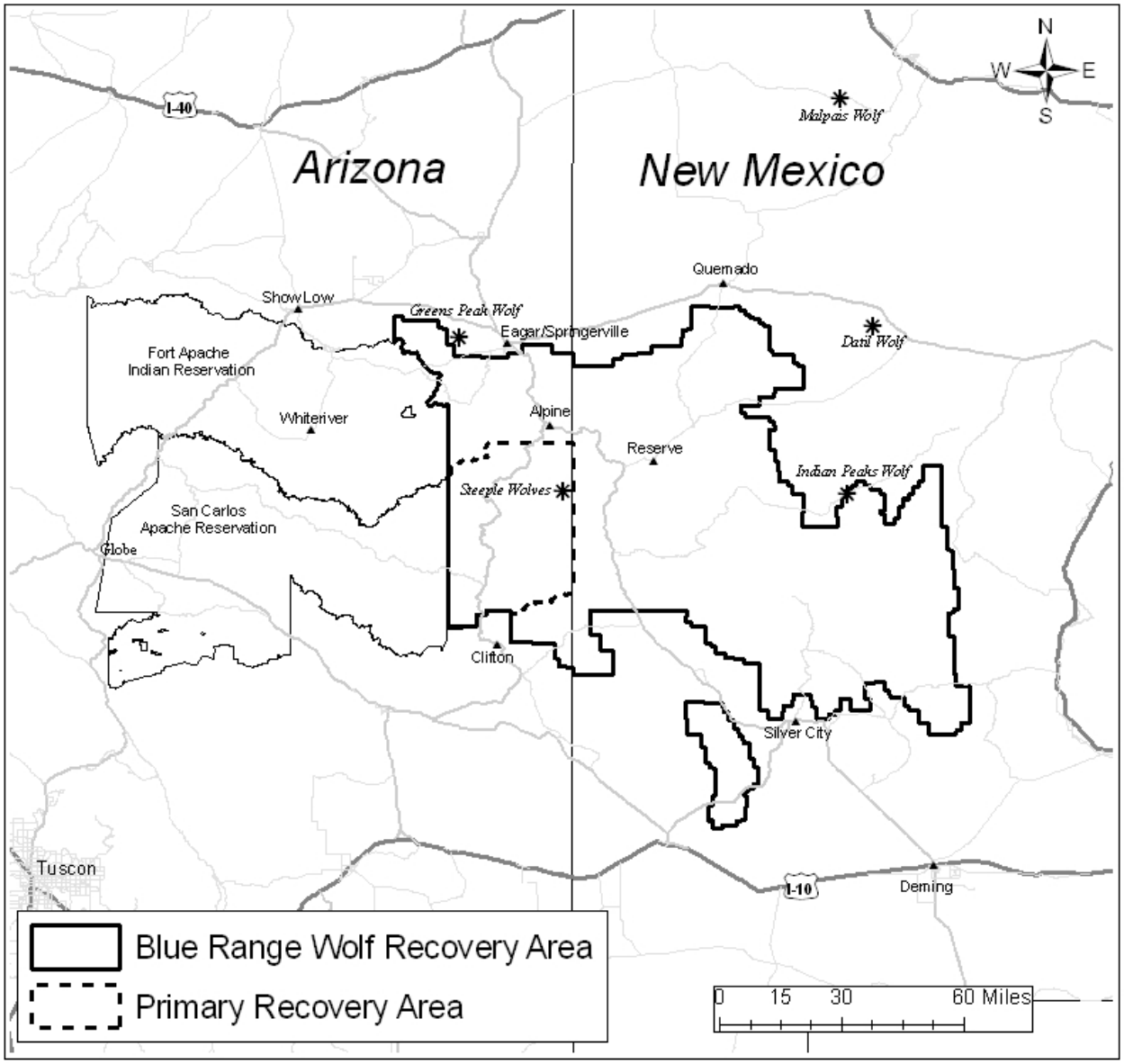


Figure 7. Uncollared wolves documented and counted in the 2012 wolf population in Arizona and New Mexico.

