

MEXICAN WOLF RECOVERY PROGRAM



A Mexican wolf pup is given a health check at a 2022 foster event. Credit: Mexican Wolf Interagency Field Team

PROGRESS REPORT # 25

PREPARED BY: U.S. FISH AND WILDLIFE SERVICE

COOPERATORS: ARIZONA GAME AND FISH DEPARTMENT, NEW MEXICO DEPARTMENT OF GAME AND FISH, USDA-APHIS WILDLIFE SERVICES, U.S. FOREST SERVICE, AND WHITE MOUNTAIN APACHE TRIBE

Mexican Wolf Recovery Program

PROGRESS REPORT #25

Reporting period: January 1-December 31, 2022

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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 of 1973, as amended (Act). The Mexican Wolf Recovery Program has two interrelated components: 1) Recovery – includes aspects of the program administered by the Service with assistance from partner agencies that pertain to the overall goal of Mexican wolf recovery and delisting from the list of threatened and endangered species, and 2) Monitoring and Management – includes aspects of the program implemented by the Service and cooperating States, Tribes, other Federal agencies, and counties that pertain to the monitoring and management of the reintroduced Mexican wolf population in the Mexican Wolf Experimental Population Area (MWEPA). This report provides details on both aspects of the Mexican Wolf Recovery Program. The reporting period for this progress report is January 1-December 31, 2022.

BACKGROUND

The Mexican wolf is listed as endangered under the Act in the southwestern United States and Mexico (80 FR 2488-2512, January 16, 2015). It is the smallest, rarest, southernmost occurring, and most genetically distinct subspecies of the North American gray wolf (*Canis lupus*).

Mexican wolves were extirpated in the wild in the southwestern United States by 1970, following several decades of private and governmental efforts to reduce predator populations due to conflict with livestock. Recovery efforts for the Mexican wolf began in 1976 with its listing as an endangered species. In the late 1970s and early 1980s, the initiation of a binational captive breeding program originating from seven wolves prevented the extinction of the Mexican wolf.

As recommended in the Mexican Wolf Recovery Plan, Second Revision (Service 2022) (Recovery Plan), recovery efforts for the Mexican wolf focus on the reestablishment of two Mexican wolf populations in the wild, one in the United States and one in Mexico, and on maintenance of the captive breeding population. Mexican wolves were first released to the wild in the United States in 1998. In Mexico, Mexican federal agencies initiated a reintroduction effort in 2011 pursuant to Mexico's federal laws and regulations.

Today, the wild population in the United States is managed and monitored by an Interagency Field Team (IFT) comprised of staff from the Service, Arizona Game and Fish Department (AZGFD), New Mexico Department of Game and Fish (NMDGF), White Mountain Apache Tribe (WMAT), U.S. Forest Service, and U.S. Department of Agriculture-Wildlife Services (USDA-WS).

PART A: RECOVERY ADMINISTRATION

1. MEXICAN WOLF CAPTIVE BREEDING PROGRAM

a. Mexican Wolf Species Survival Plan

The Mexican Wolf Species Survival Plan (SSP) is a binational captive breeding program between the United States and Mexico for the Mexican wolf. The SSP mission is to reestablish the Mexican wolf in the wild through captive breeding, public education, and research. While Mexican wolves are maintained in numerous captive facilities in both countries, they are managed as a single population. SSP member institutions routinely transfer Mexican wolves among participating facilities for breeding to promote genetic exchange and maintain the health and genetic diversity of the captive population. Wolves in these facilities are managed in accordance with a Service-approved standard protocol. Without the SSP, recovery of the Mexican wolf would not have been possible.



*Mexican wolf m1888 recovers after surgery at the Albuquerque BioPark veterinary clinic.
Credit: Courtesy of ABQ BioPark.*

This year, the SSP's binational meeting to plan and coordinate wolf breeding, transfers, and related activities among facilities was held virtually. The meeting included updates on the reintroduced populations in the US and Mexico, discussion on gamete banking needs, evaluation and selection of release candidates for both the United States and Mexico, and reports on research including advances in gamete banking, contraception and assisted reproductive technologies, and progress toward a lifetime reproductive plan for wolves to maximize an individual's potential to contribute to the population.

As of July 2022, the SSP population includes 366 Mexican wolves managed in approximately 57

facilities in the United States and Mexico. The SSP goal is to house a minimum of 240 wolves, with a target population size of 300, to ensure the security of the subspecies in captivity and produce animals for reintroduction.

The SSP population has served as the sole source population to reestablish the subspecies in the wild. Mexican wolves released to the wild from the SSP population also serve a critically important role in improving the gene diversity of the wild population. Wolves that are considered genetically well-represented in the SSP population may be designated for release. Suitable release candidates are determined based on criteria such as genetic makeup, reproductive performance, behavior, and physical suitability. We perform analyses to ensure the released wolves are beneficial to the genetic diversity of the wild population while minimizing adverse effects to the genetic integrity of the captive population if wolves released to the wild do not survive. Since 2016, the Service and its partners have focused on fostering as the primary release method in the United States. While much consideration is given to breeding captive wolves that will produce pups that genetically benefit the wild population, the selection of pups to use in fostering efforts is ultimately determined by timing and synchrony of wild and captive litters. See below (page 25; releases and translocations) for more discussion on fostering.

b. Mexican Wolf Pre-Release Facilities

Prior to release to the wild, Mexican wolves are acclimated in captive facilities designed to house wolves in a manner that fosters wild behaviors (e.g., increasing natural fear of human presence, and acclimation to an intermittent, unpredictable feeding regimen). The Service oversees the management at the Ladder Ranch and Sevilleta Wolf Management Facilities, located in New Mexico. At these facilities, wolves are managed with minimal exposure to humans in order to minimize habituation to humans and maximize pair bonding, breeding, pup rearing, and healthy pack structure development. These facilities have been successful in breeding wolves for release (including pups for fostering) 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 fed carnivore logs and a zoo-based exotic canine diet formulated for wild canids. In addition, we supplement their diet with carcasses of road-killed ungulate species, such as deer and elk, and scraps (meat, organs, hides, and bones) from local game processors from wild game/prey species only. Release candidates are given annual examinations to vaccinate for canine diseases (e.g., parvo, adeno2, parainfluenza, 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

The Sevilleta Wolf Management Facility (Sevilleta) is located on the Sevilleta National Wildlife Refuge near Socorro, New Mexico and is managed 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. National Wildlife Refuge staff assist Mexican Wolf Recovery Program staff in the maintenance and administration of the wolf pens.

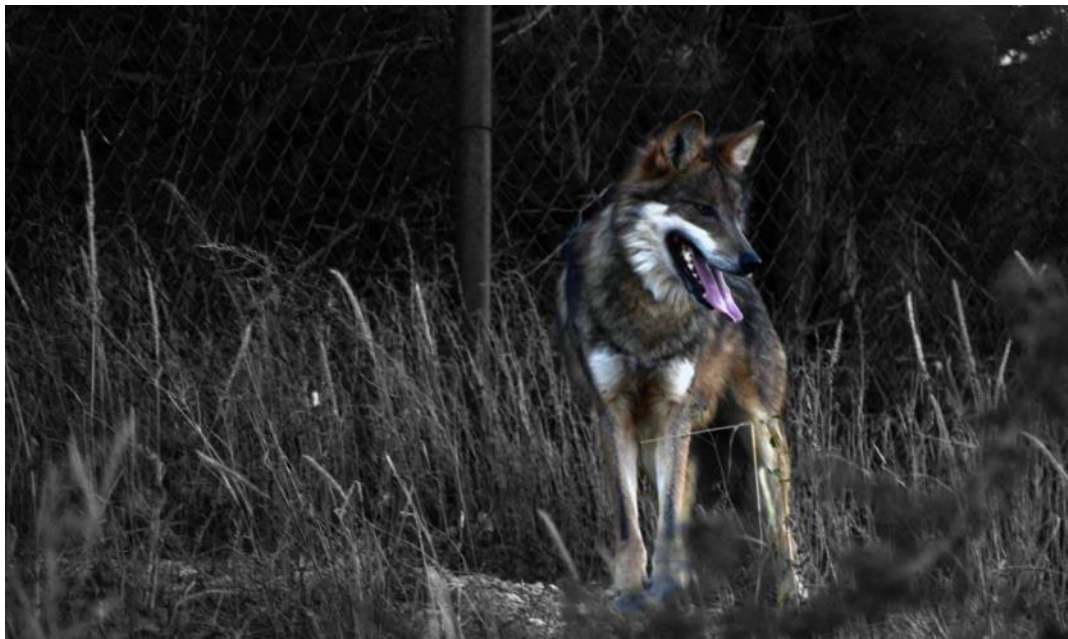
Twenty-two Mexican wolves were housed at the Sevilleta during 2022. These wolves were

maintained in various social groups including adults with pups, breeding pairs, sibling groups, and single wolves. The wolves housed at the Sevilleta contributed to all three Mexican wolf populations managed for recovery. Twenty-one percent of management activities supported recovery efforts in the United States by housing wolves for release in the MWEPA (foster pups), and housing wolves removed from the MWEPA. Sixty-one percent of management activities supported the Mexican Wolf SSP's mission of maintaining Mexican wolves in captivity to support recovery efforts. Eighteen percent of management activities supported recovery efforts in Mexico by preparing wolves for direct release into the Sierra Madre Occidental Mountains (SMOCC) in Mexico.

Ladder Ranch Wolf Management Facility

The Ladder Ranch Wolf Management Facility (Ladder Ranch), owned by R. E. Turner, is located on the Ladder Ranch near Truth or Consequences, New Mexico. The facility consists of five enclosures, ranging in size of 0.3 acre to approximately 0.70 acre. The caretaking of wolves at the facility is carried out by an employee of the Turner Endangered Species Fund, though the facility is managed and supported financially by the Service.

Sixteen Mexican wolves were housed at the Ladder Ranch during 2022. These wolves were maintained in various social groups including adult pairs, sibling and yearling groups, and single wolves. These wolves contributed to all three Mexican wolf populations managed for recovery. Four percent of management activities supported recovery efforts in the United States by housing wolves removed from the MWEPA. Fifty-six percent of management activities supported the Mexican Wolf SSP's mission of maintaining Mexican wolves in captivity to support recovery efforts. Forty percent of management activities supported recovery efforts in Mexico by preparing wolves for direct release into the SMOCC in Mexico.



A Mexican wolf stands inside an enclosure at the Ladder Ranch Wolf Management Facility. Credit: U.S. Fish and Wildlife Service.

2. RECOVERY PLAN IMPLEMENTATION / PROGRESS TOWARD RECOVERY

The Recovery Plan provides downlisting and delisting criteria for the Mexican wolf, as well as recovery actions that, if implemented, will achieve the criteria (Service 2022, pp. 19-21, 29-35). To assist the Service and our partners in the implementation of the Recovery Plan, we developed a Recovery Implementation Strategy (RIS) <https://www.fws.gov/library/collections/mexican-wolf-recovery-planning-documents>. We intend to update the RIS as needed during recovery.

In 2022, we implemented a number of recovery actions associated with the objectives in the RIS; including: survey and monitor Mexican wolves to determine population status including Mexican wolves on the Fort Apache Indian Reservation and San Carlos Apache Reservation; reduce Mexican wolf- livestock conflicts; develop plans for and implement releases (via fostering) and translocation of Mexican wolves; monitor the genetic health of the population; and, manage the captive breeding/SSP population. See Part B of this report for more detail on these activities as they pertain to management of the Mexican wolves in the MWEPA.

Recognizing the challenges inherent in Mexican wolf recovery, the Recovery Plan recommends progress evaluations at five and ten years into plan implementation to ensure the recovery strategy and actions are effective (Service 2022, pg. 27-28). For the five-year evaluation, the Recovery Plan provides the following demographic and genetic benchmarks:

- 145 wolves in the United States and 100 wolves in Mexico; and
- a sufficient number of wolves have been released or translocated to result in 9 released animals surviving to breeding age in the United States, and 25 released animals surviving to breeding age in Mexico.

We will conduct the five-year evaluation in 2023 and 2024, using data through 2022, inclusive of the 2022 year-end annual population count. Because we will conduct a portion of the 2022 annual population count in early 2023, we will complete the evaluation six years after finalization of the Recovery Plan. As of this annual report, the minimum population is 242 Mexican wolves and 13 released or translocated wolves have survived to breeding age to count toward the genetic recovery criteria. Also as of this annual report, the estimated population in Mexico is 20 Mexican wolves and nine released or translocated wolves have survived to breeding age to count toward the genetic recovery criteria.

3. SUMMARY OF LITIGATION

Plaintiffs: Center for Biological Diversity; Defenders of Wildlife

Defendants: Secretary of the Interior; US Fish and Wildlife Service

Intervenors: State of Arizona (Defendant)

Allegation: (APA) Violations of NEPA in revising the 10(j) Rule and issuance of associated 10(a)(1)(A) permit

Date NOI Filed: No NOI Filed on alleged APA violations; 1/16/15 NOI pertaining to 10(a)(1)(A) permit

Date Complaint Filed: 1/16/15; amended complaint filed 3/23/15

Case Number/Court: 4:15-cv-00019-LAB (D. Ariz.)

Status: The Court entered Judgment in accordance with its 3/31/18 Order remanding the 10(j) Rule. On 4/28/21, the Court granted Plaintiff's motion to modify the deadline for completion of the remand stating the Service shall issue a final, revised 10(j) rule by July 1, 2022. A final, revised 10(j) rule was published in the Federal Register on July 1, 2022.

Plaintiffs: Center for Biological Diversity; WildEarth Guardians

Defendants: Secretary of the Interior; US Fish and Wildlife Service

Allegation: APA Violations, NEPA Violations and ESA violations in revising the 10(j) Rule and issuance of associated 10(a)(1)(A) permit

Date NOI Filed: WildEarth Guardians 7/1/22 NOI; CBD 8/5/22 NOI, No NOI Filed on alleged APA or NEPA violations.

Date Complaints Filed: 7/12/22 CBD filed its complaint, amended in October 2022 to add ESA claims; 10/3/22 WEG Complaint;

Case Numbers: No. CV-22-00303-TUC-JAS No. CV-22-00453-TUC-JAS 4:15-cv-00019-LAB (D. Ariz.)

Status: Court consolidated the two cases on 10/30/22. The United States has answered both complaints. On January 19, 2023, the Court issued a scheduling order setting forth the schedule for the case.

Plaintiffs: AZ and NM Coalition of Counties for Stable Economic Growth et al (18 plaintiffs)

Allegation: Violations of APA, NEPA, Regulatory Flex Act. E.O. 12898 in implementing the Record of Decision/FEIS and 2015 10(j) Rule

Defendants: US Fish and Wildlife Service; Secretary of the Interior; Dan Ashe; Benjamin Tuggle

Intervenors: None

Date NOI Filed: No NOI filed

Date Complaint Filed: 2/12/15

Case Number/Court: 4:15-cv-00179-FRZ (D. Ariz.)

Status: Consolidated with District of Arizona case 4:15-cv-00019-JGZ

Plaintiffs: Wild Earth Guardians; New Mexico Wilderness Alliance; Friends of Animals

Defendants: Director of the US Fish and Wildlife Service; Secretary of the Interior

Intervenors: None

Allegation: Violation of ESA for not considering essential status for Mexican wolves; Violation of NEPA for not assessing revisions to final rule

Date NOI Filed: 3/24/15

Date Complaint Filed: 7/2/15

Case Number/Court: 4:15-cv-00285-JGZ (D. Ariz.)

Status: Consolidated with District of Arizona case 4:15-cv-00019-JGZ

Plaintiffs: Safari Club International

Defendants: Secretary of the Interior; US Fish and Wildlife Service

Intervenors: Center for Biological Diversity, Defenders of Wildlife (Defendants)

Allegation: Violations of ESA, APA, and NEPA promulgating the 2015 10(j) Rule and FEIS/ROD

Date NOI Filed: 8/3/15

Date Complaint Filed: 10/16/15

Case Number/Court: 4:16-cv-00094-JGZ (D. Ariz.)

