

2004 ANNUAL REPORT

Middle Rio Grande Endangered Species Collaborative Program

<http://mrgesacp.fws.gov>

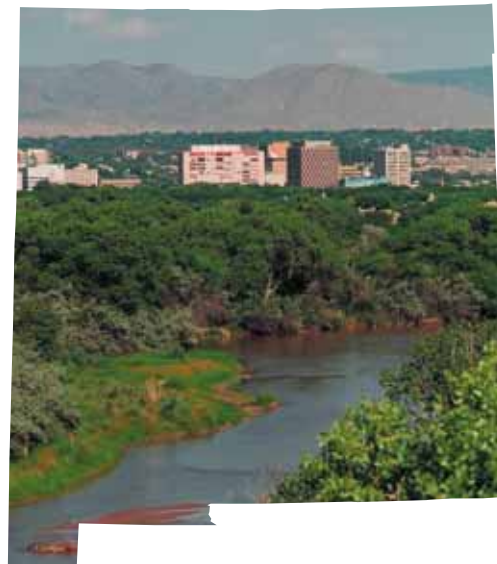


Table of Contents

3	Introduction
5	2004 Technical Achievements
5	MINNOW POPULATION MANAGEMENT
8	HABITAT RESTORATION
10	RESEARCH AND MONITORING
13	WATER ACQUISITION AND MANAGEMENT
15	Keys to Program Success
15	RECOVERY GOALS AND SPECIES MONITORING
15	STRATEGIC PLANNING
16	ORGANIZATION AND ADMINISTRATION
17	INFORMATION TECHNOLOGY
18	CONTACT INFORMATION

Cover photo courtesy of Kim Greenwood, Bureau of Reclamation



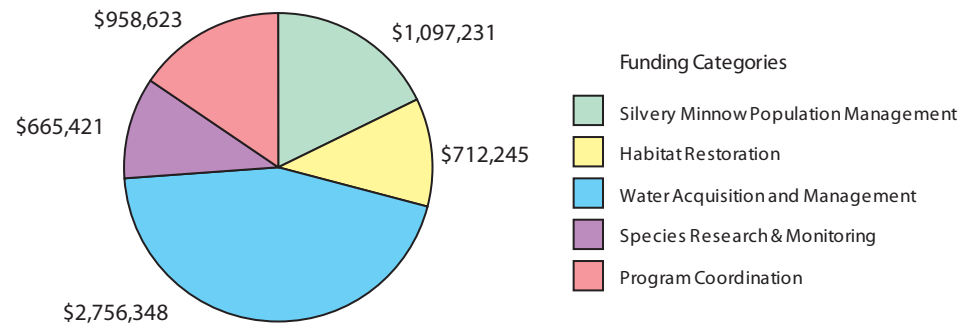
The Middle Rio Grande Endangered Species Collaborative Program (Program) is a partnership created to protect and improve the status of endangered species in the Middle Rio Grande (MRG) of New Mexico while simultaneously protecting existing and future water uses in this area.

During fiscal year 2004 Congress appropriated nearly \$7 million for Program activities (the figure below shows how funds are allocated to Program activities), while New Mexico State agencies provided more than \$2 million for Program related projects. Program signatories and other non-signatory participants contributed in-kind services that included land, access to land, personnel services and voluntary fish salvage efforts. The Program is grateful for all federal and non-federal support.

Given the ongoing drought, the Program prioritized funding of activities in fiscal year 2004 to meet multiple Program objectives that:

- 1) Manage species to ensure survival through activities that augment silvery minnow populations.
- 2) Restore species habitat, through activities that focus on a small number of projects that provide high value to the silvery minnow, that can be constructed 'on the ground' within two years, that are constructed upstream of the Isleta Diversion structure; and that have completed designs and permits in place.
- 3) Seek funding to acquire water to meet the flow requirements listed in the U.S. Fish and Wildlife Service (USFWS) 2003 Biological Opinion (BO), and implement supporting measures for water management required to meet the long-term goal of a sustainable river.