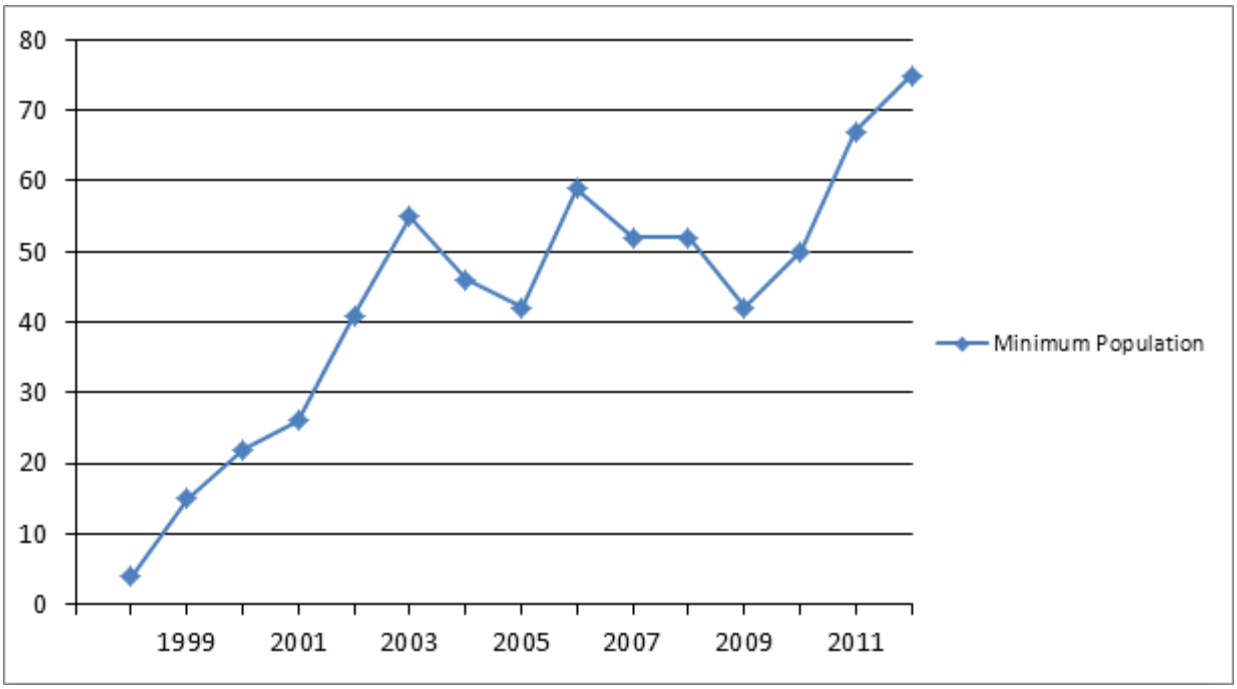


Figure 8. Mexican wolf minimum population estimates from 1998 through 2012 in Arizona and New Mexico.

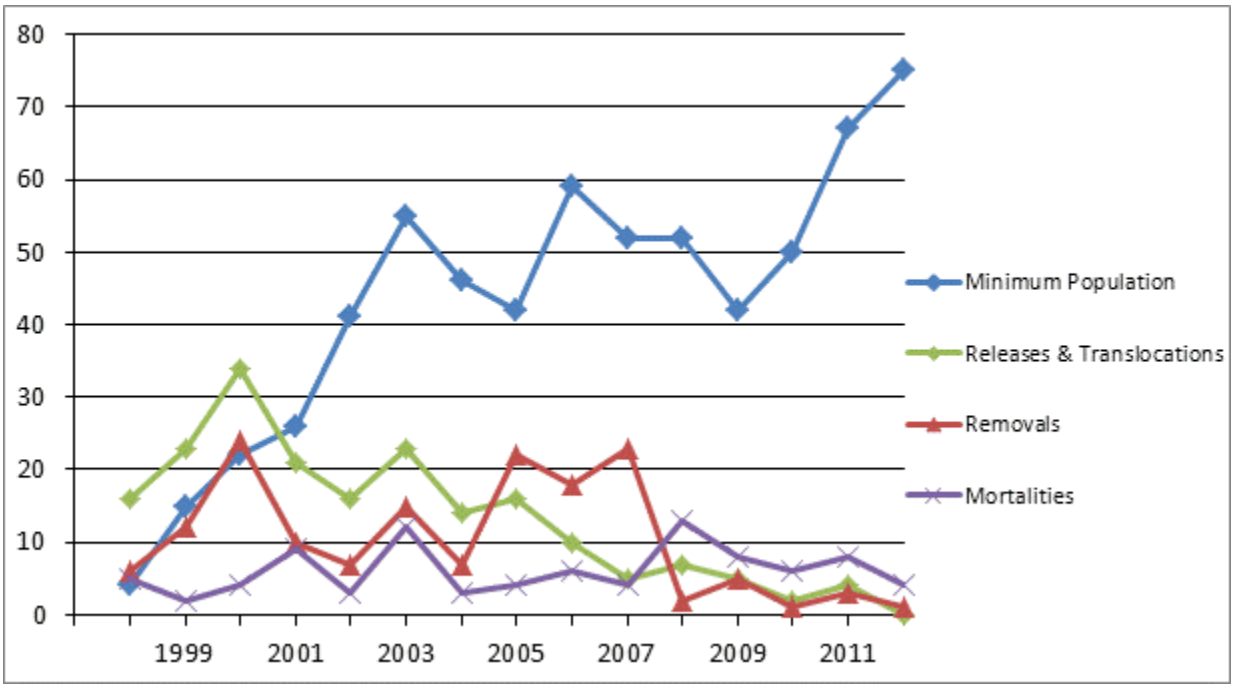


Figure 9. Mexican wolf minimum population estimates and associated population parameters (1998-2012). Releases and translocations included: initial releases (wolves released with no wild experience), translocations (wolves re-released from captivity back into the wild, and free-ranging wolves that were captured and re-released back into the wild for management purposes such as but not limited to boundary issues without having been placed temporarily into captivity). Removals included: wolves permanently removed from the wild (including wolves lethally controlled because they are associated with management actions), wolves temporarily

removed from the wild and available for future translocation, and free-ranging wolves temporarily removed for management purposes such as boundary issues but without having been placed temporarily into captivity.

