BUREAU OF RECLAMATION

Calendar Year 2024 Report to the Rio Grande Compact Commission

Interior Region 7: Upper Colorado Basin

Rio Grande looking downstream near Escondida Bridge (Reclamation, 2024)

U.S. Department of the Interior

March 2025

Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, Native Hawaiians, and affiliated Island Communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Calendar Year 2024 Report to the Rio Grande Compact Commission

Interior Region 7: Upper Colorado Basin

prepared by Bureau of Reclamation, Albuquerque Area Office, Albuquerque, New Mexico

For the Rio Grande Compact Commission:

Colorado
Jason Ullmann, P.E.

New Mexico
Elizabeth Anderson, P.E.

Texas
Robert Skov

Federal Chairman
Hal Simpson

Contents

Figures

Tables

Acronyms

ABCWUA	Albuquerque Bernalillo County Water Utility Authority
ac-ft	acre-feet
AIS	Aquatic Invasive Species
ANWR	Alamosa National Wildlife Refuge
AOP	Rio Grande Annual Operating Plan
BdA	Bosque del Apache National Wildlife Refuge
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BWHA	Blanca Wildlife Habitat Area
CADSWES	Center for Advanced Decision Support for Water and Environmental Systems
CBD	San Luis Valley Project-Closed Basin Division
cfs	cubic feet per second
Collaborative Program	MRG Endangered Species Collaborative Program
Compact	Rio Grande Compact of 1938
CP&G	Comprehensive Plan and Guide
CPUE	Catch-Per-Unit-Effort
CPW	Colorado Parks and Wildlife
cuckoo	Western Yellow-billed Cuckoo
CWA	Clean Water Act
Delta Channel	San Marcial Delta Water Conveyance Channel Project
D.N.M.	District Court of New Mexico
DMI	Data Management Interface
DOI	U.S. Department of the Interior
EBID	Elephant Butte Irrigation District
EDW	Emergency Drought Water
EIS	Environment Impact Statement
EPCWID	El Paso County Water Improvement District No. 1
EPWSD	El Prado Water and Sanitation District
ESA	Endangered Species Act
ET	Evapotranspiration
EWLP	Environmental Water Leasing Program
flycatcher	Southwestern Willow Flycatcher
HCCRD	Hudspeth County Conservation and Reclamation District No. 1
HDB	Hydrologic Database
HydroMet	Hydrologic and Meteorological Monitoring Stations
IBWC	International Boundary and Water Commission
IDD	Isleta Diversion Dam
JPL	NASA's Jet Propulsion Laboratory
jumping mouse	New Mexico Meadow Jumping Mouse
kWhr	kilowatt-hour
LFCC	Low Flow Conveyance Channel
LiDAR	Light Detection and Ranging
LSARI	Lower San Acacia Reach Project
MDWCA	Llano Quemado Mutual Domestic Water Consumer Association
MF-OWHM	MODFLOW One-Water Hydrologic Flow Model

MODFLOW	Modular Three-Dimensional Finite-Difference Groundwater Flow Model
MRG	Middle Rio Grande
MRG BO	2016 Middle Rio Grande Biological Opinion
MRGP	Middle Rio Grande Project
MRGCD	Middle Rio Grande Conservancy District
NAA	Native American Affairs
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NFWF	National Fish and Wildlife Foundation
NMDGF	New Mexico Department of Game and Fish
NMISC	New Mexico Interstate Stream Commission
NMOSE	New Mexico Office of the State Engineer
NRCS	Natural Resources Conservation Service
NWIS	National Water Info System
O&M	Operation and Maintenance
P&P	Prior and Paramount
PFR	Periodic Facility Review
PVID	Pojoaque Valley Irrigation District
Reclamation	Bureau of Reclamation
RGP	Rio Grande Project
RGPA-DRT	Rio Grande Project Drought Resilience Team
RGP BO	Rio Grande Project Biological Opinion
RGSM	Rio Grande Silvery Minnow
RGTIHM	Rio Grande Transboundary Integrated Hydrologic Model
Rio Chiquito	Acequia Madre del Rio Chiquito/Acequia del Monte del Rio Chiquito
RM	River Mile
RR-SWA	City of Rio Rancho
RWS	Regional Water System
S&T	Science and Technology Program
SADD	San Acacia Diversion Dam
Santa Fe	City of Santa Fe
SCOTUS	Supreme Court of the United States
SECURE	Science and Engineering to Comprehensively Understand and Responsibly Enhance Water Act
SJCP	San Juan-Chama Project
SWA	State Wildlife Area
SWE	Snow Water Equivalence
Title XVI	Title XVI of P.L. 102-575, Water Reclamation and Reuse Program
TRGWM	Transboundary Rio Grande Watershed Model
ToT	Town of Taos
URGWOM	Upper Rio Grande Water Operations Model
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WaterSMART	DOI's Sustain and Manage America's Resources for Tomorrow Program
WID	Watercraft Inspection and Decontamination