Status: The Court entered Judgement in accordance with its 3/31/18 Order remanding the 10(j) Rule. On 4/28/21, the Court granted Plaintiff's motion to modify the deadline for completion of the remand stating the Service shall issue a final, revised 10(j) rule by July 1, 2022. A final, revised 10(j) rule was published in the Federal Register on July 1, 2022.

Plaintiffs: Center for Biological Diversity, Defenders of Wildlife, the Endangered Wolf Center, David R. Parsons, the Wolf Conservation Center, WildEarth Guardians, Western Watersheds

Defendants: Secretary of the Interior, US Fish and Wildlife Service, Amy Lueders

Intervenors: New Mexico Department of Game and Fish

Allegation: Violations of ESA and APA regarding the adequacy of the 2017 Mexican wolf Recovery Plan

Date NOI Filed: 11/29/17

Date Complaint Filed: 1/30/18

Case Number: Ninth Circuit, Nos. 22-15029 & 22-15091 (appeals of 4:18-cv-00047-BGM and 4:18-cv-00048-JGZ (D. Ariz.))

Status: District Court of Arizona issued 10/14/21 Order remanding the recovery plan to the Service stating the Service shall produce a draft recovery plan within six months that includes site-specific management activities and a final plan six months thereafter. The Plaintiffs' appealed to the Ninth Circuit Court of Appeals; the United States did not appeal. A draft revised recovery plan was published in January 2022 and a final revised recovery plan was published in September 2022. The U.S. Department of Justice filed a motion to dismiss this case on 11/18/22. The motion to dismiss was dismissed without prejudice to allow the Ninth Circuit panel to address it when the panel addresses the full case. Oral argument is scheduled for June 5, 2023, in San Francisco.

4. MEXICAN WOLF EXPERIMENTAL POPULATION AREA MANAGEMENT STRUCTURE

The Memorandum of Understanding (MOU) that guides the reintroduction and management of the Mexican wolf population in the MWEPA was revised in 2019 to address the provisions of the revised 2015 10(j) Rule and 2017 Mexican Wolf Recovery Plan, First Revision. Signatories of this MOU included the Arizona Game and Fish Department, Bureau of Land Management, National Park Service, New Mexico Department of Game and Fish, US Department of Agriculture-Forest Service, US Department of Agriculture-Wildlife Services, White Mountain Apache Tribe, and the Service, as well as the cooperating counties of Gila, Graham, Greenlee, and Navajo in Arizona, Catron County and Sierra County in New Mexico, and the Eastern Arizona Counties Organization (EACO). A copy of this MOU can be found at <https://www.fws.gov/program/conserving-mexican-wolf/library>.

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 MWEPA. The 2022 report is included as PART B of this document. Mexican Wolf Recovery Program Quarterly Updates are available at <https://www.fws.gov/program/conserving-mexican-wolf/library> or you may sign up to receive them electronically by visiting <https://www.azgfd.com/> and clicking on the subscribe button at the bottom of the page. Additional information about the management of Mexican wolves can be found on the Service's web page at: <https://www.fws.gov/program/conserving-mexican-wolf> or AZGFD's web page at: <https://www.azgfd.com/wildlife-conservation/conservation-and-endangered-species-programs/mexican-wolf-management/>.

5. COOPERATIVE AGREEMENTS

In 2022, the Service funded cooperative or grant agreements with AZGFD, The Cincinnati Zoo, Turner Endangered Species Fund (TESF), University of Idaho, University of New Mexico, and WMAT. These agreements convey funding for the monitoring and management of captive and wild Mexican wolves (AZGFD, Cincinnati Zoo, TESF, and WMAT), administration and facilitation of recovery planning and implementation efforts (Mexican Wolf Fund—when funded), and genetic analysis and preservation of biomaterials (University of Idaho and University of New Mexico). The Service also provides funding to AZGFD and NMDGF for Mexican wolf recovery through Section 6 of the Act, which requires 25 percent matching funds from each state.

Cooperator	U.S. Fish and Wildlife Service Mexican Wolf Project Funds Provided in 2022
AZGFD	\$ 240,000
Cincinnati Zoo	\$ 40,000
TESF	\$ 40,000
University of Idaho	\$ 20,000
University of New Mexico	\$ 15,000
White Mountain Apache Tribe	\$ 375,000

In addition to the above agreements, the Service also provided funding for several miscellaneous contracts for veterinary, helicopter, mule packing, and other services. For more information on Program costs to date visit <https://www.fws.gov/program/conserving-mexican-wolf/library>.

6. LIVESTOCK CONFLICT COMPENSATION PROGRAMS

There are currently two programs from which livestock producers can seek compensation for confirmed livestock losses due to predation by Mexican wolves, 1) the Livestock Indemnity Program authorized by the 2018 Farm Bill and administered by the U.S. Department of Agriculture's Farm Service Agency, and 2) the Wolf Livestock Loss Demonstration Grants authorized by the Omnibus Public Lands Management Act of 2009 (P.L. 111-11) and awarded by the Service through a competitive process to qualifying States and Tribes.

Livestock Indemnity Program

The Livestock Indemnity Program (LIP) compensates livestock producers for losses in excess of normal mortality that are due to adverse weather or attacks by animals reintroduced to the wild by the Federal Government. LIP compensation payments are equal to 75 percent of the (national) average fair market value of the livestock. For more information see <https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/livestock-indemnity/index>.

Wolf-Livestock Loss Demonstration Project Grants

The Service provides approximately \$1,000,000 annually through a competitive process to eligible states and tribes to (1) assist livestock producers in undertaking proactive, non-lethal activities to reduce the risk of livestock loss due to predation by wolves, and (2) compensation to livestock producers for livestock losses due to wolf predation. P.L. 111-11 states that funding made available should be allocated equally between the two grant purposes (compensation and prevention), and that the Federal share of the cost does not exceed 50 percent (requires a 50 percent non-Federal match).

The Wolf-Livestock Loss Demonstration Project Grants (WLDG) are applied for by AZGFD and New Mexico Department of Agriculture (NMDA) in Arizona and New Mexico, respectively. The Arizona Livestock Loss Board administers the funds received by AZGFD; the Mexican Wolf/Livestock Council assisted in administering the funds received by NMDA in 2022. The County Livestock Loss Authority will begin administering the funds received by NMDA in 2023. For more information on the Arizona Livestock Loss Board please visit <https://live-azlivestocklossboard.pantheonsite.io/>.

The following tables reflect annual WLDG amounts and disbursement of funds for associated activities. Note that these expenditures required at least a 1:1 non-Federal match.

Year	Direct Compensation for Livestock Lost - Arizona	Direct Compensation for Livestock Lost – New Mexico	Total
2011	\$5,400	\$12,781	\$18,181
2012	\$7,550	\$15,050	\$22,600
2013	\$14,581	\$13,013	\$27,594
2014	\$21,100	\$42,624	\$63,724
2015	\$33,070	\$77,133.90	\$110,203.90
2016	\$15,785	\$58,041.18	\$73,826.18
2017	\$29,880	\$29,942.50	\$59,822.5
2018	\$17,850	\$92,573.38	\$110,423.38
2019	\$99,312.37	\$185,797.46	\$285,109.83
2020	\$68,306.10	\$105,892.00	\$174,198.10
2021	\$98,016.32	\$80,931.00	\$178,947.32
2022	\$140,014.20	\$62,302	\$202,316.20

Year	Arizona Wolf/Livestock Conflict Prevention	Arizona Wolf/Livestock Pay for Presence	New Mexico Wolf/Livestock Conflict Prevention	New Mexico Wolf/Livestock Pay for Presence	Total
2011	N/A	N/A	N/A	N/A	N/A
2012	N/A	N/A	N/A	N/A	N/A
2013	N/A	\$38,000	N/A	\$47,500	\$85,500
2014	N/A	\$38,000	N/A	\$47,500	\$85,500
2015	N/A	\$51,000	N/A	\$32,300	\$83,300
2016	N/A	\$48,000	N/A	\$57,000	\$105,000
2017	\$10,000	\$50,000	N/A	\$57,000	\$117,000
2018	\$21,000	\$60,000	N/A	\$57,000	\$138,000
2019	\$156,043.80	N/A	N/A	\$57,000	\$213,043.80
2020	\$90,000.20	N/A	N/A	\$57,000	\$147,000.20
2021	\$94,500	N/A	N/A	N/A	\$94,500
2022	\$77,500	N/A	N/A	N/A	\$77,500

7. LITERATURE CITED

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- US Fish and Wildlife Service, 2014. Final Environmental Impact Statement for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf. 79 Federal Register 70154-70155.
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PART B: REINTRODUCTION

MEXICAN WOLF EXPERIMENTAL POPULATION AREA INTERAGENCY FIELD TEAM ANNUAL REPORT

Reporting period: January 1–December 31, 2022

Prepared by:

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

Participating Agencies:

Arizona Game and Fish Department (AZGFD)

New Mexico Department of Game and Fish (NMDGF)

USDA-APHIS Wildlife Services (USDA-WS)

U.S. Fish and Wildlife Service (Service)

U.S. Forest Service (USFS)

White Mountain Apache Tribe (WMAT)

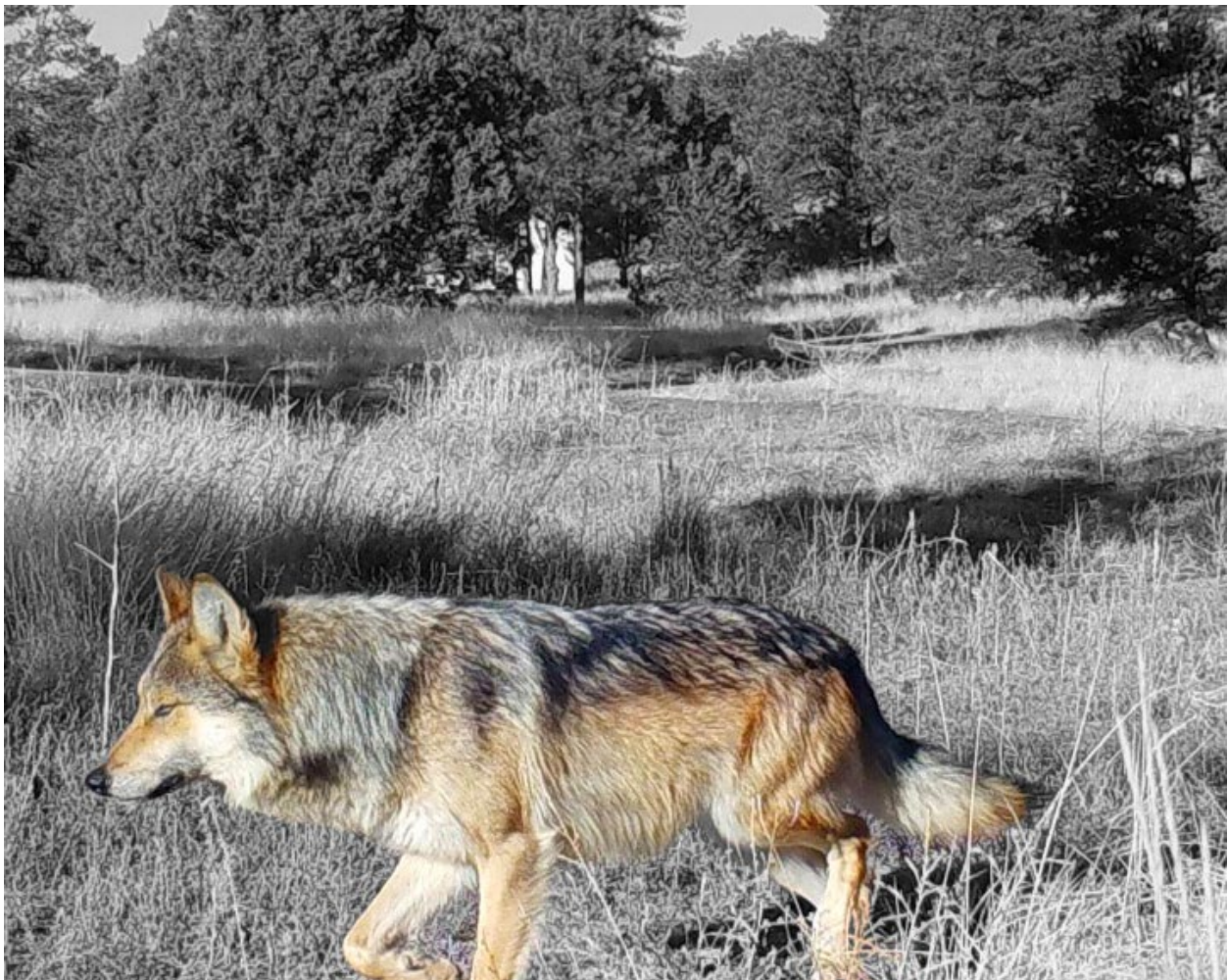
1. KEY DEVELOPMENTS

- A minimum of 242 Mexican wolves and 32 breeding pairs were documented in the Mexican Wolf Experimental Population Area (MWEPA) at the end of 2022.
- Eleven new packs and 1 new pair were documented at the end of 2022.
- Pup survival increased to 68 percent in 2022 (compared to 39 percent in 2021), with 82 pups surviving until the end of the year. The pup survival rate in 2022 was higher than the previous ten-year (2012-2021) average of 62 percent.
- Eleven genetically diverse wolf pups were fostered from captive facilities across the United States into five wild wolf dens in Arizona and New Mexico. By the end of 2022, thirteen fostered wolves (from all years) were radio-collared and known to be alive. From 2016 to the end of 2022, seven fostered wolves had been documented producing pups and a minimum of eleven different litters had been produced by foster wolves.
- A high adult survival rate (0.92) combined with the number of pups that survived to December 31, resulted in a high population growth (23 percent in 2022). Thus, the population exceeded the management objective for 2022 of a 10 percent increase in the minimum population count and/or the addition of at least two breeding pairs. The high number of pups recruited in the last two years, 56 and 82 in 2021 and 2022, respectively, contributed to the high population growth.



A member of the field team brings in a sedated wolf during the year-end population count. Credit: Mexican Wolf Interagency Field Team.

- In 2022, the overall (inclusive of all age classes) survival rate (0.89) was higher than the to the previous 10- year (2012-2021) period (0.73).
- At the end of 2022, thirteen released wolves counted toward the genetic criterion (AM1471, AF1578, F1692, AM1693, M1710, F1712, F1866, M1888, F1889, F1890, M1953, F2503, M2545). Seven of these thirteen fostered wolves produced pups in 2022 (AM1471, AF1578, AM1693, AF1712, F1866, AF1890, AF2503).
- The 2022 confirmed killed cattle rate of approximately 56.20 depredations/100 wolves was slightly lower than the previous 10-year (2012-2021) recovery program mean of 60.37 confirmed killed cattle per 100 wolves. Therefore, meeting the program goal of maintaining the depredation rate at or below the previous 10-year recovery program mean. The 2022 depredation rate decreased by 10 percent from 2021.



An uncollared Mexican wolf seen on a trail camera. Credit: Mexican Wolf Interagency Field Team.

2. INTRODUCTION

The reintroduction, monitoring and management of Mexican wolves in the MWEPA is part of a larger recovery program that is intended to reestablish the Mexican wolf (*Canis lupus baileyi*) within its historical range in the United States and Mexico. The first releases of Mexican wolves occurred in March 1998 on the Alpine and Clifton Ranger Districts of the Apache-Sitgreaves National Forest, Arizona. In 2022, the wild population minimum count increased to 242 wolves; this report summarizes the results of Mexican Wolf IFT activities during 2022. The objective of this report is to document progress towards recovery goals set out in the 2022 Mexican Wolf Recovery Plan, Second Revision (Recovery Plan) for the United States population.