Appendix A. 2011 Pack and Single Wolf Summaries

7. Pack Summaries

Bluestem pack (AF1042, AM806, mp1275, mp1277, fp1280, fp1289)

In January, the Bluestem pack consisted of four wolves (AF1042, AM806, mp1240 and one uncollared pup). Throughout the year the Bluestem pack utilized their traditional territory in the central portion of the ASNF. The IFT determined that AM806s radio collar stopped functioning sometime during early 2012. Despite routine efforts through early summer, the IFT was unable to document AM806 with the Bluestem pack following the January 2011 population count. The IFT documented denning behavior in the Bluestem pack in late April. In May, the IFT located the den site and documented the production of at least 3 pups. In early July, the IFT documented 5 pups with the Bluestem pack. A food cache was set up to assist AF1042, m1240 and an uncollared subadult wolf with feeding the pups of the year. The food cache was maintained through mid-August when the pack moved away to a rendezvous site. On July 6, AM806 was located dead from a gunshot wound. On August 13, a pup was trapped, collared, and assigned studbook number mp1275. On August 17, a pup was trapped, collared, and assigned studbook number mp1277. In late-August the Bluestem pack moved from their rendezvous site to an area further north on the edge of their territory which they continued to occupy for the remainder of 2012. The IFT documented 8 wolves with the Bluestem pack throughout the fall. On September 29, a pup was trapped, collared, and assigned studbook number fp1280. Genetic testing confirmed that all pups trapped in 2012 were the offspring of AM806. In mid-December, m1240 began dispersing from the Bluestem pack throughout the BRWRA. On January 21, 2013, during the annual population count, a pup was captured, collared and assigned studbook number fp1289. As of January 2013, the Bluestem pack consisted of seven animals (AF1042, mp1275, mp1277, fp1280, fp1289, one uncollared yearling, and one uncollared pup); therefore, this pack was not considered a "Breeding Pair" per the definition in the Final Rule (USFWS 1998). There were no depredations, removals, or translocations involving the Bluestem pack in 2012.

Canyon Creek pack (F1246, M1252)

In January, f1246 of the Luna pack and m1248 of the Hawks Nest pack were located together. After three months of being located together, the IFT designated f1246 and m1248 the Canyon Creek pack. In early-May, the IFT documented denning behavior in this pack. By late-May, however, F1246 and M1248 were making large movements throughout the packs territory; behavior suggestive of possible den failure or not having produced pups. In late October, two weeks after M1248 was not located, the IFT documented F1246 and M1252 traveling together. The IFT was unable to locate M1248 throughout the remainder of 2012. As of December 31, the Canyon Creek pack consisted of F1246 and M1252; therefore, this pack was not considered a "Breeding Pair" in 2012, per the definition in the Final Rule. No confirmed depredations, removals, translocations, or mortalities involving the Canyon Creek pack occurred in 2012.

Dark Canyon pack (AF923, AM992, m1293, fp1278)

In January, the Dark Canyon pack consisted of AM992, AF923, fp1250, fp1251 and one uncollared pup. Throughout the year, the IFT located the Dark Canyon pack within its traditional territory in the west-central portion of the GNF. In early May, the IFT documented denning behavior in the Dark Canyon pack. On May 19, f1250 was found dead. Necropsy results indicated the cause of death to be a gunshot wound. In July, the IFT located tracks indicating that the pack was traveling with a pup. In August, a pup was documented on a camera and on August 24, a pup was trapped, collared and assigned studbook number fp1278. In November and December, f1251 began displaying dispersal behavior and during the January 2013 helicopter operation f1251 was documented traveling with an uncollared wolf. On January 24, 2013, during the annual population count, an uncollared wolf traveling with AM992, AF923, and fp1278 was captured, collared and assigned studbook number m1293. As of January 2013, the Dark Canyon pack consisted of four animals, AM992, AF923, m1293 and fp1278; therefore, this pack was not considered a "Breeding Pair" in 2012, per the definition in the Final Rule. No confirmed depredations, removals, or translocations involving the Dark Canyon pack occurred in 2012.