Introduction

The Bureau of Reclamation (Reclamation) is responsible for operation, maintenance, and oversight of four projects on the mainstem of the Rio Grande and its upper basin tributaries. These projects are the San Luis Valley Project, the San Juan-Chama Project (SJCP), the Middle Rio Grande Project (MRGP), and the Rio Grande Project (RGP).

The San Luis Valley Project in Colorado consists of two divisions: the Conejos Division, which includes Platoro Dam and Reservoir, supplies water for approximately 81,000 acres within the Conejos Water Conservancy District; and the Closed Basin Division (CBD), a groundwater salvage project located near Alamosa, Colorado, which pumps water from the shallow, unconfined aquifer primarily to assist Colorado in meeting its commitment under the Rio Grande Compact (Compact) of 1938.

The SJCP consists of a system of diversion structures, tunnels, and channels for transbasin movement of water from the San Juan River Basin to the Rio Grande Basin as a component of the Colorado River Storage Project. The transbasin water stored in Heron Reservoir supplies water for municipal, domestic, industrial, recreation, fish and wildlife purposes, and supplemental water for irrigation. Another part of the SJCP is the Pojoaque Tributary Unit including Nambé Falls Dam. The Pojoaque Tributary Unit supplies water for approximately 2,800 irrigated acres in the Pojoaque Valley.

The MRGP consists of El Vado Dam and Reservoir, Angostura, Isleta, and San Acacia Diversion Dams, the Low Flow Conveyance Channel (LFCC), and over 1,000 miles of irrigation and drainage facilities in the Middle Rio Grande Valley (MRG). It supplies water to 50,000 – 70,000 acres of land within the Middle Rio Grande Conservancy District (MRGCD) and includes irrigated lands of the Six Middle Rio Grande Pueblos (Pueblo de Cochiti, Santo Domingo Tribe, Pueblo of San Felipe, Santa Ana Pueblo, Pueblo of Sandia, and Pueblo of Isleta). Additionally, the MRGP maintains valley drainage and provides flood protection to over one million people. The MRGP also includes 260 miles of the Rio Grande channel from Velarde, New Mexico, to Caballo Reservoir, where the natural hydrological effects of the river's flow create some of the highest sediment loads in the world requiring ongoing maintenance by Reclamation to maintain and ensure the ability to deliver water to and through the MRG Valley directly supporting New Mexico's commitments under the Compact.

The RGP includes Elephant Butte and Caballo Reservoirs and Percha, Leasburg, and Mesilla Diversion Dams. It stretches from the lower Rio Grande Valley of southern New Mexico to Fort Quitman, located south of El Paso, Texas. The RGP provides agricultural water supply for approximately 178,000 acres of land within the Elephant Butte Irrigation District (EBID) in New Mexico and the El Paso County Water Improvement District No. 1 (EPCWID) in Texas. Water is also supplied for diversion to the Republic of Mexico by the United States Section of the International Boundary and Water Commission (IBWC), according to the terms of the Convention of 1906 between the United States and the Republic of Mexico. Drainage waters from the Project lands provide a supplemental supply for approximately 18,000 acres of land within the Hudspeth County Conservation and Reclamation District No. 1 (HCCRD) in Texas. Elephant Butte Dam also generates hydroelectric power that is marketed by the Western Area Power Administration.

San Luis Valley Project, Colorado

There are two divisions within the San Luis Valley Project (see Figure 1), the Conejos Division and CBD.