**Middle Rio Grande Endangered Species Collaborative Program
Fund Distribution (FY 2004)**





The Program has focused on the above objectives in 2004 with the following results: 1) the USFWS March 2003 BO Take limit was not exceeded; 2) the upper reaches of the MRG were augmented with several hundred thousand silvery minnows; 3) more silvery minnows were salvaged and relocated in 2004 than previous years, suggesting the augmentation efforts are beginning to show some effect; 4) the USFWS March 2003 BO river flow targets were met; and 5) a number of silvery minnow specific habitat restoration projects were planned for the Albuquerque reach of the Rio Grande.

In addition, the Program identified a number of projects it would seek to complete within two years. The State of New Mexico has allocated funding to the projects identified in Table 1.

Projects Planned for Construction March 2004 — March 2006	Lead Agency	Project status				Project notes
		Planning	Permitting	In Progress	Completed	
Habitat Construction — Pueblo of San Juan	Pueblo of San Juan					Completed in 2004
Development of Perennial Pools	MRGCD					In Progress
Albuquerque Reach Habitat Restoration	COA					Planning
Woody Debris in Albuquerque Reach	NMISC					Permitting
2nd Phase Construction of City of Albuquerque Regugia	COA/NMISC					Bid Package Complete
Construction of 2nd Silvery Minnow Refugia	NMISC					Land Acquisition/Permitting
Nursery and Embayment Habitat in Albuquerque Reach	NMISC					Permitting
San Marcial Railroad Bridge Flow Improvements	NMISC					Short-term Assessment Complete

Table 1

The following pages outline a few of the numerous projects that are either ongoing or were completed in 2004. These projects demonstrate the significance of multiple private, tribal, local, state, and federal contributions towards achieving the goal of a healthy river system, including recovery of the endangered Rio Grande silvery minnow (silvery minnow) and the southwestern willow flycatcher (flycatcher).

2004 Technical Achievements

It is rare to see an endangered species. Tanks containing silvery minnows at the City of Albuquerque's refugium draw interest from many (Photo courtesy of USFWS).



MINNOW POPULATION MANAGEMENT

Program activities in this focus area seek to augment the population of silvery minnow in the MRG, to produce genetically viable captively bred fish, and to reduce minnow take to limits defined in the USFWS March 2003 BO. Listed below are representative projects completed this year.

Breeding and Rearing Silvery Minnow

In 2003, a \$1.7 million state-of-the-art facility was built for the breeding and rearing of silvery minnows in captivity. The City of Albuquerque Biological Park provided the land and is providing staff to manage and operate the Naturalized Refugium (refugium) with support from the New Mexico Interstate Stream Commission (NMISC).

In March 2004, the refugium was drained and 3,145 fish were counted. Of these, 978 were from the June 2003 refugium spawn, demonstrating that silvery minnow can spawn, recruit and survive the winter at the facility. In 2004, captive spawns at the refugium produced 197,000 eggs, with an additional 150,000 eggs produced by hormone-induced spawns.

The Program is supporting breeding and augmentation of silvery minnow through a cooperative effort between the City of Albuquerque Biological Park, the Dexter National Fish Hatchery and Technology Center (NFHTC) located in Southeastern New Mexico and the New Mexico State University (NMSU) A-Mountain Propagation Facility located in Las Cruces. Spawning activities at NFHTC produced 30,000 larvae. An additional 300,000 fertilized eggs were produced from the NMSU facility and transferred to NFHTC for hatching and rearing. NFHTC also maintains a brood stock of 15,000 two and three year class silvery minnows that serve as captive brood stock of wild origin for future spawning and augmentation.

Silvery minnows are released into the river to supplement wild populations (Photo courtesy of Jason Remshardt).