Elk Horn Pack (AM1287, f1294)

During the January 2011 annual population count, f1212 of the San Mateo pack was located away from the natal pack and with an uncollared wolf. From January through October, the Elk Horn pack was located in the northwestern portion of the GNF. In April, the IFT documented denning behavior for F1212 and the uncollared wolf and were designated the Elk Horn pack. Throughout the summer and early-fall the IFT continued to document an uncollared wolf with F1212. On September 22, the IFT documented the production of one pup. On September 29, a dead cow was investigated and a depredation was assigned to either AF1212 or the adult uncollared wolf (AM1287). On October 5, AF1212 was recaptured and fitted with a new radio collar. On October 22, an uncollared adult male was captured, collared and assigned stud book number AM1287. On December 17, the Elk Horn pack was located with the Fox Mountain pack. On December 19, AF1212 was located with the Fox Mountain pack and AF1287 was located separate from this group. Throughout the remainder of 2012, the IFT located AF1212 with the Fox Mountain pack and AM1287 traveling between Arizona and New Mexico in the north-central portions of the BRWRA. During the 2013 annual population count, AF1212 was located with the Fox Mountain pack and is now considered a member of the Fox Mountain pack. AM1287 was located with an uncollared wolf; who was caught, collared and assigned stud book number f1294 on January 25. As of the January 2013 annual population count the Elk Horn pack consisted of AM1287 and f1294; therefore, the Elk Horn pack was not considered a "Breeding Pair" in 2012, per the definition in the Final Rule. No confirmed removals, translocations, or mortalities involving the Elk Horn pack occurred in 2012.

Fox Mountain pack (AM1158, AF1188, AF1212, m1276, mp1274, fp1281)

In January, the Fox Mountain pack consisted of AM1158, AF1188 and one uncollared pup. Throughout the year, the IFT located the Fox Mountain pack within the northeastern portion of the ASNF in New Mexico. On March 27, a dead cow was investigated in the vicinity of Canovas Creek outside of the BRWRA in NM. In response, the IFT initiated intensive monitoring in the area of the depredation; which was later assigned to M1158 and F1188 of the Fox Mountain pack. In mid- to late-April, the IFT documented denning behavior in the Fox Mountain pack. On April 26, a dead calf on private land outside of the BRWRA was

investigated and a depredation was assigned to M1158 and F1188 of the Fox Mountain pack. In April, the IFT intensively monitored, initiated a diversionary food cache, and hazed the Fox Mountain pack in response to the depredations. On April 27, the IFT observed an uncollared wolf with AM1158. On May 1, a dead cow (not recently dead) was investigated north of the BRWRA and a depredation was assigned to M1158 or F1188 of the Fox Mountain pack. At the end of June, the IFT documented the production of six pups. In July, remote cameras revealed at least four pups surviving. On July 27, a pup was captured, radiocollared and assigned studbook number mp1274. Within a few days, mp1274 slipped its radio collar. On August 1, a dead calf was investigated north of Jim Smith Peak on the GNF and a depredation was assigned to M1158 or F1188 of the Fox Mountain pack. On August 8, the USFWS issued a lethal removal order for AF1188. On August 10, the USFWS rescinded the lethal removal order; however, a permanent removal order was retained for AF1188. On August 14, an uncollared yearling wolf was trapped, collared and assigned studbook number m1276. On September 22, a pup was trapped and determined to be mp1274 which had previously slipped its radio collar; it was recollared and released. On September 27, m1276 was trapped and released. On October 2, a pup was trapped, collared and assigned studbook number fp1281. On October 10, AF1188 was trapped and permanently removed from the wild. Intensive monitoring of the Fox Mountain continued through the remainder of 2012. In November, the Fox Mountain pack was located outside their territory, and in the territory of the Elk Horn pack. On December 5, the IFT received a report that a trapper had caught a wolf and that the wolf had run off with the trap on its foot. On December 6, the IFT confirmed that mp1274 had a trap on its foot and that the trap appeared to have fallen off. On December 17, members of the Fox Mountain pack were located with the Elk Horn pack. On December 19, the IFT documented AF1212 of the Elk Horn pack traveling with the Fox Mountain pack and separate from AM1287 of the Elk Horn pack. On December 27, the IFT documented that mp1274 was missing a toe but did not appear compromised by the injury. On December 30, a dead cow was investigated near Hard Castle Canyon on the GNF and confirmed to be wolf killed. The depredation was later assigned to AM1158, AF1212, or m1276. During the January 2013 helicopter operation, the IFT documented AM1158, m1276 and an uncollared pup traveling with AF1212 and mp1274 traveling with fp1281. As of January 2013, the Fox Mountain pack consisted of six animals (AM1158, AF1212 (formerly of the Elk Horn pack), m1276, mp1274, fp1281, and one uncollared pup); therefore, the Fox Mountain pack was considered an "Operational Breeding Pair", a modification of the "Breeding Pair" definition adopted by USFWS in 2008. No confirmed translocations or mortalities involving the Fox Mountain pack occurred in 2012.