More information on population metrics can be found at: <https://www.fws.gov/program/conserving-mexican-wolf/library>.

a. *Background*

The Recovery Plan establishes several important metrics to gauge relative progress towards recovery. First, the recovery criteria call for an average of at least 320 wolves over eight years in the United States population. Thus, a growing population is an important measure of success. The population viability model Miller (2017) used to help determine recovery criteria show scenarios with mean adult mortality rates less than 25 percent, combined with mean sub-adult mortality rates less than 33 percent and mean pup mortality (for radio-marked pups greater than four months old) less than 13 percent resulted in an increasing population that will meet the population abundance recovery criteria, under certain management regimes. In particular, Miller (2017) found that growth rates and recovery were sensitive to small changes in adult mortality. Thus, adult mortality will be an important metric for evaluation of the program. On a favorable note, the documented annual mortality in 2022 was the lowest since 2017 and was substantially lower than the documented annual mortality totals in 2021 and 2020. The recovery criteria also call for 22 wolves released from captivity to survive for one (sub-adults and adults) to two (pups) years following release. This recovery criterion allows for the incorporation of under-represented genes from captivity into the wild population. Thus, the survival of animals released from captivity into the population will need to continually be monitored.

Evaluations will be conducted five and ten years from the publishing of the 2017 Recovery Plan, First Revision to determine the progress of the Mexican wolf population toward recovery goals. The five- and ten- year evaluations will assess the status of the United States and Mexico populations toward recovery. The interim abundance target at the end of 2022 is 145 wolves in the United States and 100 wolves in Mexico. The interim release and translocation target at the end of 2022 is nine released wolves surviving to breeding age in the United States and 25 released or translocated wolves surviving to breeding age in Mexico. The interim abundance target in 2027 is 210 wolves in the United States and 167 wolves in Mexico. The interim release target in 2027 is 16 wolves released from captivity surviving to breeding age in the United States and 37 released or translocated wolves surviving to breeding age in Mexico. These evaluations will determine if the recovery strategy is proving effective and feasible or needs to be revised.

Management of wolves in the MWEPA is conducted in accordance with an experimental population Final Rule (Service 2022; 2022 10(j) Rule). This rule designates the reintroduced population as experimental and nonessential and establishes the MWEPA within historical range south of Interstate 40 to the United States-Mexico border in Arizona and New Mexico, inclusive of three management areas (Zone 1, 2, and 3; Figure 1). Mexican wolves can occupy any portion of the MWEPA (Zones 1-3), can be released into Zone 1 (or in accordance with tribal or private land agreements in Zone 2), and/or translocated into Zones 1 and 2 (note: fostering—considered a release—may be conducted in Zone 1 and on Federal lands in Zone 2). Zone 1 includes all the Apache-Sitgreaves and Gila National Forests; the Payson, Pleasant Valley and Tonto Basin Ranger Districts of the Tonto National Forest; and the Magdalena Ranger District of the Cibola National Forest. In 2000, the WMAT agreed to allow free-ranging Mexican wolves to inhabit the Fort Apache Indian Reservation (FAIR). The FAIR is in east-central Arizona and provides 2,440 mi² (6,319 km²) of area that wolves may occupy. See the Final Rule (Service 2022; 2022 10(j) Rule) for more information.

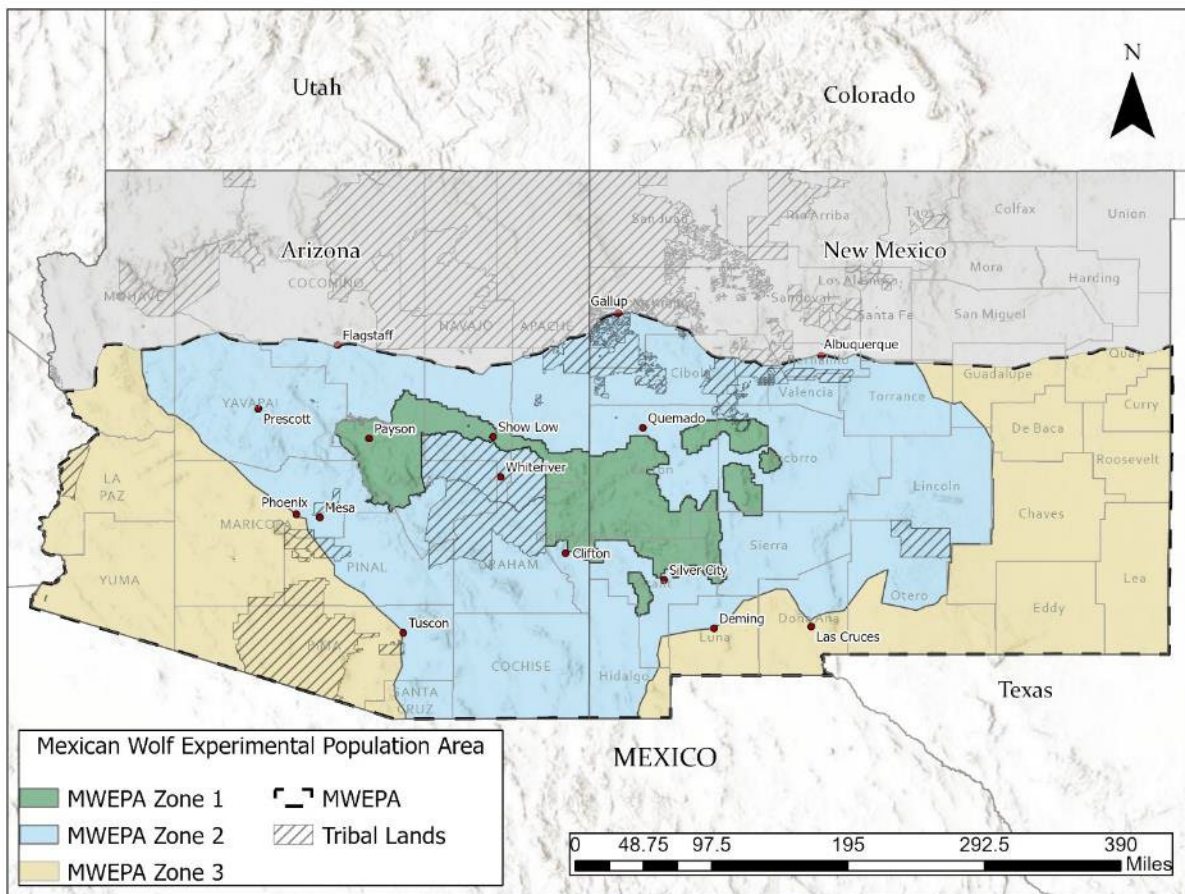


Figure 1: The Mexican Wolf Experimental Population Area (MWEPA) and Zones 1-3 in Arizona and New Mexico as described in the Final Rule.

Wolf age and sex abbreviations used in this document:

A = alpha/breeder (wolf that has successfully bred and produced/sired at least one pup)

M = adult male (24 months or older)

F = adult female (24 months or older)

m = subadult male (younger than 24 months)

f = subadult female (younger than 24 months)

mp = male pup (born in the most recent spring)

fp = female pup (born in the most recent spring)

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. However, wolves occurring on the FAIR and SCAR are included in total counts for depredations and population metrics.

3. POPULATION STATUS

a. Definitions

Breeding pair: a pack that consists of an adult male and female and at least one pup of the year surviving through December 31.

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

New pair: a male and female wolf, traveling together for at least one month, that are likely to form a new pack.

b. Monitoring Techniques

The year-end minimum population count (population or population count) is derived from information gathered through a variety of methods deployed annually from November 1 through the year-end helicopter operation. The IFT continued to employ comprehensive efforts initiated in 2006 to make the 2022 year-end population count accurate, consistent, and repeatable. Management actions implemented to document Mexican wolves included: surveys and trapping for uncollared wolves, greater coordination and investigation of wolf sightings provided through the public and other agency sources, deployment of remote trail cameras, cameras at supplementary and diversionary food caches, and howling surveys in areas of suspected uncollared wolves.

Wolf sign (e.g., 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.

In January and February 2023, aircraft were used to document wolves for the 2022 year-end population count and to capture wolves to affix radio collars. Including January and February count data in the December 31 population count (and in this 2022 annual report) is appropriate and consistent with previous years' annual counts, because wolves alive in these months were also alive in the preceding December (i.e., whelping only occurs in spring, and any wolf added to the population via initial release or translocation after December 31 and before the end of the survey are not counted in the year-end population count). During the year-end count, fixed-wing aircraft were used to locate wolves and assess the potential for darting wolves from the helicopter. A helicopter was used to obtain a visual count of uncollared wolves associated with collared wolves in all areas and to capture priority animals (e.g., uncollared wolves, injured wolves, or wolves with failed or old collars) where the terrain and land ownership allowed.

As part of the 2022 year-end population 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 reviewed to determine those that most likely represented unknown wolves or wolf packs for purposes of completing the population count.

Documentation of wolves or wolf sign, obtained through the above methods, was also used to guide efforts to trap uncollared single wolves or groups of wolves. The objective is to have at least one member (preferably two) of each pack collared. These various methods also allowed the IFT to count uncollared wolves not associated with collared wolves.



Two wolves from the Whitewater Canyon pack seen on a trail camera. Credit: Mexican Wolf Interagency Field Team.

c. Minimum Population Count

At the end of 2022, the population count was 242 wolves, which was a 23 percent increase from the previous year's population (n=196; Figure 2). Pups comprised 34 percent of this population. Thirty-two packs were considered breeding pairs in 2022, compared to twenty-five in 2021.

At end of 2022, the functioning collared population consisted of 109 radio-collared wolves among 56 packs, and eight single wolves, which was an overall increase from 2021 (Table 5). A total of 133 uncollared or failed collared wolves were documented at the end of 2022 (*note: all the uncollared wolves captured during the January and February 2023 helicopter operation were included as uncollared animals associated with known packs above; Table 5*).

Sixteen uncollared wolves were documented in 2022 (Figure 3) that were not associated with known packs. Searches for uncollared wolves occurred throughout the calendar year; however, only uncollared wolves documented between November and the end of the annual helicopter count and capture operations are included in the population count for the year.

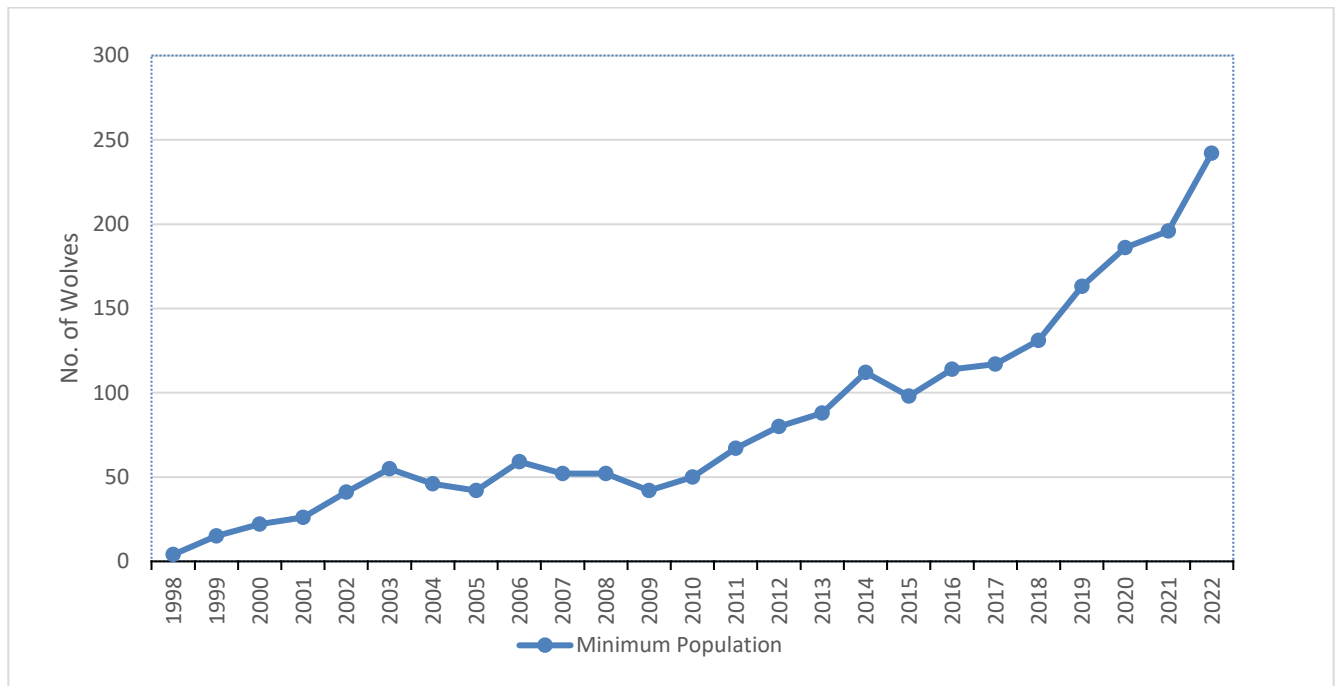


Figure 2: Mexican wolf minimum population counts from 1998 through 2022 in Arizona and New Mexico.

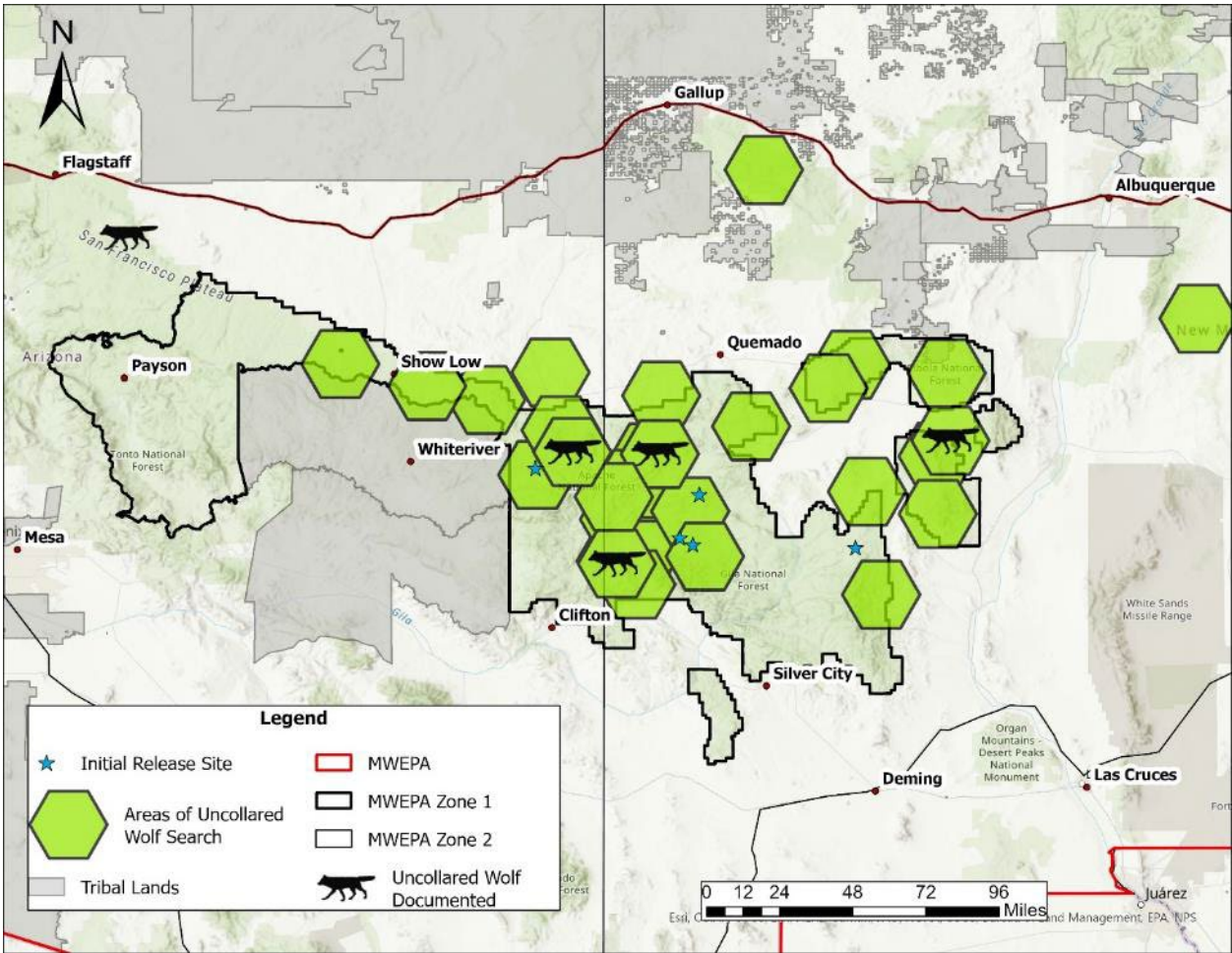


Figure 3: Areas searched for uncollared wolf sign within the Mexican Wolf Experimental Population Area. Areas where the uncollared wolves documented contributed to the year's total population count are indicated as uncollared wolves documented. Overlap of polygons with tribal lands do not necessarily indicate sign search conducted on tribal land. Five initial release sites (dens for fostering efforts) were used during 2022 in Arizona and New Mexico.

d. Reproduction

In 2022, 36 packs exhibited denning behavior, which included 13 packs in Arizona and 23 packs in New Mexico. Of the 36 packs, 32 of those were considered breeding pairs at the end of the year. The IFT also fostered a total of 11 captive-born pups into dens of five wild packs in Arizona and New Mexico. A maximum of 121 pups were documented with a minimum of 82 surviving in the wild until year-end in Arizona ($n = 32$) and New Mexico ($n = 50$), which showed that 68 percent of the pups documented in early counts survived until the end of the year (Figure 4, Table 5).