2004 Technical Achievements

Minnows were marked with a colored dye and released into the Rio Grande (Photo courtesy of USFWS).



Population Augmentation

The ultimate goal of the silvery minnow augmentation effort is to re-establish self-sustaining populations of silvery minnow in the river. To meet this goal, studies are underway to:

- 1) evaluate stocking efforts and provide a better understanding of propagation methods and,
- 2) evaluate monitoring efforts.

Since June of 2002, biologists have released nearly 250,000 hatchery raised silvery minnows into the MRG. The first 2004 release occurred in January, and included 48,513 minnows raised from eggs that were salvaged along the San Acacia reach in May of 2003 and reared at NFHTC. An April 2004 release of 66,644 minnows represented groups of fish reared from salvaged eggs from the river and eggs produced from artificial spawning activities at the refugium and NFHTC. An additional 59,267 young silvery minnows from the refugium and NFHTC were released to the MRG in November 2004. Another 60,000 silvery minnows are being maintained at NFHTC for a March 2005 release. Each batch of fish released to the river is marked with a color-coded tag to aid in tracking fish populations.

Monthly monitoring in the MRG by the USFWS Fisheries Resource office indicate that stocking efforts are showing some success. The USFWS Fisheries Resource office recorded 450 silvery minnows collected from June 2003 to May 2004, including 99 that were positively identified as previously released fish. Of the 99 marked minnows that were recaptured, the majority (52) were associated with a single release. Subsequent to the April 2004 release, 3,977 silvery minnows were collected of which 296 were identified as previously released fish.

2004 Technical Achievements

During periods of river drying, the silvery minnows are captured by seining and moved to deeper parts of the river (Photo courtesy of Rob Dudley).



Silvery Minnow Rescue and Salvage

As the MRG dried downstream of the Isleta and San Acacia diversion dams, USFWS staff salvaged approximately 13,000 mostly young-of-year silvery minnows during 2004. Of these, approximately 92.5% were transported alive and released in the consistently wet Albuquerque reach. Twenty-seven species of fish were documented to exist in portions of the river that were mostly dry seven months earlier.

Observations by field biologists during the salvage suggested that during periods of extreme water scarcity, silvery minnows appear to seek out habitats that are cooler and deeper, including pools and an array of habitats in association with overhead cover, irrigation drain return flows, and shallow groundwater. These findings will be used to promote future habitat improvements and address seasonal intermittent flows in these reaches.

The Rio Grande Silvery Minnow is a stout minnow with moderately small eyes and a small, slightly oblique mouth. Adults may reach up to four inches in total length (Photo courtesy of USFWS).

Egg Entrainment

Silvery minnow eggs are semi-buoyant and float downstream with the current. To minimize egg entrainment field staff salvaged minnow eggs from the Middle Rio Grande Conservancy District (MRGCD) diversion canals. In 2004, 10 eggs were collected at diversion dams. It appears that more eggs were retained upstream during the spawn suggesting a reduction in the numbers of eggs that were collected at structures and transported. Egg monitoring/capture was also conducted in all reaches from May-June 2004, by the USFWS and City of Albuquerque staff. Although low numbers of eggs were captured, a small peak in capture rate was observed during the week of May 3, 2004. Studies are underway that will examine egg retention, dispersion and travel rates in the upcoming year.



2004 Technical Achievements

Dr. Thomas A. Wesche supervising the construction of perennial pools (Photo courtesy of Sterling Grogan).



HABITAT RESTORATION

Long-term restoration focuses on constructing habitat throughout the MRG to increase the listed species ability to survive each year and reproduce. Short-term restoration focuses on constructing minnow habitat in areas where the water supply is more reliable but specific types of habitat are limiting. Following are representative projects completed this year .