Hawks Nest pack (AM1038, AF1208, m1244, fp1247)

In January, the Hawks Nest pack consisted of five wolves (AM1038, F1208, mp1244, fp1247, and one uncollared pup). Throughout the year, the Hawks Nest pack was located within its traditional territory in the north-central portion of the ASNF. On March 27, fp1247 was located dead from a gunshot wound. In April, the IFT documented denning behavior in the Hawks Nest pack. In May, a food cache was established to reduce potential conflicts with livestock. In June, the IFT investigated the den site but was unable to confirm pup production. The IFT obtained a visual of AM1038 carrying a pup in his mouth; AM1038 has a non-functioning rear leg and white radio collar, making him easily recognizable. In early-October, m1244 dispersed from the Hawks Nest pack and began traveling widely through the BRWRA. On December 9, F1208 was found dead from a gunshot wound. Despite a non-functioning radio collar, the IFT documented

AM1038 alive at year-end, via its characteristic tracks, in the packs traditional territory. As of January 2013, the Hawks Nest pack consisted of AM1038; therefore, this pack was not considered a "Breeding Pair" per the definition in the Final Rule. There were no confirmed depredations, removals, or translocations involving the Hawks Nest pack in 2012. Since AM1038's radio collar is non-functioning, and no other collared wolves remain in the packs territory, the IFT no longer considers the Hawks Nest pack to be a viable pack. If the IFT re-captures AM1038 or other uncollared wolves utilizing the Hawks Nest pack traditional territory the pack may again be considered viable.

Luna pack (AF1115, AM1155, mp1284, mp1285, mp1286)

Throughout the year, the IFT located the Luna pack within its traditional territory in the north-central portion of the GNF. In January, the Luna pack consisted of AF1115, f1246, mp1241, two uncollared yearlings and four uncollared pups. On January 4, a dead calf in the vicinity of Y Canyon on the GNF was investigated and a depredation was assigned to mp1241. On January 9, the IFT located M1155 with the Luna pack. During the January 2012 annual population count, f1246 was documented traveling with m1248 and mp1241 was located alone. Following the 2012 population count, the IFT never located f1246 or mp1241 with AF1115. One uncollared wolf, however, continued to be documented with AF1115 and M1155. On March 5, a dead calf near Collins Park in the central GNF was investigated and a depredation was assigned to an uncollared yearling of the Luna pack. After having not been located with its pack for three months, in late-March, mp1241 was considered a single wolf. On April 9, M1155 was officially considered part of the Luna pack. In late-April, the IFT documented denning behavior in the Luna pack. On May 21, a dead calf was investigated near Cox Canyon in the GNF and a depredation was assigned to M1155. On July 9, a dead calf was investigated near Cox Canyon in the GNF and a depredation was assigned to a member of the Luna pack. On July 21, the IFT documented the production of 3 pups; and continued to document an uncollared wolf travelling with AM1155 and AF1115. On July 22, AM1155 was trapped and fitted with a new radio collar. On October 18, a pup was trapped, collared and assigned studbook number mp1284. On October 20, a pup was trapped, collared and assigned studbook number mp1285. On October 21, a pup was trapped, collared and assigned studbook number mp1286. As of December 31, the Luna pack consisted of five animals (AF1115, AM1155, mp1284, mp1285 and mp1286); therefore, this pack was considered a "Breeding Pair" in 2012, per the definition in the Final Rule. No confirmed removals, translocations, or mortalities involving the Luna pack occurred in 2012.

Maverick pack (AM1183, mp1290, fp1291)

In January, the Maverick pack was considered a FAIR pack; therefore, initial pack numbers are withheld from this report. Throughout the beginning of the year, the Maverick pack was located within their traditional territory on the FAIR. In June, the Maverick pack began to travel between the ASNF and the FAIR; spending proportionally more time on the ASNF. Despite repeated attempts, the IFT was unable to trap members of the Maverick pack in the late summer and fall. On August 23, the IFT documented three adult sized wolves and the survival of at least three pups on the ASNF. On August 28, a dead calf was investigated and a depredation incident was assigned to AM1183. Throughout the remainder of the year, the Maverick pack was primarily located east of their traditional territory on the FAIR, occupying areas further into the ASNF. In January 2013, during the annual population count, two pups were captured, collared, and assigned studbook numbers mp1290 and fp1291. As of January 2013, the Maverick pack

consisted of five wolves (AM1183, mp1290, fp1291, one uncollared adult believed to be the alpha female, and one uncollared pup). Therefore, the Maverick pack was considered a "Breeding Pair" per the definition in the Final Rule. No confirmed removals, translocations, or mortalities involving the Maverick pack occurred in 2012.

Middle Fork pack (AM871, AF861)

In January, the Middle Fork pack consisted of AM871, AF861 and four uncollared pups. Throughout the year, the Middle Fork pack was located within their traditional territory in the central portion of the GNF and Gila Wilderness. On February 26, an injured cow was investigated near the Gila Wilderness on private land and a depredation was assigned to either AM871 or AF861 of the Middle Fork pack. In early May, the IFT documented denning behavior in the Middle Fork pack. In July, the IFT documented four yearlings with the Middle Fork pack. Despite efforts, the IFT was unable to document pup production in the Middle Fork pack. During the January 2013 annual population count, the Middle Fork pack consisted of AM871 and AF861; therefore, the Middle Fork pack was not considered a "Breeding Pair" per the definition in the Final Rule. No confirmed removals, translocations, or mortalities involving the Middle Fork pack occurred in 2012.