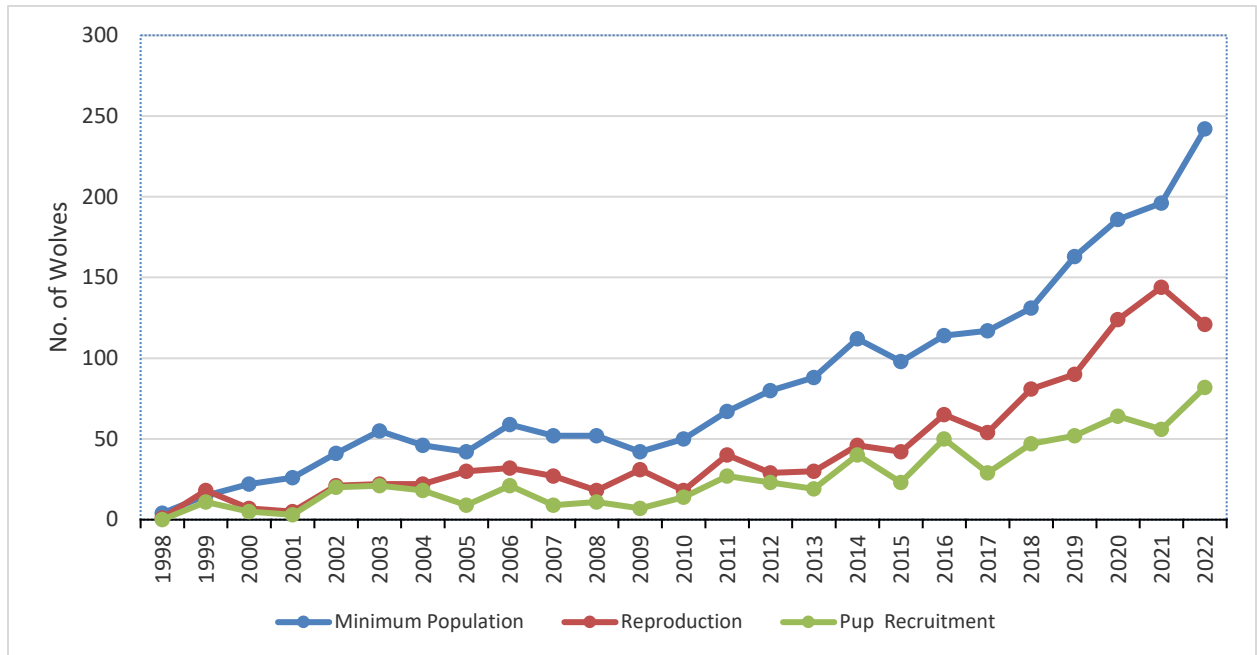


Figure 4: Mexican wolf minimum population estimate, reproduction (maximum number of pups documented), and recruitment (number of pups surviving at years end) documented in Arizona and New Mexico, 1998-2022.

e. Captures

In 2022, 47 wolves were captured a total of 49 times. Thirty wolves were captured, collared for the first time, processed, and released on site for routine population monitoring purposes. Nine wolves were captured, re-collared, processed, and released on site, or simply released on site with the current collar. One wolf was translocated, and three wolves were removed to captivity. Three wolves were captured by the IFT for veterinary care, two were released after treatment, and one wolf was humanely euthanized at the veterinary hospital. Three wolves were captured by private trappers. Two of these wolves were released on site by the IFT. One of these wolves required veterinary care and was released after treatment.

f. Releases and Translocations

Foster: the transfer of offspring from their biological parent(s) and placement with surrogate parent(s). If the offspring were in captivity at the time of the transfer, this is also considered an *Initial Release* (see definition below). If the offspring were in the wild at the time of their transfer this is also considered a *Translocation* (see definition below).

Initial Release: the release of Mexican wolves to the wild within Zone 1 (Figure 1), or in accordance with tribal or private land agreements in Zone 2 (Figure 1), that have never been in the wild, or releasing pups that have never been in the wild and are less than five months old within Zones 1 or 2. The initial release of pups less than five months old into Zone 2 allows for the fostering of pups from the captive population into the wild, as well as enables translocation-eligible adults to be re-released in Zone 2 with pups born in captivity (see 2022 10(j) Rule at <https://www.fws.gov/program/conserving-mexican-wolf/library>).

Translocations: the release of Mexican wolves into the wild that have previously been in the wild. In the MWEPA translocations will occur only in Zones 1 and 2 (Figure 1; see 2022 10(j) Rule at <https://www.fws.gov/program/conserving-mexican-wolf/library>).

Supplemental Food Cache: road-killed native prey carcasses or carnivore logs provided to wolves to assist a pack or remnant of a pack when extenuating circumstances reduce their own ability to do so (e.g., one animal raising young, or just after initial releases and translocations (including fostering)).

In 2022, eleven wolves were initially released (all 11 were fostered pups; Table 1, Figure 3, Figure 5) into five packs (Buzzard Peak, Dark Canyon, Iron Creek, Rocky Prairie, Whitewater Canyon). These captive-born pups came from five SSP facilities including: Chicago Zoological Park (Brookfield Zoo), El Paso Zoo, Wolf Conservation Center, Sevilleta Wolf Management Facility, and the Southwest Wildlife Conservation Center. These foster events occurred in April and May 2022. Additionally, one wolf was translocated in 2022 (Table 1). Translocations can occur throughout the year. We supplementally fed packs where foster events occurred. Supplemental food assists the pack with the nutritional demand of additional pups. Of the 12 wolves that were initially released or translocated in 2022, three were captured by the IFT, radio collared and known to be alive during the end of year count (m2590, mp2709, mp2722), and 9 were uncollared and considered fate unknown (mp2710, fp2717, mp2718, mp2719, mp2723, fp2724, mp2727, fp2728, fp2736) as the IFT had not been able to capture and collar the pups, nor were they documented as a mortality. The IFT will continue efforts to document surviving fostered pups in the following years.



A pile of captive-born and wild-born Mexican pups mixed together during 2022 fostering efforts. Credit: New Mexico Department of Game and Fish.

Table 1: Mexican wolves initially released from captivity or translocated from the wild in Arizona and New Mexico during January 1 – December 31, 2022.

Wolf pack	Wolf ID	Release site	Release date	Released or translocated
Buzzard Peak	mp2709	Buzzard Peak Den	4/28/2022	Released (fostered)
Buzzard Peak	mp2710	Buzzard Peak Den	4/28/2022	Released (fostered)
Dark Canyon	mp2723	Dark Canyon Den	5/12/2022	Released (fostered)
Dark Canyon	fp2724	Dark Canyon Den	5/12/2022	Released (fostered)
Iron Creek	mp2722	Iron Creek Den	5/12/2022	Released (fostered)
Iron Creek	fp2736	Iron Creek Den	5/12/2022	Released (fostered)
Rocky Prairie	mp2727	Rocky Prairie Den	5/6/2022	Released (fostered)
Rocky Prairie	fp2728	Rocky Prairie Den	5/6/2022	Released (fostered)
Whitewater Canyon	fp2717	Whitewater Canyon Den	5/6/2022	Released (fostered)
Whitewater Canyon	mp2718	Whitewater Canyon Den	5/6/2022	Released (fostered)
Whitewater Canyon	mp2719	Whitewater Canyon Den	5/6/2022	Released (fostered)
Single	mp2590	Gila Flats	3/18/2022	Translocated

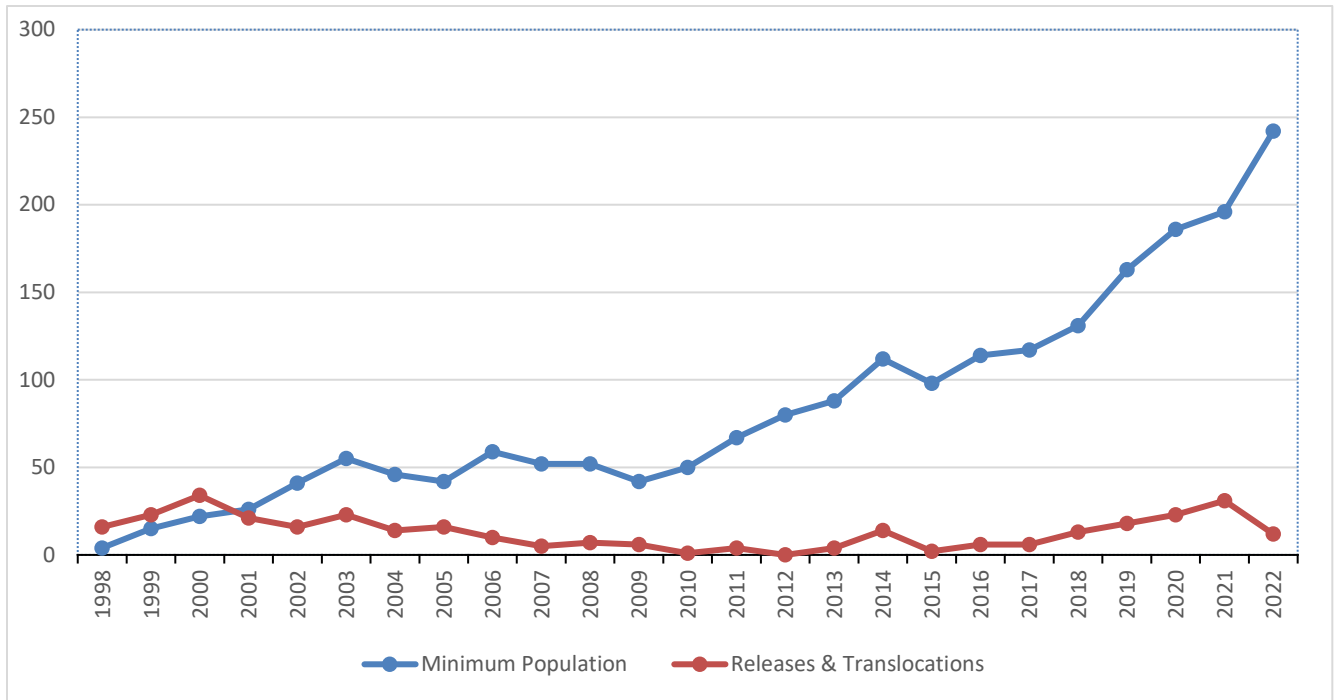


Figure 5: Mexican wolf minimum population estimates and associated releases and translocations including: initial releases (wolves released with no wild experience), translocations (wolves re-released from captivity back into the wild, and wolves in the wild that were captured, moved, and re-released in a different location for management purposes such as but not limited to boundary issues and conflicts with livestock).

g. Home Ranges and Movements

Home ranges were calculated using ≥ 20 individual locations on a pack, pair, or single wolf exhibiting territorial behavior over a period of greater than six months. Due to the large volume of deployed GPS collars, individual wolves were selected to represent a pack's home range territory (Kittle et al. 2015). When possible, breeders were selected to represent the territorial behavior of the pack with preference given to the breeding female. To maximize sample independence, two locations per animal per day were used in the analysis. After any major pack disturbance that affected territorial behavior (i.e., death of a breeder), GPS locations were right-censored to avoid extra territorial movement. Home ranges were not calculated for wolves that displayed dispersal behavior or exhibited non-territorial behavior during 2022. Individual point selection was accomplished with program R (R Core Team 2015). Home range polygons were generated using the 95 percent adaptive kernel method (Seaman and Powell 1996) with R and the adehabitatHR package in conjunction with ArcPro (Calenge 2019, ESRI 2018).

All wolves equipped with functioning radio collars were monitored by standard radio telemetry opportunistically from the ground and air (White and Garrot 1990). During all or portions of the year, 117 wolves were equipped with Global Positioning Collars (GPS) collars to provide more detailed location information and management capability.

Home ranges were calculated for 47 packs or pairs exhibiting territorial behavior in 2022 using

kernel density estimation (Seaman et al. 1999). These home ranges were between 48 square miles (Sierra Blanca pack) and 1,767 square miles (Manada del Arroyo pack), with an average home range size of 208 square miles (Figure 6). For additional information regarding home range details in Arizona and New Mexico please see Appendix A.

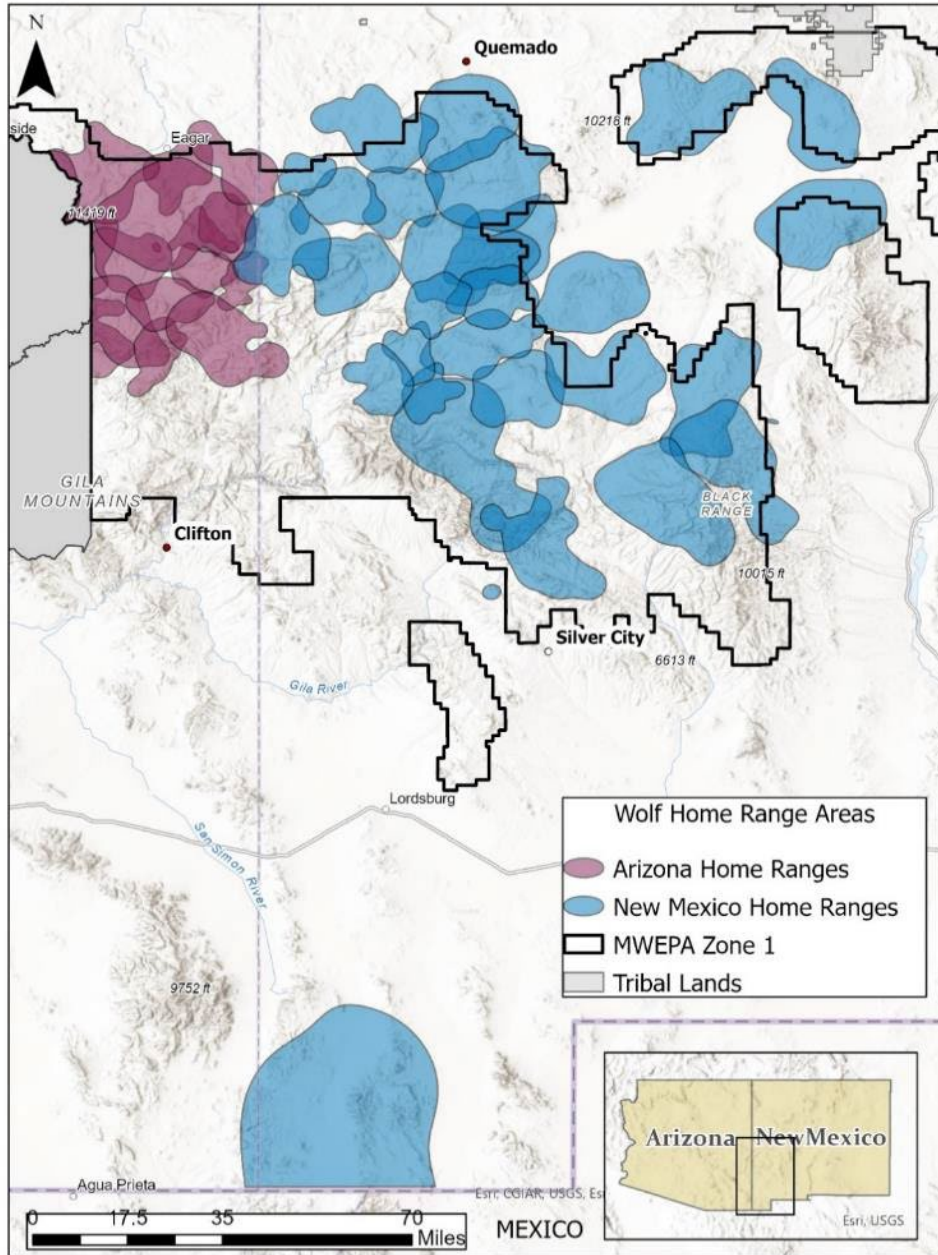


Figure 6: Mexican wolf home ranges (95 percent fixed kernel utilization distribution) for 2022 in Arizona and New Mexico excluding tribal lands. Darker areas indicate overlap between home ranges.

h. Dispersals

In 2022, the IFT documented 18 collared wolves that dispersed from their natal packs (i.e., the pack the wolf was born into or raised by). These dispersing wolves were classified into one of three categories: 1) dispersed to form a new pack ($n = 7$); 2) dispersed into an existing pack ($n = 3$); or 3) were still single wolves at the end of the year ($n = 8$).

i. Occupied Range

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

Under this definition, Mexican wolves occupied 29,663 square miles of the MWEPA during 2022 (Figure 7). In comparison, Mexican wolves occupied 26,877 square miles during 2021. The Mexican wolf occupied range increased by 10 percent from 2021. For additional information on areas utilized by Mexican wolves in 2022, please see Appendix B.