Long-Term Planning

The Program's Habitat Restoration Subcommittee, through the NMISC and its contractor TetraTech Inc., completed a Long-Term Habitat Restoration Plan (plan). The plan provides a framework to implement and integrate actions needed to address both water and endangered species management issues in the MRG. The plan also addresses habitat improvement elements identified in the USFWS 2003 BO to avoid jeopardy for the silvery minnow and the flycatcher. It will guide habitat restoration activities by providing a framework for soliciting, reviewing and implementing habitat restoration proposals that create long-term, self-sustaining habitat for the silvery minnow and flycatcher. The plan also provides a technical resource for the development and assessment of Program-funded restoration activities.

Snags encourage scouring of river substrate to create pools used by silvery minnow (Photo courtesy of Sterling Grogan).



Perennial Pools

The MRGCD is managing the effort to design, install and evaluate three cottonwood snag habitat improvement structures along the MRG Albuquerque reach. The snags provide needed woody debris to enhance habitat structure, complexity, cover and food for the silvery minnow. Preliminary results show that: 1) the snags continue to maintain their structural integrity; 2) hydraulic performance is satisfactory but further evaluation under higher flows is needed; 3) the habitat provided is similar to that known to be used by silvery minnow; and 4) colonization by aquatic macroinvertebrates has occurred.

2004 Technical Achievements

Pueblo of Sandia Bosque Restoration

The Pueblo of Sandia has completed phase two of a three phase habitat restoration project funded in part by the Program. This project focuses on the eradication of invasive species followed by the planting of native grasses and trees. The project's goal is to create diverse habitat for native plants and animals while reducing hazardous vegetative fuels that increase catastrophic fire risk to habitat as well as to Pueblo residences. The Pueblo has initiated a phase three feasibility study that focuses on silvery minnow habitat restoration. Clean water and habitat have always been a valued part of Pueblo culture and are monitored in conjunction with developing projects to ensure that these values remain intact.

Clearing bosque invasive species, cottonwood bosque after clearing, and replanting of cottonwoods (Photos courtesy of Alex Puglisi).



Pueblo of Santa Ana Restoration

The Pueblo of Santa Ana recently completed two projects partially funded by the Program. The first project integrated new flycatcher habitat with the ongoing Pueblo ecosystem restoration efforts. The Pueblo created ten acres of flycatcher habitat through the planting of willows and by providing connections to the river to encourage flooding. Additionally, portions of the old riverbank were graded to expand swale areas and create terraces for willow and other native shrubs. Buffers of diverse native plant communities were also established on the swale areas after removal of exotic shrub species.

The Pueblo's second project facilitated the implementation of the Conservation Water Agreement, enhanced sediment management in the MRG, and supported development and implementation of a safe harbor agreement with the USFWS for the benefit of the silvery minnow, flycatcher, and bald eagle.



2004 Technical Achievements

RESEARCH AND MONITORING

Research and monitoring activities seek to improve the scientific understanding of ecological processes so that related Program activities can be more focused and cost effective. The Rio Grande Silvery Minnow Recovery Team has recommended research activities that will contribute to a better understanding of the minnow's life history needs. Representative projects completed this year are listed below.

Evaluation of Sediment Bars

The NMISC is completing a study of the size, shape, and distribution of sediment bars in the MRG. Sediment bars are an integral part of a river and a study of the dynamics and spatial distribution of bars can provide a surrogate for a full hydraulic and sediment transport study. Understanding the interaction between the flows in the river and the sediments that form the channel are critical in evaluating the design and performance of habitat improvement projects, and to assure that various projects do not adversely affect one another.

Vegetation Mapping

The Bureau of Reclamation (Reclamation) enlisted contractors to conduct vegetation mapping between January 2002 and January 2004. By using recent aerial photographs as basemaps and assigning species codes to designated plant community types, field crews completed vegetation classifications along specified portions of the MRG. Coordinates were recorded and converted into a Geographical Information System (GIS) spatial coverage.