The Conejos Division facilities include Platoro Dam and Reservoir, which is operated and maintained by the Conejos Water Conservancy District, and which regulate the water supply for up to 81,000 acres of irrigated land.

The CBD salvages shallow groundwater in San Luis Valley's Closed Basin. The salvaged water is delivered to the Rio Grande to help meet Colorado's water delivery requirements in accordance with the Compact and the Convention of 1906, a treaty with the Republic of Mexico. This project also conveys water to Alamosa National Wildlife Refuge (ANWR), Bureau of Land Management's Blanca Wildlife Habitat Area (BWHA), San Luis Lakes State Wildlife Area (SWA). Reclamation operates the project under the guidance of the San Luis Valley's CBD Operating Committee.

Conejos Division

Platoro Operations

Platoro Reservoir began 2024 at an elevation of 10,003.04 ft (33,167 ac-ft) and ended the year at 9,999.56 ft (30,659 ac-ft). The maximum elevation for the year was 10,007.53 ft (36,550 ac-ft) on July 2, and the minimum elevation was 9,999.56 ft (30,659 ac-ft) on December 31. Article VII[1] restrictions were implemented on June 25 and remained in effect for the rest of the year.

2025 Platoro Outlook

The March 2025 Natural Resources Conservation Service (NRCS) most probable forecast for Platoro Reservoir inflow from April to July is for 36,000 ac-ft (71 percent of median). Given current RGP storage, it seems likely that Article VII restrictions may remain in place throughout 2025.

[1] Refers to the Rio Grande Compact of 1938, Article VII; See the Article VII section under Rio Grande Project.