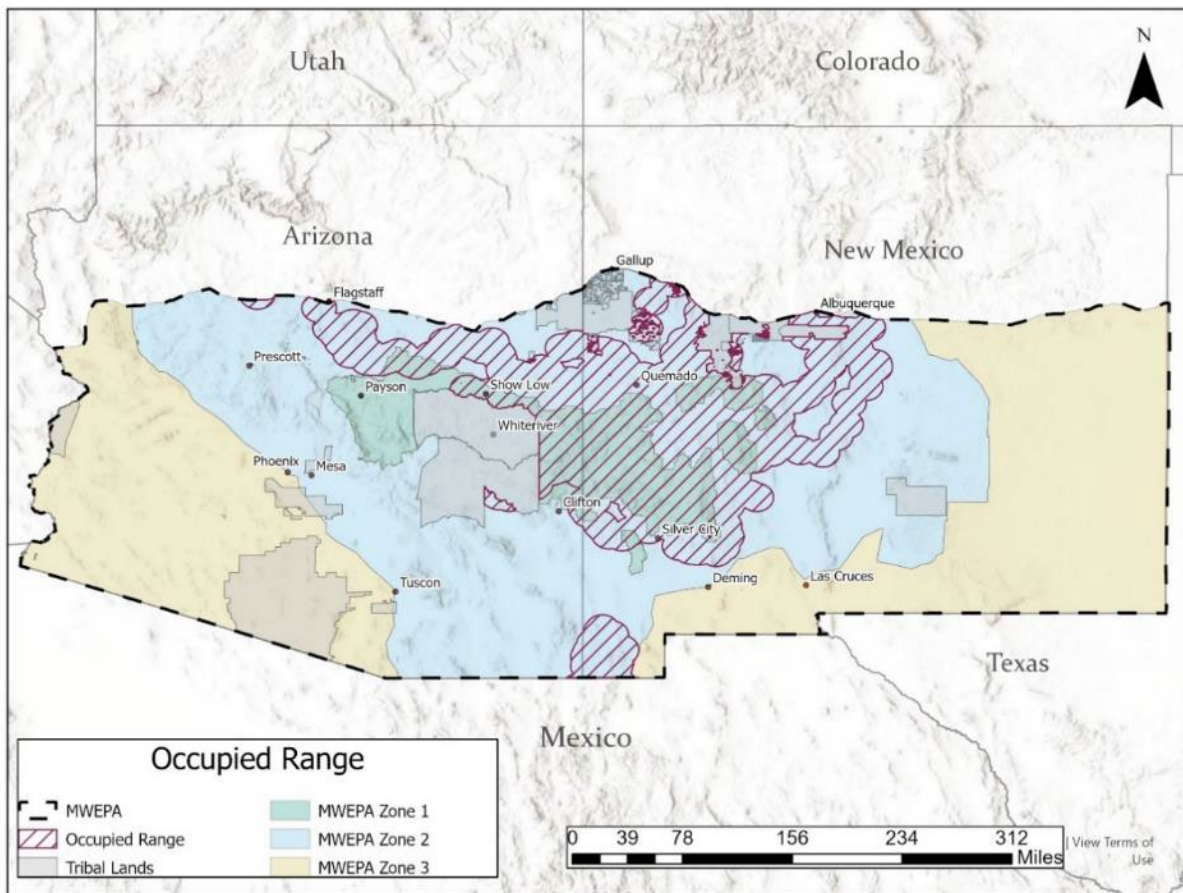


Figure 7: Mexican wolf occupied range in Arizona and New Mexico during 2022.

i. Mortality and Removals

Wolf mortalities were detected via ground telemetry, GPS locations, and public reports. Mortality signals from radio collars were investigated within approximately 24 hours of detection to determine the status of the wolf. Carcasses were investigated by law enforcement personnel from the lead agencies and necropsies were conducted to determine cause of death (Table 2). The IFT has documented 253 wolf mortalities since 1998, 12 of which occurred in 2022 (Tables 2 and 3, Figure 8). The annual mortality total for 2022 was substantially lower than 2021 (25 mortalities) and 2020 (29 mortalities) and was the lowest annual total of documented Mexican wolf mortalities since 2017 (12 mortalities) when the Mexican wolf population was significantly smaller (minimum of 114 wolves). Causes of death were classified into six categories including: 1) illegal mortality; 2) vehicle collision; 3) natural; 4) other; 5) unknown; and 6) pending necropsy. Seven of the 12 (59 percent) documented wolf mortalities were considered illegal and accounted for the majority of deaths. Three of the 12 (25 percent) documented wolf mortalities were caused by a vehicle collision. One of the 12 (8 percent) documented wolf mortalities died from natural causes (e.g., starvation, exposure, interspecific competition, intraspecific competition). Cause of death could not be determined for one of the 12 (8 percent) documented wolf mortalities. In total, 10 (83 percent) of the documented mortalities are considered human-caused (includes illegal mortality and vehicle collision). All causes of death should be considered minimum estimates of mortality, as uncollared wolves (of any age, including those with failed collars) may die without those mortalities being documented.

Table 2: Wild Mexican wolf mortalities documented in Arizona and New Mexico, 1998-2022.

Year	Illegal mortality ^a	Vehicle collision	Natural ^b	Other ^c	Unknown	Awaiting necropsy	Annual total
1998	4	0	0	1	0	0	5
1999	0	1	2	0	0	0	3
2000	2	2	1	0	0	0	5
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	2	0	1	0	1	0	4
2008	7	2	2	0	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
2013	5	0	0	2	0	0	7
2014	7	1	3	0	0	0	11
2015	8	0	3	0	2	0	13
2016	7	2	1	2	2	0	14
2017	6	1	4	0	1	0	12
2018	13	2	3	0	3	0	21
2019	9	1	1	2	2	0	15
2020	14	6	0	4	6	0	30
2021	12	5	4	3	1	0	25
2022	7	3	1	0	1	0	12
Total	138	35	38	16	26	0	253

^a Illegal mortality causes of death may include but are not limited to known or suspected illegal shooting with a firearm or arrow, and illegal trap related mortalities by the public following necropsy.

^b Natural causes of death may include, but are not limited to predation, starvation, interspecific strife, lightning, and disease.

^c Other causes of death include capture-related mortalities, legal shootings and legal trap related mortalities by the public.

Wolves not located or otherwise documented alive for three or more months are considered missing or “fate unknown.” These wolves may have died, dispersed, or have a malfunctioned radio collar. Two wolves last located in Arizona (2540, 2602) and four wolves last located in New Mexico (1158, 1285, 1834, 2635) were designated fate unknown (e.g., not observed via sightings, remote cameras, or radio telemetry for >3 months during portions of 2022).

Table 3: Mexican wolf mortalities documented in Arizona and New Mexico during January 1-December 31, 2022.

Wolf ID	Pack	Age (years)	Date found	Cause of death
m2520	Single	1	1/1/2022	Illegal
F1791	Prime Canyon	3	1/21/2022	Unknown
M1290	Hoodoo	10	3/30/2022	Vehicle collision
m2594	Lava	1	7/13/2022	Illegal
F2751	New Pack AZ	2	7/17/2022	Illegal
m2605	Hoodoo	1	7/28/2022	Natural
F1837	Beaver Point	3	7/29/2022	Illegal
M1693	Seco Creek	4	10/7/2022	Illegal
m2761	Uncollared wolf	1	10/26/2022	Vehicle collision
mp2699	Uncollared wolf	<1	11/5/2022	Vehicle collision
F1684	Whitewater Canyon	5	12/9/2022	Illegal
F1701	Owl Canyon	4	12/20/2022	Illegal

For wolves equipped with radio collars, mortality, missing, and removal rates were calculated using methods presented in Heisey and Fuller (1985). Missing animals were censored at the date of the last signal/location of a functioning collar and classified as likely alive or dead based on the totality of the information associated with the failure (e.g., do we have subsequent photos of the animal, did the collar malfunction suddenly or fail in a predictable manner, etc.).

Management removals can have an effect equivalent to mortalities on the population of Mexican wolves (Paquet et al. 2001). Thus, yearly cause-specific removal rates were calculated for wolves equipped with radio collars. Wolves are removed from the population for four primary causes: 1) livestock depredations; 2) nuisance to humans; 3) wolves are outside the boundary (e.g., north of I-40 or requested removal from tribal lands (these wolves are generally translocated within the U.S. or Mexico)); and 4) other (e.g., pair with other wolves, veterinary treatment, 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). Fourteen wolves equipped with functioning radio collars were considered removed ($n = 3$), dead ($n = 8$), or missing ($n = 3$). Uncollared wolves and individuals with

failed collars (documented dead $n = 4$; removed $n = 1$) were not included in the analysis of management removals.

An overall failure rate of wolves was calculated 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. Uncollared or failed-collared wolves that were found dead or removed were not included in the survival analyses because these wolves were not consistently monitored throughout the year (e.g., animals may die without being found and the individuals that are found are random occurrences that do not reflect overall population dynamics). In addition, wolves that died as a result of handling (no wolves with functioning radio collars died as a result of handling in 2022) were right-censored at the time of their death (e.g., radio days were counted until their death, but the death was not counted in survival estimates) in accordance with standard survival analyses methodology (Heisey and Fuller 1985, Smith et al. 2010).

The overall survival rate was 0.89 with a corresponding failure rate of 0.11. The overall failure rate was composed of human caused mortality rate (0.07; $n = 8$), natural mortality rate (0.00; $n = 0$), unknown/awaiting necropsy mortality rate (0.00; $n = 0$), boundary removal rate (0.01; $n = 1$), missing wolves' rate (0.01; $n = 1$), livestock depredation removal rate (0.00; $n = 0$), nuisance removal rate (0.01; $n = 1$), and other removal rate (0.01; $n = 1$). Much of the mortality was concentrated on sub-adult (radio days = 9,825, failures = 5, survival rate = 0.83), and pup (radio days = 1,938, failures = 1, survival rate = 0.83) components of the population relative to the adults (radio days = 26,455, failures = 6, survival rate = 0.92).

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 plus missing rate) rate of 0.11 in 2022. Following Fuller et al. (2003), our failure rate would predict an increasing population which was the case in 2022. Further, Miller (2017) found that population growth was particularly sensitive to adult failure rates, which were lower in our population (0.08) than other components (sub-adults 0.17, pups 0.17) in 2022. High number of pups recruited in the last two years 56 and 82 in 2021 and 2022, respectively, contributed to the rapid increase of the population in 2022. The number of management removals has remained low in the recent past with the majority of the population losses in 2022 being due to human-caused mortalities. The overall failure rate was extremely low 2022 which also contributed to the high growth rates observed in 2022.

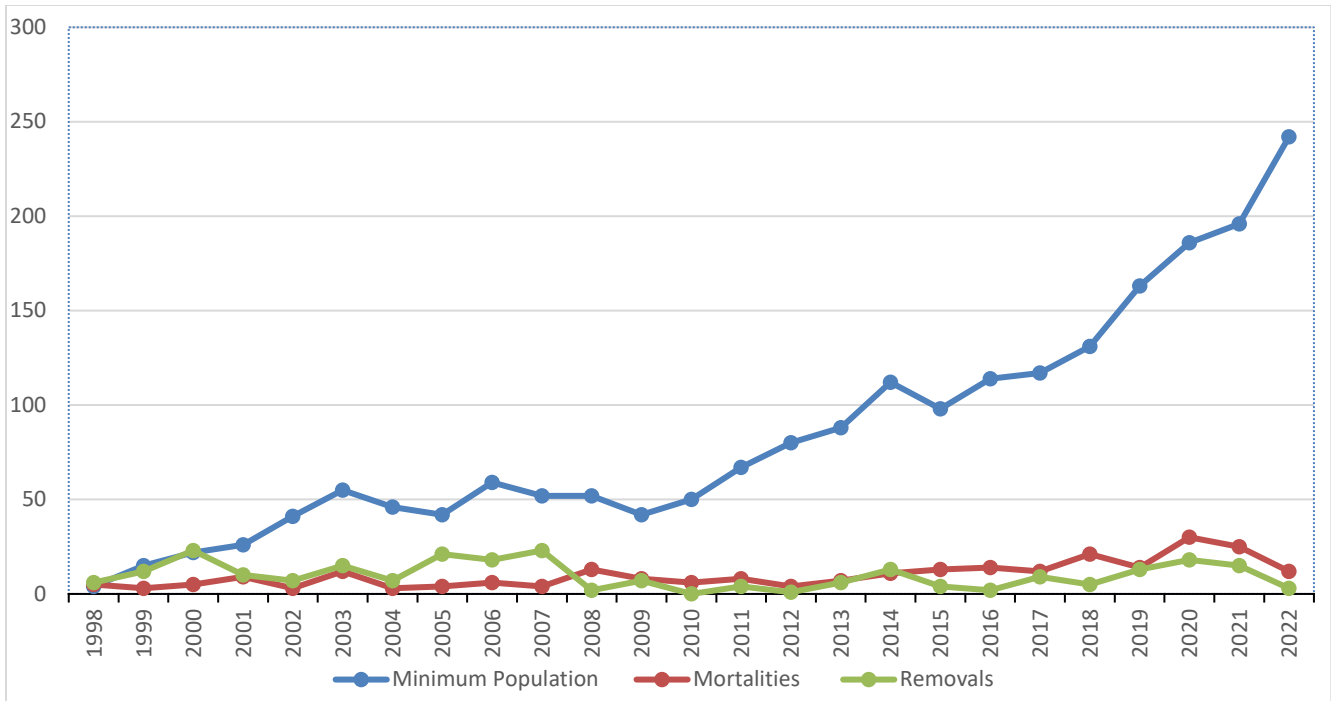


Figure 8: Mexican wolf minimum population estimates and associated removals and mortalities, 1998-2022.