Population Monitoring Efforts

The University of New Mexico (UNM) monitored silvery minnow populations at 20 sites on a monthly basis between January-September 2004 throughout the MRG. Silvery minnow appeared to spawn multiple times during 2004 based on high numbers of fish observed in May (517) and June (411) that included young-of-year fish. The abundance of silvery minnow remained elevated above 2003 levels during most of the summer. Population monitoring efforts from September to November 2004 will be used to assess the relative success of recruitment in 2004 compared to previous years (1993-2003). Although preliminary assessment of the silvery minnow population during 2004 indicates that there was an increase in the abundance of silvery minnow compared to 2003, a more complete data set supplemented by population gathering between October and November will provide greater confidence in the strength and spatial extent of the potential upward trend.

2004 Technical Achievements

Genetics Studies

UNM researchers studied the genetic effects of artificial propagation and captive rearing of silvery minnows by evaluating the degree of genetic diversity. The aim of this study was to determine how well different methods of supportive breeding reflected the genetic variation present in the wild population. Seven generations of wild silvery minnow, five stocks of captive spawned and reared fish and five stocks of captive reared wild-caught eggs were examined. Three principal findings resulted from this study. First, there were two drastic reductions in the wild population's genetic diversity that corresponded to major declines in abundance of the silvery minnow. Second, a supportive breeding program that relies on captive rearing of wild-caught eggs better reflect wild population genetic diversity than one that relies on captive spawning. And third, the combination of communal spawning, small brood stock sizes and unequal sex ratios resulted in a loss of diversity and a loss of progeny from captive spawning when compared to wild silvery minnow or stocks reared from wild-caught eggs. The findings are being considered in ongoing population management efforts.

Water Quality Assessment

The USFWS completed their initial report that included a literature search of existing water quality information within the MRG and a summary of water quality data collected during 2002-2003.

New hydrologic and biologic data were collected at eleven sites within the MRG main stem; two sites located in wastewater treatment plant outfalls, and one site located in an irrigation return drain. Data collected included: 1) water and sediment samples for the purpose of chemical analyses; 2) physical properties measurements of Rio Grande embayments that included water temperature, pH, specific conductance, dissolved oxygen, and turbidity; 3) physical properties measurements taken along cross-sectional surface-water channel transects; 4) physical properties measurements taken in surface water at random and discretionary seine haul locations; and 5) continuous 24-hour measurements of physical properties taken along transects. Additionally, changes in dissolved oxygen over time, as measured by the continuous-monitoring probes were used to determine the relative productivity of aquatic flora for each site. Chemical and health analyses were conducted on fish collected through this study.

Joel Lusk with the U.S. Fish and Wildlife Service installs a continuous water quality monitoring device (Photo courtesy of Cyndie Abeyta).



2004 Technical Achievements

Data logger being programmed at Bosque del Apache National Wildlife Refuge (Photo courtesy of Julie Coonrod).

Bosque Soil Evaporation Monitoring and Modeling

A UNM project evaluated water depletions and hydrology in the MRG that will assist decision makers in developing bosque restoration strategies. The study conducted in 2003 and 2004: 1) quantified and evaluated losses from evaporation and evapotranspiration (ET); 2) developed an empirical predictive model for soil water evaporation; and 3) developed an integrated GIS-based model for estimating soil water evaporation under different river flow conditions. This project involved monitoring soil water evaporation as a function of different conditions relative to the distance to the water table, soil type, climatic conditions, river staging, shading, and surface mulch. Instrumentation arrays were located at each field site to measure soil water content, temperature, and suction between the water table and the ground surface. Preliminary results indicate that water loss from unshaded soils where the groundwater table is shallow can approach that of a vegetated site.