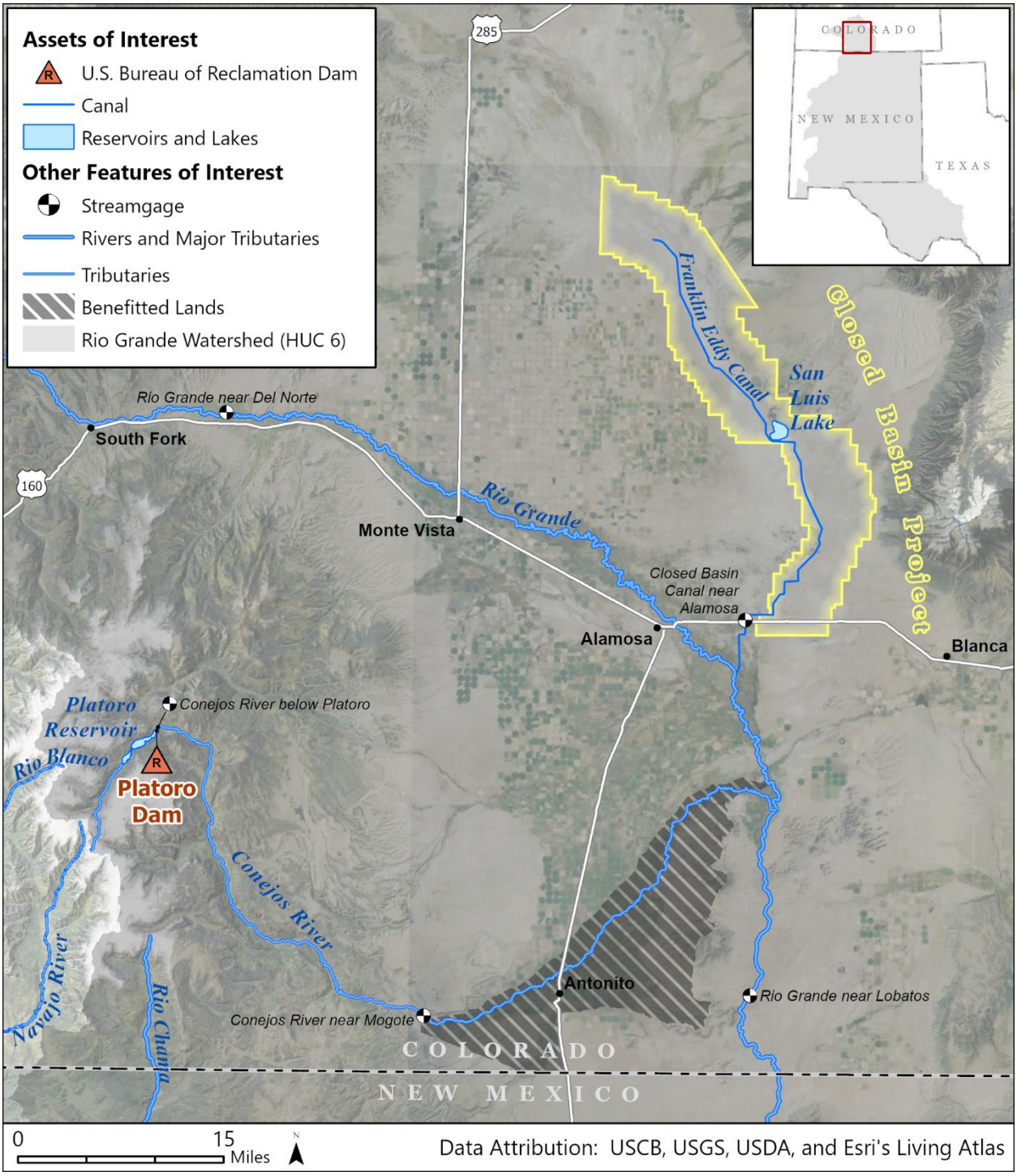


Figure 1: Map of the San Luis Valley Project in Colorado.

Platoro Dam Facility Review and Safety of Dams Program

Platoro Dam has no significant dam safety-related operation and maintenance (O&M) issues. Recoating the interior of the conduit pipe exhibiting coating degradation, first observed in 2017 and stemming from high velocity discharges, has been deferred to spring 2025. A backup generator that was on back order was installed in the summer of 2024. The Annual Site Inspection was completed

in June 2024 and there were two new Category 3 O&M recommendations. The Facility Reliability Rating was completed in September 2024 with Platoro Dam receiving a score of 97 which equates to an overall rating of "Good." The next facility review is a Periodic Facility Review (PFR) scheduled for summer 2025.

Closed Basin Division

Operations

The CBD continues to supply Compact and mitigation water deliveries. The San Luis Valley remains in a long-term drought. Since 2002, some areas of the water table in the unconfined aquifer have dropped significantly. CBD salvage wells are operated to minimize aquifer impacts outside of the project area. Salvage wells that were turned off at the recommendation of the Operating Committee remain off while nearby water levels are monitored.

Deliveries by the CBD included deliveries to the Rio Grande, BWHA, ANWR, and San Luis Lakes SWA. In 2024, the CBD delivered 11,360 ac-ft. Of that, total creditable Compact water[1] delivered to the Rio Grande was 7,979 ac-ft. This included 7,357 ac-ft delivered at the CBD canal outlet, 582 ac-ft of exchanges with Bureau of Land Management (BLM), and a 40 ac-ft exchange with Colorado Parks and Wildlife (CPW) delivered to the San Luis Lakes SWA. The ANWR was owed a total mitigation amount of 2,584 ac-ft. Of this total, 2,334 ac-ft was delivered to the ANWR, while 250 ac-ft was delivered to the BWHA through an exchange between U.S. Fish and Wildlife Service (USFWS) and BLM. Mitigation deliveries to BLM were reduced by 3 ac-ft due to an excess of 3 ac-ft in 2023. Table 1 reports total production and Compact deliveries in 2024 and the four preceding years. Table 2 shows total water accounting by delivery location and month.

Table 1: CBD Deliveries 2020-2024[2]

Year	Total CBD Production	Delivered at CBD Canal Outlet	Delivered by Exchange[3]	Total Creditable Delivery
2024	11,360	7,357	622	7,979
2023	11,004	7,440	162	7,602
2022	11,673	8,110	166	8,276
2021	11,600	7,777	462	8,239
2020	9,911	6,188	310	6,498

[1] Refers to the Rio Grande Compact of 1938, Article III.
[2] Units are ac-ft.
[3] CBD water delivered to BWHA or San Luis Lakes SWA in exchange for other water sources delivered upstream to the Rio Grande.