4. CONFLICT MANAGEMENT

Reports of wolf-caused livestock depredations are investigated and classified by USDA-WS as confirmed wolf, probable wolf, or determined as not having wolf involvement. A depredation is defined as a confirmed killing or wounding of lawfully present domestic animals by one or more Mexican wolves. A depredation incident is defined as 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. Depredation investigations of injuries of animals that survive that are confirmed or probable are not considered depredation incidents. Depredation investigations where an animal is killed, and the investigator determines the death was probably caused by wolves are also not considered depredation incidents.

USDA-WS investigated suspected wolf depredations on livestock, including dead and injured livestock within 24 hours of receiving a report unless rare circumstances prevented arrival within 24 hours. Not all dead livestock were found or found and reported in time to document cause of death. Accordingly, depredation numbers in this report represent the minimum number of livestock confirmed by USDA-WS to have been killed by wolves.

a. Depredations

In 2022, investigators confirmed that wolves were responsible for the death of 136 cattle, and one horse and injuries to 12 cattle and one dog. Additionally, nine cattle were identified as probable wolf-caused deaths and two cattle were identified as probable wolf-caused injuries (Table 4). In 2022, the total number of confirmed depredation incidents increased by 8 percent from 2021 (Figure 9). Investigations of dead and injured livestock conducted by USDA-WS that were determined to be from causes other than wolves (i.e., vehicle strike, illness, coyote predation, bear predation, or unknown cause) are not listed.

Table 4: USDA-WS confirmed and probable wolf depredations by type of incident and state in 2022.

	Confirmed Wolf		Probable Wolf	
	Killed or died from injuries	Injured	Killed or died from injuries	Injured
Arizona	49	8	3	2
New Mexico	88	5	6	0
Total	137	13	9	2

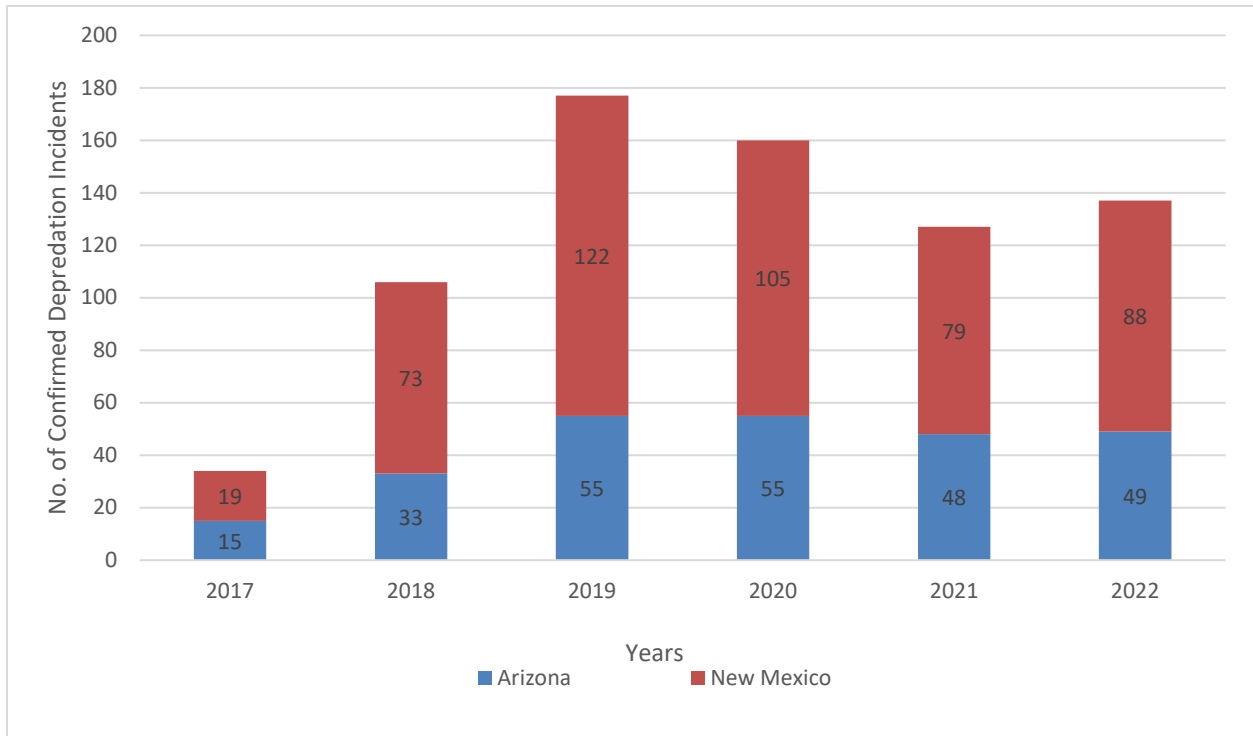


Figure 9: Total number of confirmed depredation incidents (animal killed or died from injuries) by state 2017-2022.

From 2012 to 2021 (10-year average), the mean number of cattle confirmed killed by wolves per year is 77.4 which extrapolates to 60.37 cattle killed per year per 100 Mexican wolves (Figure 10). The mean of cattle killed per year per 100 wolves is useful for comparison purposes in 2022. The depredation rate for 2022 extrapolates to 56.20 confirmed cattle killed per 100 wolves using the number of confirmed killed cattle compared to the final population count. Furthermore, the 2022 rate is slightly below the previous 10-year average (2012 to 2021) mean of 60.37 confirmed killed cattle/100 wolves/year, and the 2022 depredation rate decreased by 10 percent from 2021.

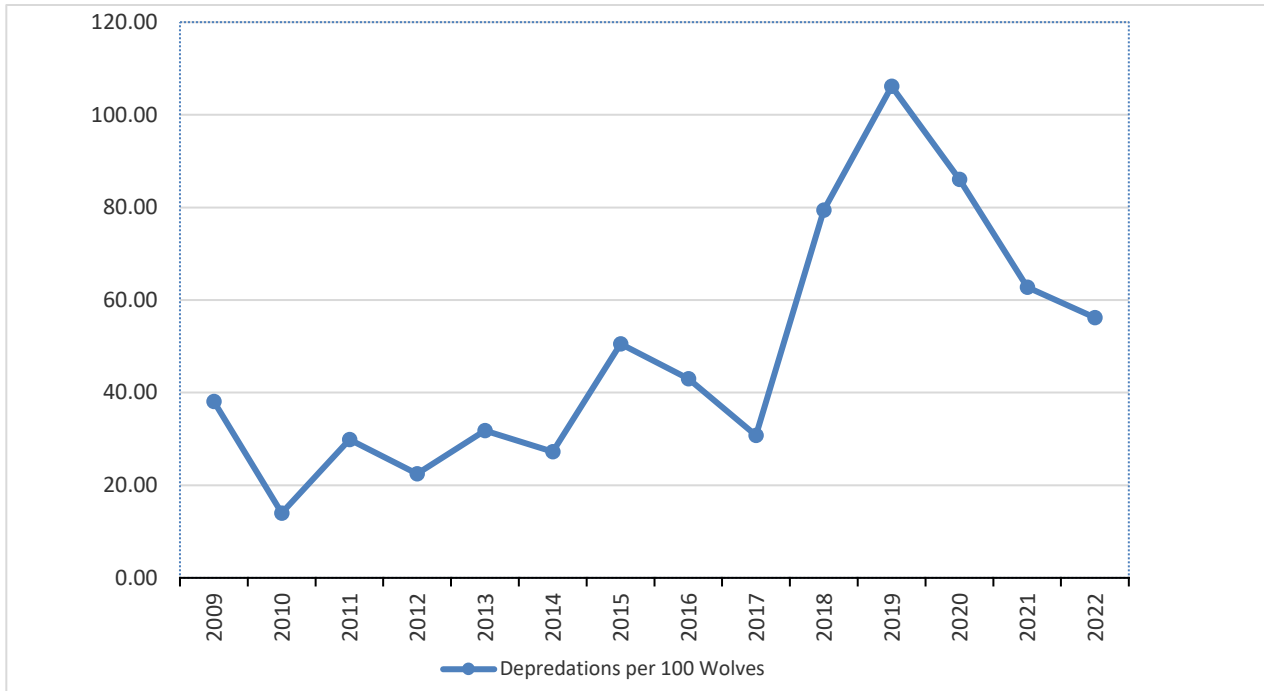


Figure 10: Mean number of cattle killed per year per 100 Mexican wolves, 2009-2022.

b. Wolf-Human Conflict

Wolf-human conflict incidents are categorized as: imminent threat to humans, potential threat to humans, or nuisance incidents in which a report is taken of unacceptable wolf behavior or a wolf sighting in an unacceptable area, such as near a residence, but not posing an imminent or potential threat to humans. Though wolf attacks on humans are very rare in North America, we recognize there is potential for wolves, as with all large predators, to pose a risk to human safety. For this reason and to build social tolerance of wolves, every effort is made to investigate such reports in a timely manner, determine what wolf/wolves were involved in the incident and implement management efforts to avert or resolve credible reports of wolf-human conflict. Some wolf-human conflict reports are determined to involve animals that are not wolves, such as dogs or coyotes. Other reports are classified as unknown if it cannot be determined that wolves were present or responsible.

In 2022, the IFT fielded 34 wolf-human conflict reports. Of the 34 reports, the IFT determined 21 reports (Figures 11 and 12) involved or may have involved Mexican wolves, 12 reports involved species other than wolves (domestic dogs, coyotes, etc.) and one report the IFT was unable to determine if wolves were involved or not. Of the reports that involved or may have involved wolves, all 21 were determined to be nuisance incidents not posing an imminent or potential threat to humans.

Following a report of wolf-human conflict, IFT members used on-site investigations, interviewing of reporting parties, trail cameras, tracking, telemetry, GPS locations, howling, and trapping during investigations to gather evidence of wolf involvement. Hazing was used to move wolves away from residences, recreational areas, or domestic animals in proximity to humans. Carcasses and other attractants were removed from affected areas when appropriate.

Wolf-human conflict reports were documented in the Mexican Wolf Recovery Program Quarterly

Updates which can be accessed on the Service's Mexican wolf web site at <https://www.fws.gov/program/conserving-mexican-wolf/library>.

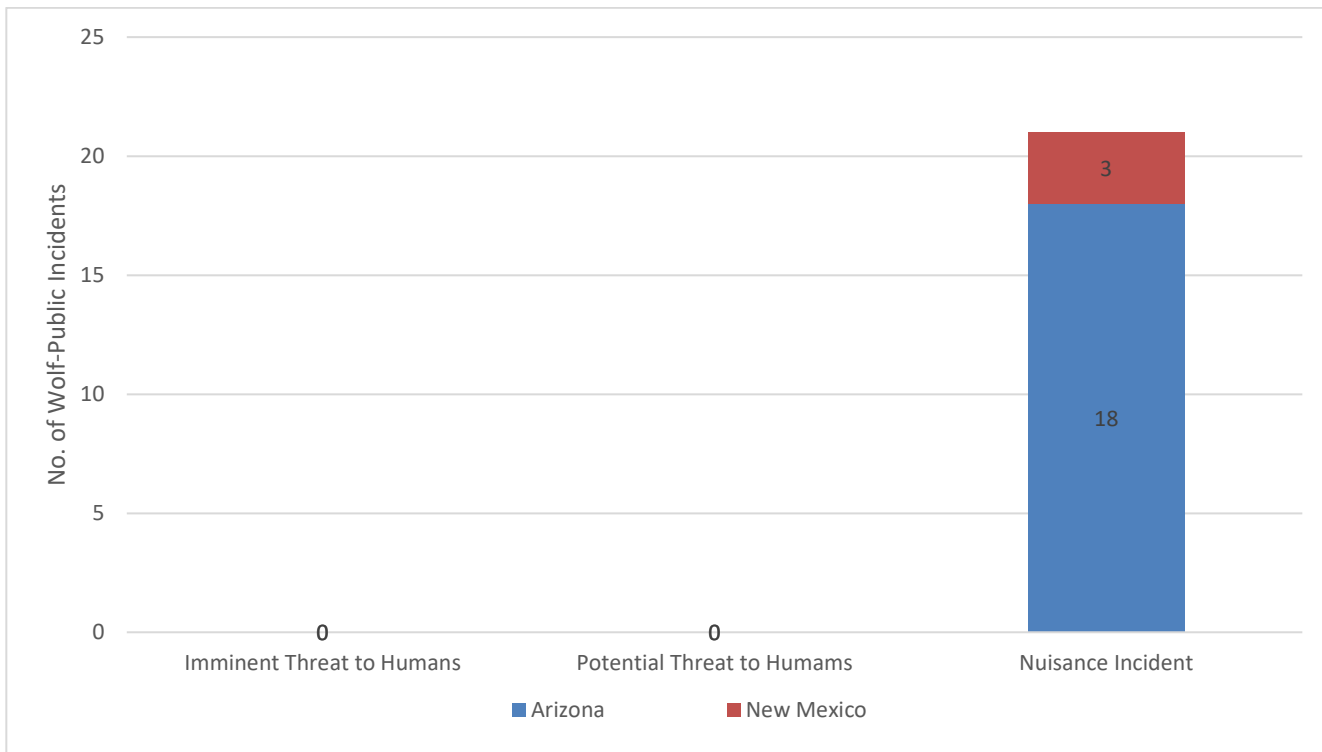


Figure 11: Total number of wolf-human conflict incidents by incident category and state in 2022.

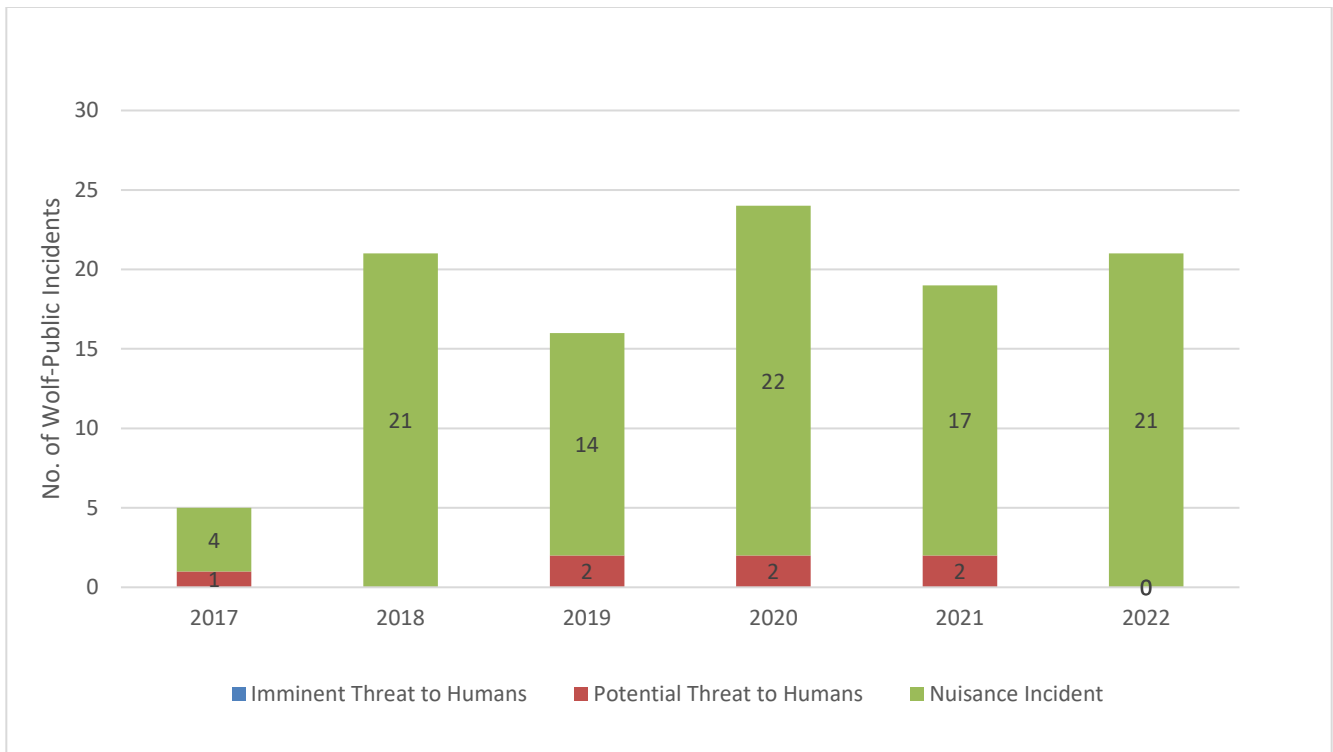


Figure 12: Number of confirmed wolf-human incidents by category 2017-2022.

c. Proactive Management

Various proactive management activities were utilized to reduce wolf-livestock conflicts during 2022. These management approaches and tools may include:

- *Altering livestock grazing rotations:* moving livestock between different pastures within USFS grazing allotments to avoid areas of high wolf use or depredations. Project personnel met with USFS District Rangers, biologists, and range staff to discuss livestock management options during the wolf denning season and to address potential conflicts between livestock and wolves. During 2022, alteration of livestock grazing rotation schedules was implemented once to minimize wolf-livestock conflict.
- *Carcass Removals:* attractants such as livestock carcasses are removed when the presence of those attractants could draw in wolves and lead to increased conflict. Carcass removal is prioritized in areas with active calving and prior to denning season to reduce the likelihood that wolves will localize and den in an area where cattle are present. Carcass removal is not possible in some areas due to access issues. During 2022, the IFT removed 54 livestock carcasses to minimize wolf-livestock conflict.
- *Diversionary food caches:* *carnivore logs* or road-killed native prey carcasses provided to wolves in areas to reduce potential wolf conflicts with livestock and potential nuisance incidents. Diversionary food caches were established in areas where depredations had occurred or were likely to occur for 14 known packs and one uncollared wolf area during 2022. Supplemental food caches were established in association with 4 packs during 2022. These supplemental food caches can also act as diversionary food caches by reducing the potential wolf-livestock conflict.