Paradise pack (AM795, AF1056, m1243, m1245)

In January, the Paradise Pack consisted of AF1056, AM795, mp1243, mp1245 and one uncollared pup. The uncollared animal was not documented after January 2012. Throughout the year, the Paradise pack occupied their traditional territory in the northern portions of the ASNF and FAIR. During April and May, the IFT initiated intensive efforts to haze and monitor the Paradise pack as they were frequently located in the vicinity of cattle. On April 24, a dead cow was investigated and a depredation was assigned to AF1056, AM795 and m1243. The IFT increased their hazing efforts following the depredation and over the next week the pack moved out of the area. The IFT did not document denning behavior in the Paradise pack during 2012. In early May, the Paradise pack moved on to the FAIR. This pack spent the summer traveling between the ASNF and the FAIR. In November and December, m1243 and m1245 dispersed into the BRWRA in New Mexico. As of December 31, the Paradise pack consisted of 2 animals, AM795 and AF1056; therefore, the Paradise pack was not considered a "Breeding Pair" per the definition in the Final Rule (USFWS 1998). There was one confirmed depredation and no mortalities, removals, or translocations involving the Paradise pack in 2012.

Rim (AF858, AM1107)

In January, the Rim pack consisted of AM1107 and AF858. Throughout the year, the Rim pack occupied their traditional territory in the central portion of the ASNF. On January 26, AM1107 was captured during the 2012 annual population count and fitted with a new radio collar. Locations the following day indicated that AM1107 had regrouped with AF858. In early May, the IFT documented denning behavior. However, on May 26, investigation of the den site suggested the den was abandoned and that no pups were produced. Throughout the remainder of the year the Rim pack did not exhibit behavior consistent with having produced pups. As of December 31, 2012, the Rim pack was composed of AM1107 and AF858; therefore, this pack was not considered a "Breeding Pair" per the definition in the Final Rule. No depredations, mortalities, translocations or removals involving the Rim pack occurred in 2012.

San Mateo pack (AF903, AM1157, m1249, mp1282, fp1292)
In January, the San Mateo pack consisted of AF903, AM1157, mp1249 and one uncollared pup. Throughout the year the San Mateo pack was located within it traditional territory in the north-central portion of the GNF. In early-May, the IFT documented denning behavior in the San Mateo pack. On August 12, the IFT documented an uncollared yearling and the production of 4 pups with the San Mateo pack. On October 8, a pup was trapped, collared and assigned studbook number mp1282. On January 23, during the 2013 annual population count, a pup was captured, collared and assigned studbook number fp1292. As of January 2013, the San Mateo pack consisted of 8 animals (AF903, AM1157, m1249, mp1282, fp1292, two uncollared pups, and one uncollared yearling); therefore, this pack was considered a "Breeding Pair" per the definition in the Final Rule. No confirmed removals, depredations, translocations, or mortalities involving the San Mateo pack occurred in 2012.

Willow Springs pack (M1185, F1279)
In January, the Willow Springs pack consisted of M1185 and an uncollared female wolf. Throughout the year the Willow Springs pack was located in the north-central portion of the GNF. In late-April, the IFT documented denning behavior in the Willow Springs pack. On September 15, the female wolf was captured, collared and assigned studbook number F1279. Despite efforts, the IFT was unable to document pup production in the Willow Springs pack. As of December 31, the Willow Springs pack consisted of M1185 and F1279; therefore, the Willow Springs pack was not considered a "Breeding Pair" in 2012 per the Final Rule definition. No confirmed depredations, removals, translocations, or mortalities involving the Willow Springs pack occurred in 2012.

8. Individual Wolf Summaries

m1241
In late December 2011, mp1241 of the Luna pack began displaying dispersal behavior and was not located with the natal pack; therefore, mp1241 was considered a single wolf in March 2012. On January 4, 2012, a dead calf in the vicinity of Y Canyon on the GNF was investigated and a depredation was assigned to mp1241, a dispersing Luna pack member. mp1241 was last located by the IFT in late-February, and in late-May was considered fate unknown.

M1252
From January through October, 2012, M1252 was dispersing throughout the BRWRA. In late-October, M1252 was located with F1246 of the Canyon Creek pack. M1252 was located with F1246 for the remainder of 2012 and is now considered a member of the Canyon Creek pack. No removals, translocations, or depredations involving M1252 occurred in 2012.