Table 2: 2024 CBD Water Accounting[1]

Month	BWHA CH03 Sta. 730+00	BWHA CH04 Sta. 798+60	BWHA Total[2]	Parshall Flume Total Passing	Parshall Flume Creditable	ANWR CH01 Chicago Turnout	ANWR CH02 Mum Turnout	ANWR Pumping Plant	ANWR Total	RG Flume Less Delivery	Creditable Delivery	Non Creditable Delivery	Total CDB Production
Jan	0	0	0	859	859	0	0	0	0	859	859	0	859
Feb	0	0	0	891	891	15	16	0	31	860	860	0	891
Mar	113	113	226	828	828	292	305	0	597	231	231	0	1,054
Apr	0	0	0	883	883	49	35	0	84	799	799	0	883
May	0	0	0	839	839	0	0	0	0	839	839	0	839
Jun	122	120	242	672	672	0	0	0	0	672	672	0	914
Jul	207	223	430	524	524	0	0	0	0	524	524	0	954
Aug	206	215	421	611	611	293	212	0	505	106	106	0	1,032
Sep	131	164	295	671	671	216	264	0	480	191	191	0	966
Oct	5	10	15	989	989	307	323	0	630	359	359	0	1,004
Nov	0	0	0	955	955	0	7	0	7	948	948	0	955
Dec	0	0	0	969	969	0	0	0	0	969	969	0	969
Annual	784	845	1,629	9,691	9,691	1,172	1,162	0	2,334	7,357	7,357	0	11,320

Water Quality

The Compact specifies that creditable water delivered to the Rio Grande cannot exceed 350 parts per million total dissolved solids based on a 10-day average. Reclamation continues to monitor the water quality of CBD salvage wells, the Rio Grande, San Luis Lake, Head Lake, and the conveyance channel with 1,222 samples collected during 2024. All 2024 water deliveries met these water quality standards.

Maintenance

Routine preventive maintenance and repair activities continue at all observation and salvage wells, lateral line valves, canal structures, pumping plants, and canal and lateral access roads. In 2024, thirteen new pumps were installed, and 22 salvage wells were rehabilitated.

[1] Units are ac-ft. CBD Production is 11,320 + 40 ac-ft of delivery to CPW, bringing the total to 11,360 ac-ft.
[2] Delivery to BWHA includes a 357 ac-ft Treasure Pass exchange, 797 ac-ft of mitigation water, 225 ac-ft one time sale purchase from SLVWCD, and 250 ac-ft mitigation water transfer from ANWR.

San Juan-Chama Project, Colorado – New Mexico

The SJCP diverts water at three diversion dams from the upper tributaries of the San Juan River in Colorado through the Azotea Tunnel to Heron Reservoir in New Mexico, ultimately for use in the Rio Grande Basin of New Mexico and providing water for municipal, domestic, and industrial use (see Figure). In addition, supplemental irrigation water is provided to the MRGCD and also to the Pojoaque Valley Irrigation District (PVID) by offsetting the depletion to Rio Grande flow caused by PVID's water storage. The Compact requires this transbasin water from the SJCP to be accounted for separately from native Rio Grande flow.

San Juan-Chama Project Accounting

Reclamation is responsible for water contracts and water accounting for the SJCP. SJCP accounting for 2024 is provided to the Rio Grande Compact Commission in the separate *2024 Water Accounting Report*. Reclamation continued to use Microsoft Excel to create the water accounting report by mining accounting data from Reclamation's hydrologic database (HDB), Reclamation's database of record. The data are computed and recorded in RiverWare and sent to HDB via a Data Management Interface (DMI).

Heron Dam and Reservoir Operations

Diversions into the Azotea Tunnel began on March 7 and continued until October 25 during 2024. The total volume diverted was 74,151 ac-ft. The running 10-year average of Azotea Tunnel diversions increased slightly this year, from 90,855 ac-ft for the period 2014 through 2023, to 92,267 ac-ft for the period 2015 through 2024 (see Table 3).