Regulation of Water Flux from the Ground to the Atmosphere in Riparian Habitats

UNM is studying ET with partial funding from the Program. In this study, salt cedar (*Tamarix chinensis*) responded to groundwater decline with increased ET as greater soil volumes were exploited by rapidly growing root systems. Cottonwood (*Populus deltoids*) showed an increase in chlorosis, a disease marked by yellowing or blanching of the leaves, as groundwater declined. When the water table dropped below six feet, crown die back and loss of leaf area were observed. ET increased with greater loss of leaf area regardless of species composition. Some reduction in ET was observed with increase in leaf area due to shading of lower canopy leaves. On a daily basis, local atmospheric conditions such as temperature and wind-speed were most related to extremes in ET. The results indicate plant water use is influenced by climate, topography, groundwater level, and plant species.

ET Tower located in the bosque (Photo courtesy of James Cleverly).



2004 Technical Achievements

WATER ACQUISITION AND MANAGEMENT

The Program seeks to secure funding to lease or purchase water, acquire water rights to meet Program goals and to develop plans to more efficiently manage available water. Ongoing projects include: evaluating stored water needed to continue to meet the USFWS March 2003 BO river flow targets; providing Program funding to Reclamation for the purpose of leasing water to meet river flow targets; and evaluating interest among MRG irrigators to participate in a voluntary irrigation forbearance program. The following projects are representative of those completed this year.

A new metering gate, installed at the heading of the Belen High Line Canal, is equipped with an automatic controller and FM telemetry (Photo courtesy of David Gensler, MRGCD).

Modeling

In a cooperative project between the NMISC and the MRGCD initial modeling efforts have been completed that will lead to improved irrigation-system efficiencies. One project includes a Decision-Support Model that will facilitate system operations through better planning and water management. The model allows the needs of irrigators to be met while decreasing river water diversions primarily by using managed, rotational water deliveries. The decrease in MRGCD water diversion requirements would lead to a longer irrigation season during drier years, and thus decrease supplemental flow requirements. Associated with this Decision-Support Model development is a Program-initiated project for constructing and operating several new gages within the MRGCD to ensure accurate and efficient water deliveries. Separate funding by the New Mexico Water Trust Board supported installation of a series of automated gates within the MRGCD system.



The Utton Transboundary Resources Center, affiliated with the University of New Mexico School of Law, has been working with the Program to develop reservoir storage scenarios to minimize the need for additional supplemental water for endangered species. If consensus is reached on potential scenarios, they will be modeled using the Upper Rio Grande Water Operations Model (URGWOM) to identify potential water management improvements that will meet the needs of water users and the delivery requirements of the Rio Grande Compact. This effort will identify where significant water savings could occur and target long-term strategies for future water management efforts.

2004 Technical Achievements

More Efficient Farms

In 2004, the Program initiated a project to evaluate on-farm irrigation efficiency. Information gathered will be used to estimate on-farm efficiency under current conditions and practices, and examine the potential for increased efficiency through additional conservation measures. A newsletter will summarize information about the on-farm efficiency studies and include useful information on conservation management practices that individual irrigators within MRGCD can adopt with the realization that more supplemental water will benefit silvery minnow. The newsletter will be distributed to approximately 12,000 irrigators within the MRGCD, with another 1,000 copies supplied for distribution by local U. S. Department of Agriculture—Natural Resources Conservation Service offices.





Keys to Program Success

In 2004, Program signatories and participants partnered to support habitat restoration, water management, species salvage and research, and other Program activities that will assist in improving the status of endangered species in the MRG while protecting existing and future water uses. The Program has matured greatly this past year by focusing efforts on developing a strong planning foundation to conduct its business effectively. The addition of professional staff has allowed the Program to address several existing administrative deficiencies and to move forward in a more focused manner.