- *Hay and supplements:* feed and mineral supplements purchased for livestock producers who opt to contain livestock (e.g., cows with young calves) in smaller, more protected areas during livestock calving season or wolf denning periods to reduce the potential for conflict between wolves and cattle on grazing allotments or private property. Our partner agencies and NGOs did not purchase hay or supplements to mitigate conflicts between wolves and livestock in 2022.
- *Hazing:* human presence, rubber bullets, pyrotechnics or other combinations of light and sound used to scare wolves from an area. Wolves were hazed on foot or by vehicle in cases where wolves localized near areas of human activity, displayed nuisance behavior, were present in areas with recent depredations on livestock, or areas with potential for wolf-livestock conflict, or if found feeding on, chasing, or killing livestock. When necessary, wolves were hazed to encourage an aversive response to humans and to discourage nuisance and depredation behavior. In 2022, the IFT conducted hazing activities for 454 personnel days (e.g., multiple personnel hazing on the same day would count as 2 or more personnel days). These activities resulted in successful hazing on 250 occasions.
- *Livestock producer contacts:* the IFT regularly contacts livestock producers via phone calls, text messages, emails, and site visits. In particular team members directly notify affected producers of substantial wolf management actions, including animal translocations, foster operations, animal removals, and annual count/capture operations. The team notifies livestock producers and landowners when a wolf dens on or adjacent to active allotments or private property. Similarly, the IFT coordinates with affected producers when implementing conflict-management activities and increases communications with producers experiencing conflict. In addition to direct communication with affected stakeholders, the IFT maintains a public internet-based location map providing buffered, offset locations that is updated every two weeks. This map allows livestock producers, landowners, and land managers to independently stay informed on wolf locations and movements. All IFT members are expected to be available to respond to inquiries from affected stakeholders.
- *Radio telemetry equipment:* radio-collar monitoring equipment issued to livestock producers to facilitate their own proactive management activities and aid in the detection and prevention of conflict between wolves and cattle. The IFT issued/maintained radio telemetry equipment for livestock producers or residents in areas where wolf-livestock conflicts or nuisance incidents had occurred or were likely to occur. The IFT trained livestock producers to use the telemetry equipment to monitor wolves in the vicinity of cattle or residences and instructed them on hazing techniques. The IFT issued or updated 25 receivers during 2022.
- *Radio Activated Guard (RAG) boxes:* consists of radio-collar monitoring equipment that activates strobe lights and loudspeakers that makes various loud noises (sirens, gunshots, helicopters) when a collared wolf is detected in the area. The IFT uses RAG boxes to encourage an aversive response to humans and to discourage nuisance and depredation behavior. The IFT did not deploy any RAG boxes during 2022.
- *Range Riders:* persons who assist livestock producers in monitoring wolf activity in relation to livestock, provide human presence, and conduct hazing to deter wolves away from livestock. During 2022, our partner agencies and NGOs contracted 16 ranges riders, eight in Arizona,

and eight in New Mexico to assist stakeholders in monitoring wolves in proximity to livestock. Additionally, the AZGFD employed two seasonal range riders in Arizona which were utilized in depredation hotspot areas to mitigate and reduce wolf-livestock conflict. Following the completion of both seasonal positions, AZGFD hired one permanent range rider in 2022. USDA-WS hired one permanent range rider in New Mexico in 2022.

- *Removal of wolves:* The removal of a wolf or wolves associated with confirmed depredation incidents and/or conflict with humans. Wolves can be removed from an area using non-lethal (e.g., trapping, helicopter capture) and lethal methods. Live removals may include translocation to another area or removal to captivity. In 2022, one uncollared wolf was removed from the wild because of wolf-livestock conflict.
- *Trapping:* Foot-hold traps can be used as a method to haze wolves out of an area. Trapping and collaring previously uncollared wolves also allows the IFT to better manage conflict situations; collared wolves can be located and hazed, while uncollared wolves prove more difficult. In 2022, the IFT set 51 foot-hold traps for management purposes and/or in areas with potential uncollared wolves.
- *Turbo Fladry:* electric fence with colored flagging installed around livestock pastures and private property to discourage wolf presence inside the perimeter of the fencing. When necessary, the IFT uses electrical charged turbo fladry to encourage an aversive response to humans and to discourage nuisance and depredation behavior. The IFT installed five sets of turbo fladry in 2022.

d. Public Outreach

We are committed to engaging in effective communication, identifying various outreach mechanisms, and standardizing certain outreach activities. The goal is to ensure timely, accurate, and effective two-way communication between and among cooperating agencies, stakeholders, and the public.

Outreach activities were conducted on a regular basis as a means of disseminating information to concerned citizens, government and non-government organizations, and other interested stakeholders. Outreach was facilitated through quarterly updates, internet-based Mexican wolf location maps, phone calls to permittees, informational handouts, presentations, meetings, field trips and workshops, informational display booths, web page updates including press releases and public notices, responding to requests for information, recording public wolf reports, and conversing with the public over the phone and through email.

During 2022, quarterly updates were posted in various businesses and public buildings (e.g., libraries, post offices). These quarterly updates were also posted on the Service's Mexican wolf website at <https://www.fws.gov/program/conserving-mexican-wolf/library>. Interested individuals can sign up to receive the quarterly update electronically by visiting the AZGFD web site at <http://azgfd.gov/signup>.

A map consisting of the most recent general wolf locations was also available online via a [web mapping](#) application and updated every two weeks to inform cooperators and the public of areas occupied by wolves.

The IFT contacted campers, hunters, and other members of the public engaged in recreational activity in wolf occupied areas and provided them with information about the Mexican Wolf Recovery Program.



Biologist Alison Greenleaf gives a media about the annual population count. Credit: Mexican Wolf Interagency Field Team.

These interactions 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 2022 10(j) Rule. These contacts were used to collect information on wolf sightings, tracks, and other wolf sign from the public.

Presentations and status reports were provided to federal and state agencies, conservation groups, rural communities, schools, wildlife workshops, and various other public, private, and tribal institutions. In addition, biweekly contacts to provide wolf locations were made to cooperating agencies and stakeholders. Outreach presentations can be scheduled by contacting the IFT at 1-888-459-WOLF (9653).

Informational signs and posters were maintained that provided information on how to minimize conflicts with wolves using available USFS kiosks and various road pullouts within the MWEPA in 2022. Five hundred and fifty informational flyers and multiple countertop displays were distributed at sporting goods dealers, public offices, and businesses in occupied range to aid hunters in recognizing the differences between wolves and coyotes. Wolf vs. coyote identification flyers were also mailed to 400 deer and elk hunt permit holders in Arizona, and 400 of the same flyers were distributed to hunters by Arizona Game and Fish Wildlife Managers in Region 1 during fall and winter hunt patrols. Furthermore, wolf vs. coyote identification information can be found in the AZGFD hunting regulations. The IFT also maintained Service reward posters at USFS kiosks and local businesses, to provide notice of a \$10,000 reward for information leading to the apprehension of individuals responsible for illegally killing Mexican wolves.

Table 5: Status of Mexican wolf packs in Arizona and New Mexico, as of December 31, 2022.

Packs denoted with * indicate a pack that meets the definition of a breeding pair per Final Rule.

Wolf Pack	Wolf ID	Reproduction (maximum # of pups documented in 2022)	Pups alive (at year end)	Number collared	Number uncollared (includes wolves with non- functioning collar)	Minimum pack size (at year end)	Pack Notes -2022
Agua Frio*	AM1875, AF1936	1	1	2	1	3	
Aldo	AM2561, AF1712	0	0	2	0	2	Pack denned but a pup count was not obtained
Baldy* (FAIR)	AM1347	N/A	N/A	N/A	N/A	N/A	Wolf numbers not displayed at request of the tribe
Bear Canyon*	AM2563, AF1823	3	3	2	3	5	
Beaver Point*	AM1949, AF1837	6	3	1	5	6	AF1837 died in July
Blue Canyon	M1953, AF1834	0	0	0	2	2	AM1953 considered uncollared/non-functional collar AF1834 designated fate unknown
Burnt Peaks	F1692	0	0	1	0	1	
Buzzard Peak*	AM1831, AF1726, fp2713	8	3	3	2	5	Reproduction includes foster(s) placed into den
Canovas Creek*	AM1584, AF2569	4	2	2	2	4	
Castle Rock	AM1921, AF1686, f2540, f2632	0	0	3	4	7	f2540 designated fate unknown
Centerfire	AM2697, AF1916	0	0	2	0	2	
Cimmaron Mesa*	AM2702, AF1705	5	5	2	5	7	
Colibri	AM1856	0	0	1	1	2	Pack denned but a pup count was not obtained
Cottonwood Canyon*	AM1859, AF2503	1	1	2	1	3	
Dark Canyon*	AM1354, AF1456, fp2743	7	3	2	3	5	AF1456 considered uncollared/non-functional collar Reproduction includes foster(s) placed into den
Eagle Creek	M1477, F1548	0	0	2	0	2	
Elk Horn*	AM1838, AF1294, F1866	3	3	3	3	6	

Wolf Pack	Wolf ID	Reproduction (maximum # of pups documented in 2022)	Pups alive (at year end)	Number collared	Number uncollared (includes wolves with non- functioning collar)	Minimum pack size (at year end)	Pack Notes -2022
Frieborn*	AF1443	3	1	1	2	3	
Gallinas Canyon	AM2700, AF2588	0	0	2	0	2	
Hail Canyon	AF2690	0	0	1	1	2	
Hoodoo	AM1290, AF1333, M1789, M1893, m2602, m2605	0	0	4	1	5	AM1290 died in March M2602 designated fate unknown M2605 died in July
Iron Creek*	AM1240, AF1278, M2549, fp2746, f2756	8	2	5	2	7	Reproduction includes foster(s) placed into den
Juniper Bench*	AF1920, fp2757	6	6	2	6	8	
Lava*	AM1285, AF1405, M2750, F2753, mp2594	5	1	3	1	4	AM1285 designated fate unknown mp2594 died in July
Leon*	AM1824, AF1578	2	2	2	2	4	
Leopold	M1855 AF1346	0	0	1	1	2	AF1346 considered uncollared/non-functional collar
Luna	AM1158, AF1487, M2567	0	0	2	1	3	AM1158 designated fate unknown
Manada del Arroyo	AM1582, AF1828	0	0	2	0	2	Pack dispersed from Mexico into the U.S.
Mangas*	AM1296, AF1439	3	3	1	5	6	AF1439 considered uncollared/non-functional collar
Milligan Gulch	m2687, f2688	0	0	2	0	2	
New Pack, NM	M2755, F2694	0	0	2	0	2	
Noble Mountain*	AF1918	3	3	1	4	5	
Owl Canyon	AM1790, AF1701	0	0	1	0	1	AF1701 died in December
Pancho Spring	F1889	0	0	1	1	2	
Panther Creek*	AM1382, AF1683	3	3	1	7	8	AF1683 considered uncollared/slipped collar
Pitchfork Canyon*	AM2566, AF1853	2	2	2	2	4	
Point of Rocks	AM1717	0	0	1	1	2	
Potato Canyon	m2590, f2593	0	0	2	0	2	

Wolf Pack	Wolf ID	Reproduction (maximum # of pups documented in 2022)	Pups alive (at year end)	Number collared	Number uncollared (includes wolves with non- functioning collar)	Minimum pack size (at year end)	Pack Notes -2022
Prime Canyon*	AM1471, AF1488, F1791, M1881, M2701	4	4	2	8	10	AM1471 considered uncollared/non-functional collar AF1488 considered uncollared/slipped collar F1791 died in January
Rocky Prairie*	AM1383, AF1489, F2536, f2754, mp2762	4	2	5	3	8	
Rose*	AM1704	2	2	1	3	4	
Saffel*	AM1854, AF1939, M1852	3	3	3	4	7	
San Mateo	AM1345, AF1399	0	0	1	1	2	AM1345 considered uncollared/non-functional collar
Sawtooth*	AM2704	3	1	1	2	3	
SBP*	AM2703, AF1553	3	3	2	3	5	
Seco Creek*	AM1693, AF1728, m2689	2	2	2	2	4	AM1693 died in October
Sierra Blanca	AM1571, AF1550	0	0	2	0	2	Pack denned but a pup count was not obtained
Slade	f2691	0	0	1	0	1	
Squirrel Springs	AF1788	0	0	1	1	2	
Tsay-O-Ah* (FAIR)	AM2698, AF1283	N/A	N/A	N/A	N/A	N/A	Wolf numbers not displayed at request of the tribe
Tu dil hil* (FAIR)	AM1338, AF1679, fp2758	N/A	N/A	N/A	N/A	N/A	Wolf numbers not displayed at request of the tribe
Wagontongue Mtn*	AM1946	2	2	1	3	4	
Warm Springs	F1938	0	0	1	1	2	
Whiskey Creek*	AM1842, mp2760	5	4	2	4	6	
Whitewater Canyon	AM1455, AF1684	5	3	0	4	4	Reproduction includes foster(s) placed into den AM1455 considered uncollared/non-functional collar AF1684 died in December
Willow Creek*	AF1890	4	4	1	5	6	

Wolf Pack	Wolf ID	Reproduction (maximum # of pups documented in 2022)	Pups alive (at year end)	Number collared	Number uncollared (includes wolves with non- functioning collar)	Minimum pack size (at year end)	Pack Notes -2022
Single, AZ	m2520	0	0	0	0	0	m2520 died in January
Single, AZ	F2534	0	0	0	0	0	F2534 removed to captivity in March
Single, AZ	M1857	0	0	1	0	1	
Single, NM	M1888	0	0	1	0	1	
Single, NM	M2557	0	0	1	0	1	
Single, AZ	F2759	0	0	1	0	1	
Single, AZ	F2603	0	0	1	0	1	
Single, AZ	F2751	0	0	0	0	0	F2751 died in July
Single, AZ	M2545	0	0	1	0	1	
Single, AZ	M2556	0	0	1	0	1	
Single, AZ	mp2627	0	0	0	0	0	mp2627 removed to captivity in March
Single, NM	m2636	0	0	1	0	1	
Single, NM	M2761	0	0	0	0	0	M2761 died in October
Single, NM	mp2699	0	0	0	0	0	mp2699 died in November
Dillon Mountain, NM*	Uncollared Wolf Pack	2	2	0	4	4	
NE San Mateo Mountains, NM	Uncollared Wolf Pack	0	0	0	2	2	
Roberts Park, NM	Uncollared Wolf Pack	0	0	0	2	2	
Noble Mountain, NM	Uncollared wolves	0	0	0	2	2	
Kinnikinick, AZ	Uncollared wolf	0	0	0	1	1	
Boyce Spring, AZ (FAIR)	Uncollared wolves	N/A	N/A	N/A	N/A	N/A	Wolf numbers not displayed at request of the tribe
Christmas Tree, AZ	Uncollared wolf	N/A	N/A	N/A	N/A	N/A	Wolf numbers not displayed at request of the tribe

Wolf Pack	Wolf ID	Reproduction (maximum # of pups documented in 2022)	Pups alive (at year end)	Number collared	Number uncollared (includes wolves with non-functioning collar)	Minimum pack size (at year end)	Pack Notes -2022
(FAIR)							
SCAR, AZ	Uncollared wolf	N/A	N/A	N/A	N/A	N/A	Wolf numbers not displayed at request of the tribe
	Totals	121	82	109	133	242	

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6. PERSONNEL

We acknowledge and appreciate the assistance of all agency personnel and volunteers who provided data and support services for the operational field portion of the Mexican Wolf Recovery Program during this reporting period. The following is a list of personnel and volunteers from our cooperating agencies, and the Service directly involved in the Mexican Wolf Recovery Program.