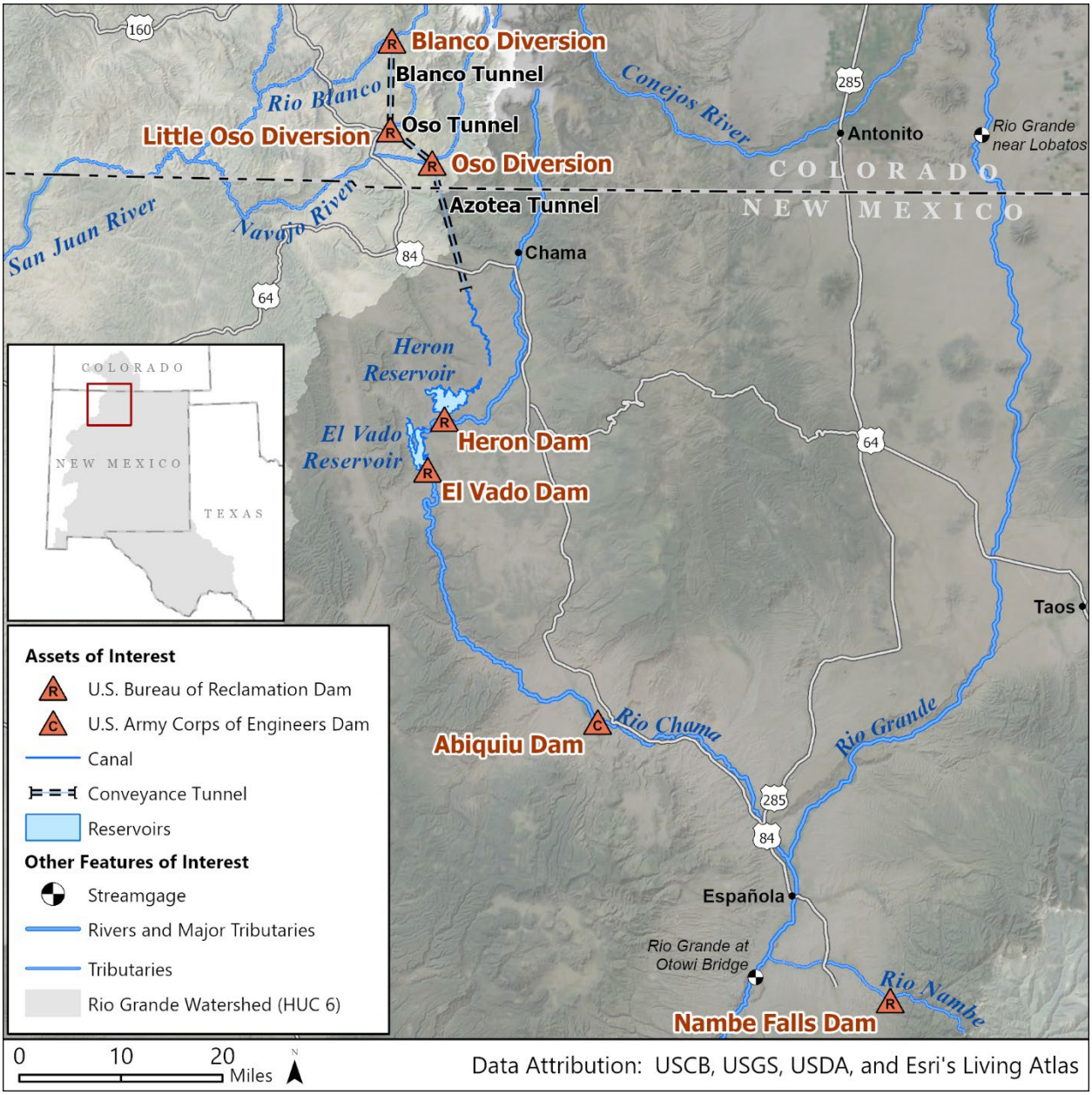


Figure 2: Map of the San Juan-Chama Project in Colorado and New Mexico.