RECOVERY GOALS AND SPECIES MONITORING

Among the fundamental issues slowing Program success was the need for clear recovery goals and objectives for the silvery minnow in the MRG. Scientific disagreement regarding the effectiveness of current silvery minnow population monitoring efforts, and the merits of extrapolating these numbers to estimate total wild populations, slowed the development of a long-term monitoring program geared toward recovery success. To address these issues, the Program convened an advisory panel of five distinguished experts in the fields of fish ecology, statistics, ecological modeling, and hydrology to provide objective guidance on establishing sampling protocols and measurable recovery criteria for the silvery minnow in the MRG. The advisory panel met with Program participants in December 2004 for a three-day workshop in Albuquerque to discuss the need to establish measurable recovery criteria that will encourage the development of focused and cost-effective implementation plans that support long-term species recovery. Their report is expected in early 2005.

STRATEGIC PLANNING

Defining the scope and constructing a long-term plan to meet Program goals has been difficult given the competing interests within the MRG and uncertainties of the species needs. To address these issues, Program signatories convened in Taos for a two-day workshop during 2004. Twenty-eight Program members representing 15 signatories attended. The workshop resulted in a draft of the Program's first long-term plan identifying activities in order of priority. As part of the strategic planning effort, the Program anticipates finalizing the Program Document (governance and organization), the Cooperative Agreement, and the Long Term Plan in early 2005. These documents will support Programmatic NEPA compliance and passage of Authorizing Legislation.

Keys to Program Success

ORGANIZATION AND ADMINISTRATION

Staffing

In April 2004, the Program hired Pete David to serve as Program Manager to facilitate the administrative and technical functions of the Program and serve as a liaison with Program members, elected officials and the public. A search for a Program Assistant began in the fall of 2004.

Non-federal Program signatories and the Program Manager met with Senator Domenici in Washington to discuss the Program's future direction (Photo courtesy of Janet Jarrat).



Restructuring

The Program is currently reviewing its organizational structure in conjunction with the development of the Long Term Plan, Program Document, and draft Authorizing Legislation. Any structural changes will strive to improve communication among technical staff, and facilitate the development of focused request for proposals and timely review of submitted proposals.

Contracting

The Program pursues scientifically-based solutions that will prevent extinction and promote recovery of endangered species in the MRG. Projects such as those highlighted in this report, are funded annually through a competitive process. Reclamation has been appropriated Program funding from Congress to provide contracting support to the Program. Program staff meet with Reclamation contract staff to develop effective working relationships and ensure that contract deadlines are met. The status of all contracts and their required product deliverables are tracked in a Program database. Future requests for proposals will focus on specific Program priorities resulting in more timely solicitations and contract awards.



Keys to Program Success

INFORMATION TECHNOLOGY

A key Program goal is to increase awareness of Program activities and provide the public access to information and Program-funded studies. In 2004, a Program website (<http://mrgesacp.fws.gov/index.cfm>) was developed to show how federal and non-federal funds are being used to restore the MRG ecosystem and support species recovery. This website is accessible to the public and is continuously updated.

In 2004, the Program initiated development of a database that eventually will be linked to the website. This database will provide location maps of all Program-funded projects being conducted in the MRG. Each project will be linked to a description highlighting the project objectives, funding, accomplishments, and completion date. Additionally, the database will house the numerous technical reports being generated by contractors and agencies funded by the Program.