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Charles Lonnie Fox, Wolf Technician

Jed Orielly, Range Rider

Riley Young, Range Rider

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New Mexico Department of Game and Fish

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Caleb Garzanelli, Non-Lethal Specialist (AZ)

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Savannah Cantrell	Meghan Murphy
Todd Cornwell	Ashley Everroad
Grace Dougan	

APPENDICES

APPENDIX A: MEXICAN WOLF PACK HOME RANGE DETAILS

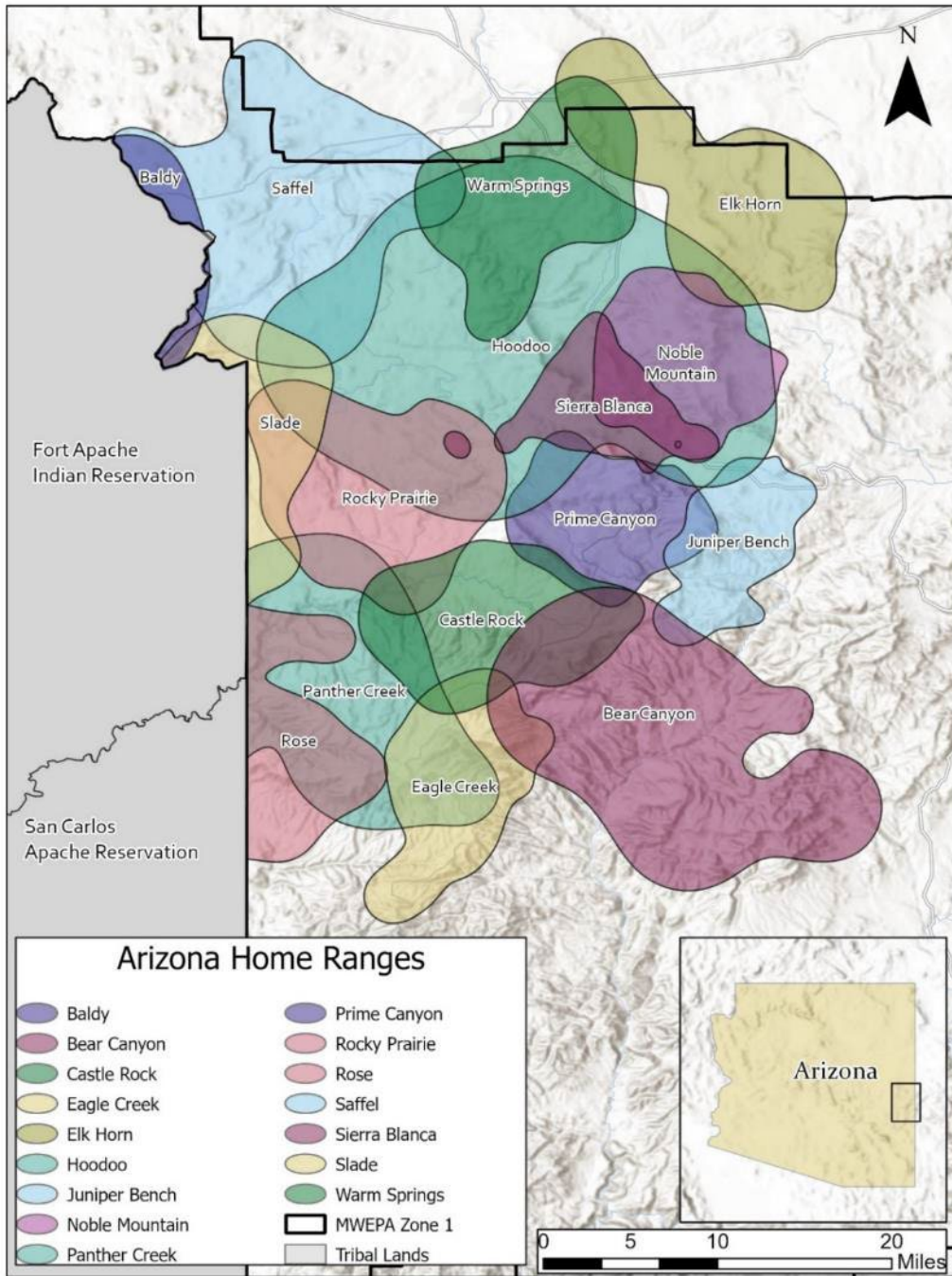


Figure 12: Arizona wolf home range map

Table 6. Arizona Wolf Home Range Details

Wolf Pack	Home Range Size (mi²)	County
Baldy	N/A	Apache
Bear Canyon	194	Greenlee
Castle Rock	92	Greenlee
Eagle Creek	75	Greenlee
Elk Horn	112	Apache
Hoodoo	362	Apache
Juniper Bench	50	Apache/Greenlee
Noble Mountain	72	Apache
Panther Creek	219	Apache/Greenlee
Prime Canyon	65	Apache/Greenlee
Rocky Prairie	116	Apache
Rose	134	Greenlee
Saffel	183	Apache
Sierra Blanca	48	Apache
Slade	180	Apache
Tsay-O-Ah	N/A	Apache
Tu dil hil	N/A	Apache
Warm Springs	94	Apache

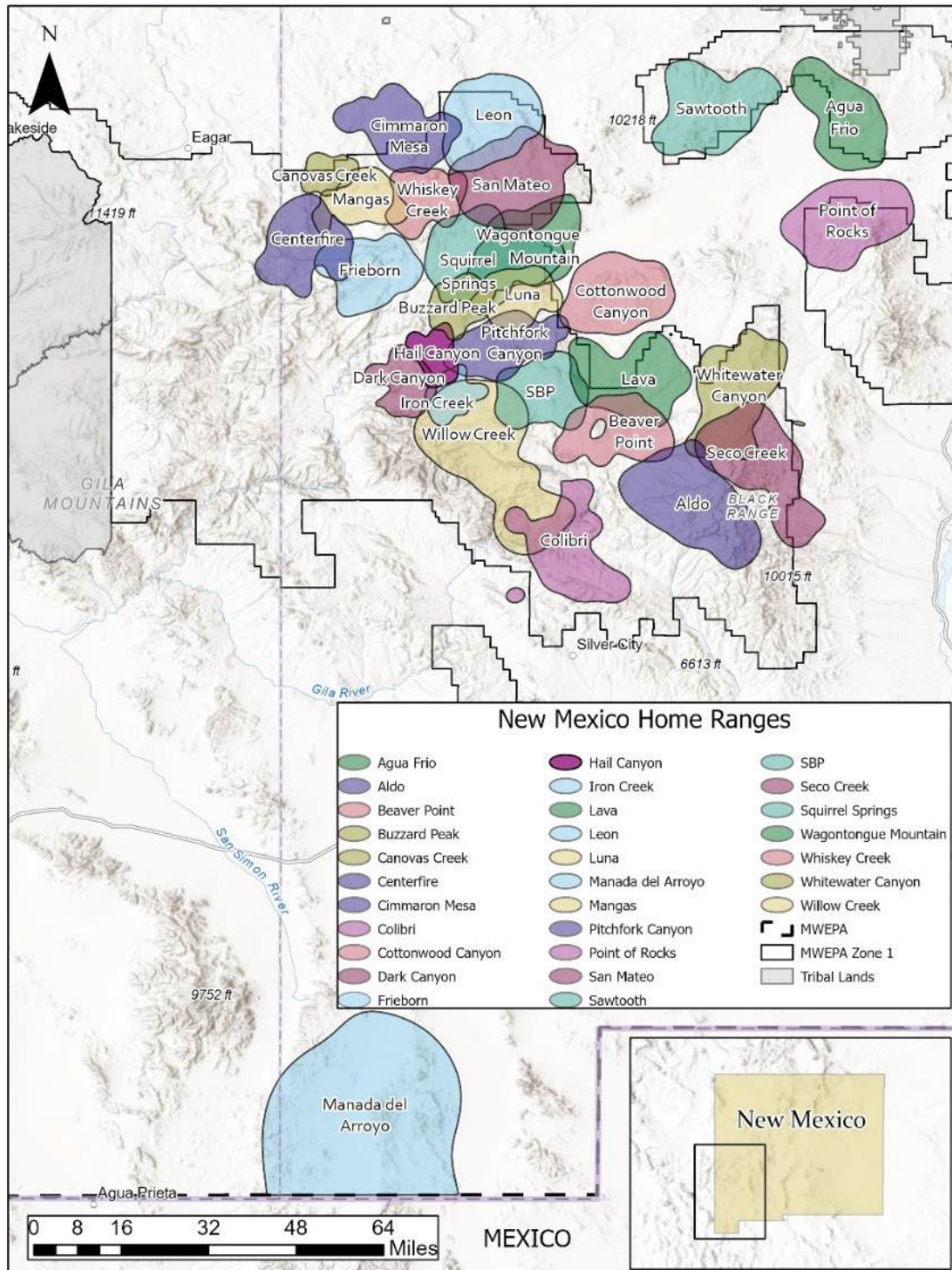


Figure 13: New Mexico wolf home range map

Table 7. New Mexico Wolf Home Range Details

Wolf Pack	Home Range Size (mi²)	County
Agua Frio	188	Socorro
Aldo	290	Catron/Grant/Sierra
Beaver Point	171	Catron
Buzzard Peak	84	Catron
Canovas Creek	51	Catron
Centerfire	181	Catron
Cimmaron Mesa	180	Catron
Colibri	226	Grant
Cottonwood Canyon	198	Catron
Dark Canyon	91	Catron
Frieborn	166	Catron
Hail Canyon	62	Catron
Iron Creek	62	Catron
Lava	219	Catron
Leon	209	Catron
Luna	114	Catron
Manada del Arroyo	1,767	Hidalgo
Mangas	111	Catron
Pitchfork Canyon	155	Catron
Point of Rocks	235	Socorro
San Mateo	256	Catron
Sawtooth	229	Catron
SBP	159	Catron
Seco Creek	251	Sierra
Squirrel Springs	260	Catron
Wagontongue Mtn	210	Catron
Whiskey Creek	117	Catron
Whitewater Canyon	237	Catron/Sierra
Willow Creek	400	Catron/Sierra

APPENDIX B: MEXICAN WOLF USE AREA

The Mexican wolf Use Area depicts both territorial and extra territorial locations of wolves in Arizona and New Mexico. The Territorial Area was calculated based on the following criteria: a ten-mile radius around all aerial locations or GPS locations of radio monitored wolves exhibiting localized behavior for greater than six months during the past year. The Extra Territorial Area was calculated based on the following criteria: (1) a ten-mile radius around all aerial locations or GPS locations of radio monitored wolves exhibiting localized behavior for less than six months during the past year; (2) a ten-mile radius around all aerial locations or GPS locations of radio monitored wolves exhibiting dispersal behavior during the past year; and (3) a ten-mile radius around all uncollared wolf locations and wolf sign documented during the past year. The Mexican wolf Use Area is different than “Occupied wolf range” as defined in the Service’s 10(j) Rule, which specifically relates to certain take prohibitions and only applies to areas within the MWEPA, excluding Zone 3 and tribal trust lands, in that it includes temporary dispersal movements outside the MWEPA, locations of wolves in Zone 3, and includes tribal trust lands (not depicted on the map). In 2022, the Mexican wolf Use Area was 37,575 mi². The Territorial Area was 17,238 mi², while the Extra Territorial Area was 20,337 mi².

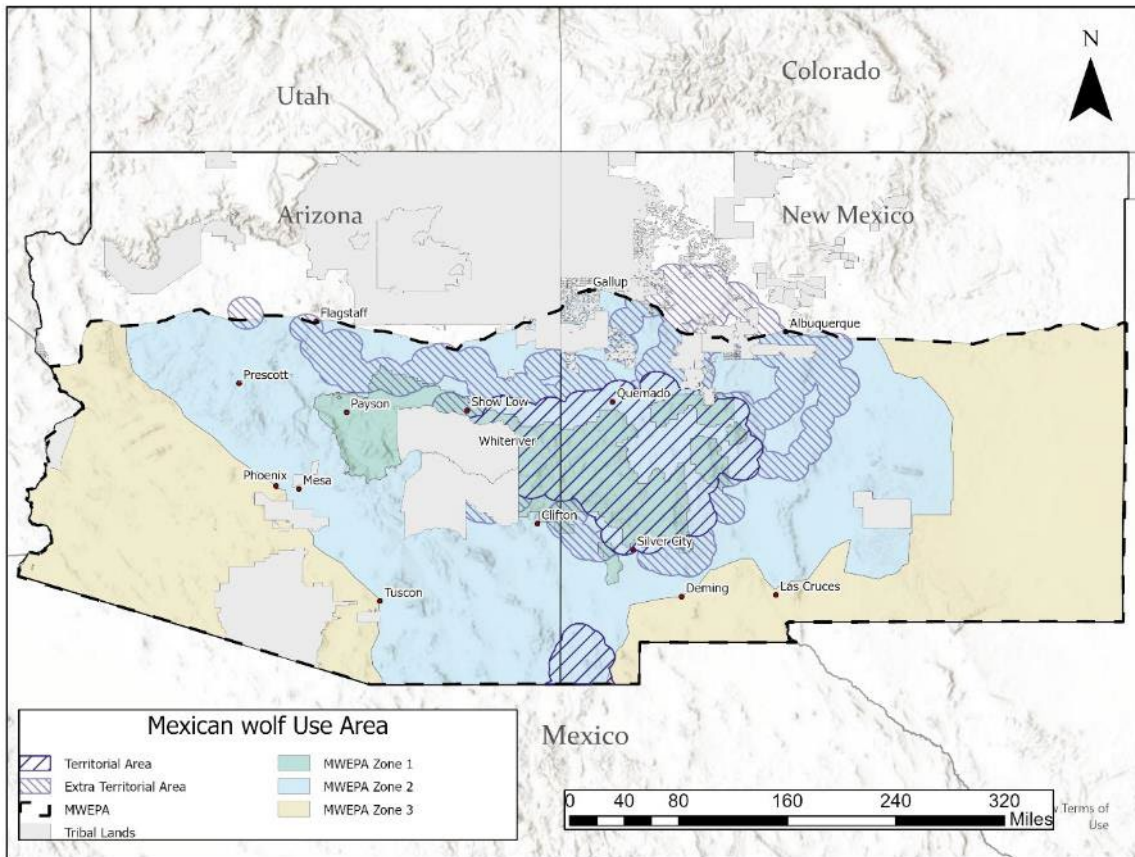


Figure 14. Mexican Wolf Use Area in 2022.