Table 3: SJCP Diversions Through Azotea Tunnel 2015-2024[1]

Month	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	10-Year Total
Jan	28	109	0	0	0	0	0	0	0	0	137
Feb	974	-1,917	1,488	0	0	9	0	0	0	0	4,388
Mar	6,890	6,489	16,839	1,598	1,036	1,644	816	2,172	204	1,211	38,899
Apr	8,163	13,687	32,628	12,869	24,049	10,605	13,446	17,079	23,661	16,167	172,354
May	24,470	27,940	45,326	15,616	33,926	26,972	24,778	29,871	59,441	21,483	309,823
Jun	38,438	35,427	46,227	2,636	56,925	7,866	17,907	6,550	47,357	22,854	282,187
Jul	8,581	3,535	10,617	152	26,285	876	2,439	4,556	10,903	5,754	73,698
Aug	889	3,681	4,809	7	5,841	159	627	4,707	592	5,682	26,994
Sep	126	1,271	1,806	0	208	83	116	848	37	686	5,181
Oct	811	253	2,413	1,216	0	0	0	2,151	0	314	7,158
Nov	862	0	279	283	0	0	0	0	0	0	1,424
Dec	334	0	90	0	0	0	0	0	0	0	424
Annual	90,566	94,309	162,522	34,377	148,270	48,214	60,129	67,934	142,195	74,151	922,667

Heron Reservoir began 2024 at an elevation of 7,113.97 ft (99,543 ac-ft). The maximum elevation for the year was reached on June 24 at 7,128.51 ft (139,544 ac-ft). Heron Reservoir ended the year at elevation 7,096.49 ft (65,199 ac-ft), which was the minimum for the year.

The initial 2024 allocation of 30,000 ac-ft was made in January, and subsequent allocations were made monthly beginning in May, with a full allocation of 96,200 ac-ft made in September.

The SJCP contractors' 2024 and waivered 2023 allocations were delivered as shown in Table 4, for a total delivery of 96,479 ac-ft. The remaining 2024 allocations are being held in Heron according to waivers, which grant an extension of the delivery date into 2025. Note that some contractors lease their allocation to Reclamation which shows up as an internal transfer within Heron and not a release from the individual contractor's account.

[1] Units in ac-ft.

Table 4: 2024 SJCP Water Released by Contractor from Heron Reservoir[1]

SJCP Contractor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
MRGCD	0	0	0	0	0	0	0	0	0	2,310	0	0	2,310
Santa Fe	0	0	0	0	0	0	0	0	5,180	292	974	0	6,446
Santa Fe County	0	0	0	0	0	0	0	0	0	0	0	375	375
Cochiti	0	0	0	0	0	0	0	0	0	936	3,354	0	4,290
ABCWUA	3,661	2,415	839	493	0	10,866	21,605	15,370	2,223	2,633	8,953	574	69,632
Pojoaque Unit	0	0	0	0	0	0	0	0	0	0	0	1,030	1,030
Taos	0	0	0	0	0	0	0	0	0	0	0	104	104
Los Alamos County	0	0	0	0	0	0	0	0	0	0	569	631	1,200
Española	0	0	0	0	0	0	0	0	0	0	0	1,000	1,000
Taos Ski Valley	0	0	0	0	0	0	0	0	0	0	0	15	15
Los Lunas	0	0	0	0	0	0	0	0	100	0	0	4	104
Bernalillo	0	0	0	0	0	0	0	0	0	0	0	0	0
Belen	0	0	0	0	0	0	0	0	0	0	0	144	144
Red River	0	0	0	0	0	0	0	0	0	0	0	0	0
Jicarilla Apache	0	0	0	0	0	0	0	0	0	600	0	0	600
Ohkay Owingeh	0	0	0	0	0	0	0	0	0	0	0	0	0
Reclamation	0	0	0	0	0	0	0	0	0	0	0	0	0
El Prado	0	0	0	0	0	0	0	2,200	3,667	3,362	0	0	9,229
Taos Pueblo	0	0	0	0	0	0	0	0	0	0	0	0	0
Aamodt Settlement	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3,661	2,415	839	493	0	10,866	21,605	17,570	11,170	10,134	13,850	3,876	96,479

[1] Units in ac-ft.

To avoid problems with high flow releases from El Vado Dam as occurred in 2023, in 2024 MRGCD released water for irrigation from Abiquiu Dam via an exchange with Albuquerque Bernalillo County Water Utility Authority (ABCWUA), instead of releasing it from Heron Dam. This operation began in late July as natural flow declined and MRGCD needed supplemental SJCP supply. The daily demand was transferred from ABCWUA's account in Abiquiu to MRGCD's account and then released. On the same day, the volume released from Abiquiu was transferred from MRGCD's Heron account to ABCWUA's Heron account.