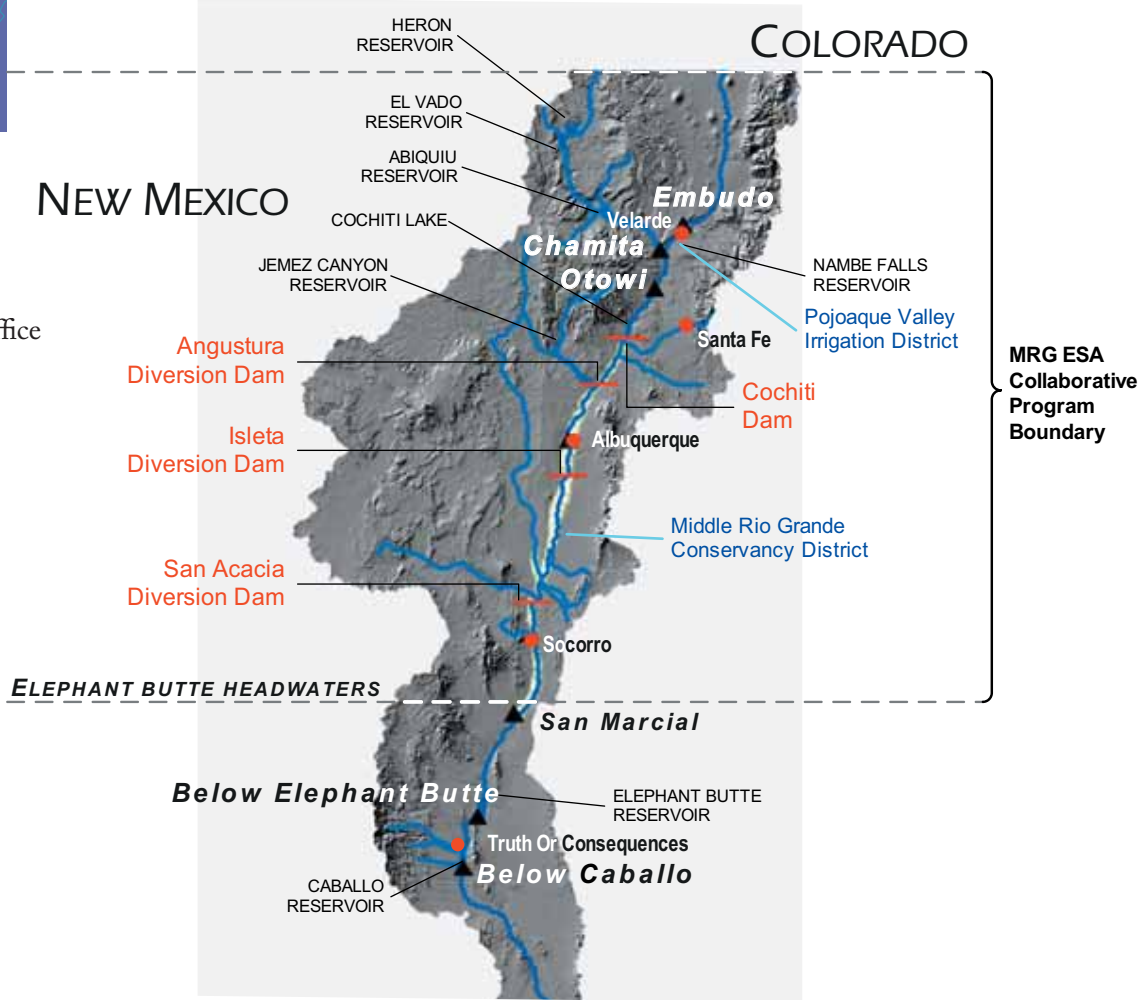


Contact

For more information, contact:

Peter David, Program Manager
 c/o U.S. Fish and Wildlife Service
 New Mexico Ecological Services Field Office
 2105 Osuna Road NE
 Albuquerque, New Mexico 87113

 505-761-4743
 505-346-2542 (fax)
 Peter_David@fws.gov



Program Signatories are: Alliance for the Rio Grande Heritage • Assessment Payers Association of the MRGCD • Bureau of Indian Affairs • Bureau of Reclamation • City of Albuquerque • Middle Rio Grande Conservancy District • National Association of Industrial and Office Properties • New Mexico Attorney General • New Mexico Department of Agriculture • New Mexico Department of Game and Fish • New Mexico Environment Department • New Mexico Interstate Stream Commission • New Mexico State University • Pueblo of Isleta • Pueblo of Sandia • Rio Grande Restoration • Rio Grande Water Rights Association • U.S. Army Corps of Engineers • U.S. Fish and Wildlife Service • U.S.D.A. Forest Service—Rocky Mountain Station • University of New Mexico