Appendix B. Summary of sighting reports received from the public from January 1 through December 31, 2012.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
# AZ Reports	**5**	**6**	**2**	**1**	**4**	**2**	**2**	**5**	**4**	**7**	**3**	**3**	**44**
Known Wolf Reports	1	0	0	0	0	0	0	1	1	1	1	0	**5**
Unknown/Uncollared Reports	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Non-wolf Reports	3	4	1	0	3	1	2	2	3	3	0	2	**24**
Probable Wolf Reports	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Not Enough Information	1	2	0	1	1	1	0	2	0	3	2	1	**14**
# NM Reports	**0**	**3**	**1**	**0**	**0**	**1**	**0**	**2**	**5**	**1**	**6**	**2**	**21**
Known Wolf Reports	0	0	0	0	0	0	0	0	0	0	1	1	**2**
Unknown/Uncollared Reports	0	1	0	0	0	0	0	1	0	0	0	0	**2**
Non-wolf Reports	0	1	1	0	0	0	0	1	2	0	2	1	**8**
Probable Wolf Reports	0	0	1	0	0	0	0	0	0	0	0	0	**1**
Not Enough Information	0	0	0	0	0	1	0	0	3	1	3	0	**8**
Total Sightings per Month	**5**	**9**	**3**	**1**	**4**	**3**	**2**	**7**	**9**	**8**	**9**	**5**	**65**

9. Personnel

Arizona Game and Fish Department
Chris Bagnoli, Field Team Leader
Jeff Dolphin, Wolf Biologist
Beth Wojcik, Wolf Technician
Quinn Harrison, Wolf Technician
Allison Greenleaf, Wolf Technician
Mike Godwin, Wildlife Manager Supervisor
Joel Weiss, Wildlife Manager
Aaron Hartzell, Wildlife Manager
Tyler Richins, Wildlife Manager
Jason Capps, Wildlife Manager
Dave Cagle, Wildlife Program Manager
John Hervert, Wildlife Program Manager
Bill David, Chief Pilot
Basil Coffman, Pilot
Pete Applegate, Pilot
Steve Sunde, Pilot
Steve Dubois, Pilot

New Mexico Department of Game and Fish
Agency cooperation ceased July 1, 2011; however, District officers remain involved in law enforcement issues.
Bobby Griego, Colonel - Field Operations Division
K.C. Gehrt, District Officer
Amos Smith, District Officer
Mike Matthews, District Supervisor
Andrew Teaschner, District Officer
Derek Theobald, District Officer
Justin Winter, District Officer
Matt Pengelly, District Officer

USDA-APHIS Wildlife Services
Sterling Simpson, Field Team Leader/Wolf Management Specialist
Bill Nelson, Wolf Depredation Specialist
Armando Orona, Wolf Management Specialist
Chris Carrillo, District Supervisor
Keel Price, District Supervisor
Mike Kelly, Wildlife Biological Science Technician
Jedediah Murphy, Wildlife Biological Science Technician

U.S. Forest Service
Cathy Taylor – Forest Service Liaison to the Wolf Project

U.S. Fish and Wildlife Service
Sherry Barrett, Mexican Wolf Recovery Coordinator
Maggie Dwire, Assistant Mexican Wolf Recovery Coordinator
Elizabeth Jozwiak, Interagency Field Projects Coordinator
John Oakleaf, Senior Wolf Biologist
Melissa Kreutzian, Fish and Wildlife Biologist
Colby Gardner, Fish and Wildlife Biologist
Susan Dicks, Fish and Wildlife Biologist
Janess Vartanian, Wildlife Biologist
Dewey Wesley, Biological Technician
Peter Fitzpatrick, Biological Technician

USFWS Interns
Trevor Smith
Brent Wolf
Jonathon Fournier
Graham Goodman
Kaija Klauder
Ben Betterly
Crissy Guimaraes
Lily Glidden
Anthony Saner
Melissa Ruszczyk
Adair McNear
Sara Eno
Rob Wise
Aaron Koehlinger

White Mountain Apache Tribe
Deon Hinton, Wolf Technician
Ivan Kasey, Wolf Technician
Bobby Tobin, Wolf Technician

Project Veterinarians
Dr. Ole Alcumbrac
Dr. Susan Dicks

Mexican wolf associated with the Luna pack.
US Fish and Wildlife Service photo.

Addendum to the 2012 Mexican wolf Annual Progress Report

The following addendum addresses population information documented by Wolf Project staff following the publication of the 2012 minimum population estimate and the 2012 annual report. Information in the addendum supersedes relevant portions of the 2012 Mexican wolf Annual Progress Report, including information in Table 1. Status of Mexican wolf packs in Arizona and New Mexico, as of December 31, 2012; and information found in Appendix A. 2012 Pack and Single Wolf Summaries.

Fox Mountain

At the end of 2012, the IFT documented the Fox Mountain pack to consist of a minimum of six wolves, AM1158, AF1212, mp1274, m1276, fp1281 and one uncollared pup (2012 Annual Report Table 1). In March 2013, an uncollared pup was captured and assigned studbook number f1295. During summer 2013, photographic evidence documented the existence of two uncollared yearling wolves; animals that were born during 2012. With the addition of this new information, the Fox Mountain pack is now known to have consisted of a minimum of 8 wolves at the end of 2012, the alpha pair, one yearling and five pups.

Luna

At the end of 2012, the IFT documented the Luna pack to consist of a minimum of five wolves, AM1155, AF1115, mp1284, mp1285, and mp1286 (2012 Annual Report Table 1). During a review of photographic evidence from November 2012, the IFT determined a female yearling wolf was missed in the 2012 population count and during December 2013 a male wolf, m1337, was captured and determined to have been a Luna pack animal born in 2012. With the addition of this new information, the Luna pack is now known to have consisted of a minimum of seven wolves at the end of 2012, the alpha pair, one yearling and four pups.

San Mateo

At the end of 2012, the IFT documented the San Mateo pack to consist of a minimum of eight wolves, AM1157, AF903, m1279, mp1282, fp1292, and three uncollared wolves.(2012 Annual Report Table 1). During the summer of 2013, IFT personnel observed an additional uncollared wolf with the San Mateo pack. The IFT was not able to determine if the additional animal would have been a pup or yearling in 2012. With the addition of this new information, the San Mateo pack is now known to have consisted of a minimum of nine wolves at the end of 2012, the alpha pair, one yearling, four pups, and an uncollared wolf of unknown age.

Additional population data documented in 2013 pertaining to the 2012 end of year count represents a 6% increase over the 2012 end of the year minimum estimate. The IFT documented an increase of five wolves in the Blue Range Wolf Population; none of the new findings affected breeding pair status. Data represented in **red** indicates changes from the original 2012 minimum population estimate. Wolf packs and individual wolves are represented in **red**, if they have associated addendum information. *Please see 2012 Annual Report Table 1 for original 2012 minimum population estimate numbers.*

Table 1. Status of Mexican wolf packs in Arizona and New Mexico, as of December 31, 2012.

Pack	Wolf ID	Reproduction[a] 2012 Addendum	Pups at Year End[b] 2012 Addendum	No. Collared 2012 Addendum	No. Uncollared 2012 Addendum	Min. pack Size[c] 2012 Addendum
Bluestem, AZ	AM806[e], AF1042, mp1275, mp1277, fp1280, fp1289	5	5	5	2	7
Canyon Creek, NM	F1246, M1248[k], M1252[h]	0	0	2	0	2
Dark Canyon, NM	AM992, AF923, f1250[e], fp1278, m1293	1	1	4	0	4
Elk Horn, NM	AM1287, f1294	1	0	2	0	2
Fox Mountain, NM**	**AM1158, AF1188[g], AF1212[h],m1276, mp1274, fp1281**	6	**5**	5	**3**	**8**
Hawks Nest, AZ	AM1038 [j], F1208[e], f1247[e]	1	0	0	1	1
Luna, NM*	**AF1115, AM1155, mp1284, mp1285, mp1286**	**4**	**4**	5	**2**	**7**
Maverick, AZ*	AM1183, mp1290, fp1291	5	3	3	2	5
Middle Fork, NM	AM871, AF861	0	0	2	0	2
Paradise, AZ	AM795, AF1056	0	0	2	0	2
Rim, AZ	AM1107, AF858	0	0	2	0	2
San Mateo, NM*	**AM1157, AF903, m1249, mp1282, fp1292**	4	4	5	**4**	**9**
Willow Springs, NM	M1185, F1279	0	0	2	0	2
Radio collared wolf, AZ	m1240[i]	0	0	1	0	1
Radio collared wolf, AZ	m1244[i]	0	0	1	0	1
Radio collared wolf, NM	m1241[f]	0	0	0	0	0
Radio collared wolf, NM	m1243[i]	0	0	1	0	1
Radio collared wolf, NM	m1245[i]	0	0	1	0	1
Radio collared wolf, NM	f1251[i]	0	0	1	1	2
Steeple Creek, AZ	Uncollared wolves	0	0	0	2	2
Greens Peak, AZ	Uncollared wolf	0	0	0	1	1
Indian Peaks, NM	Uncollared wolf	0	0	0	1	1
Malpais, NM	Uncollared wolf	0	0	0	1	1
Datil, NM	Uncollared wolf	0	0	0	1	1
FAIR	Uncollared wolves	N/A[d]	N/A[d]	N/A[d]	N/A[d]	N/A[d]
SCAR	Uncollared wolves	N/A[d]	N/A[d]	N/A[d]	N/A[d]	N/A[d]
Totals[l]		**29**	**23**	**47**	**33**	**80**

[a] Reproduction-maximum number of pups documented in 2012.
[b] Pups at year end documented surviving until December 31, 2012.
[c] Min pack size-total number of wolves (collared, uncollared, pups) documented at year end.
[d] Wolf numbers on FAIR and SCAR are not displayed at the request of the tribes.
[e] Died during 2012.
[f] Fate unknown during 2012.
[g] Permanently removed from wild during 2012.
[h] Dispersed to join existing pack.
[i] Dispersed off and on throughout fall and/or winter; counted as single in table.
[j] Telemetry collar not functioning, counted as uncollared in table.
[K] Wolf last located October 9, 2012
[l] Totals include wolves occurring on FAIR and SCAR..
** A pack that meets the definition of an *operational breeding pair*.
*A pack that meets the definition of a breeding pair per the final rule.