Table 5 presents actual monthly Heron water operations in 2024.

Table 5: 2024 SJCP Monthly Water Operations at Heron Reservoir[1]

Month	Rio Grande Inflow	SJCP Inflow	Rio Grande Outflow	SJCP Outflow	SJCP Loss	Rio Grande Content	SJCP Content	Total Content
Dec 2023	0	0	0	0	0	645	99,017	99,662
Jan	64	0	64	3,661	(220)	298	95,573	95,871
Feb	613	0	269	2,415	0	642	93,158	93,800
Mar	1,451	1,211	1,757	839	0	337	93,530	93,867
Apr	910	16,135	976	493	1,063	271	108,109	108,380
May	599	21,440	873	0	1,575	(3)	127,974	127,971
Jun	1,504	22,808	1,510	10,866	1,761	(10)	138,156	138,146
Jul	1,559	5,743	1,588	21,605	2,037	(39)	120,257	120,218
Aug	1,427	5,670	1,404	17,570	1,184	(16)	107,173	107,157
Sep	464	686	263	11,170	1,233	185	95,457	95,642
Oct	270	314	60	10,134	1,953	396	83,683	84,079
Nov	49	0	49	13,850	386	396	69,447	69,843
Dec	44	0	97	3,876	715	343	64,856	65,199
Sub-Total	8,954	74,007	8,910	96,479	-	-	-	-
Adjustment[2]	-	-	-	-	-	(350)	-	-
Annual	-	82,961	-	105,389	11,687	(7)	65,206	-

All daily operations decisions were made using provisional data available at the time of the decision. For that reason, reservoir data in the final accounting model, which uses Compact-approved data, may differ from reservoir data used to make daily operational decisions. Therefore, the dates mentioned above may differ slightly from those found using final 2024 data.

[1] Units in ac-ft; content is end of month.
[2] 350 ac-ft of native Rio Grande water is annually retained in Heron to cover water use by New Mexico State Parks' facilities under water rights file No. 1545.

Pojoaque Tributary Unit- Nambé Falls Dam and Reservoir

Operations at Nambé Falls Reservoir consist of non-irrigation and irrigation season activities. During non-irrigation season (November – April), all inflow in excess of the bypass requirement of 0.5 cfs is typically stored until an elevation of 6,825.60 ft is reached. An uncontrolled spill begins at the top of the spillway crest (6,826.60 ft). During irrigation season (May – October), water is stored and released on demand to meet downstream requirements.

Nambé Falls Reservoir began 2024 at an elevation of 6,817.88 ft (1,231 ac-ft). The reservoir filled on February 29 and remained full and spilling until late June. The maximum elevation was 6,827.01 ft (1,663 ac-ft) on April 21. A peak outflow of 37 cfs occurred on June 10. The minimum elevation of 6,817.76 ft (1,226 ac-ft) was reached on August 2. The reservoir ended 2024 at elevation 6,823.57 ft (1,489 ac-ft).

The Nambé Falls depletion for the year, which is the amount that Rio Grande flow is decreased as a result of reservoir storage, was 951 ac-ft at Otowi (970 ac-ft from Heron). In addition, a deficit of 240 ac-ft has been carried over from previous years, bringing the total depletion to 1,191 ac-ft (1,215 ac-ft from Heron). A release of 1,030 ac-ft from Heron Reservoir was made in 2024. No additional water was available to be released in 2024 to cover the remaining deficit, therefore 182 ac-ft will need to be released to Otowi in 2025 or in subsequent years, as supply is available.

Table 6 shows all SJCP water at Otowi, and includes a summary of Nambé Falls use above Otowi and the Pojoaque Unit return flow credit used to calculate depletions during 2024. A summary of 2024 Nambé Falls Reservoir operations is provided in Table 7.

Table 6: 2024 SJCP Water at Otowi[1]

Month	Release from Heron	Heron Release Stored in El Vado	Release from El Vado	Total Below El Vado	Release from or Storage in Abiquiu	Transit Losses	Nambé Falls Use Above Otowi	Return Flow Credit Pojoaque Unit	SJCP Water at Otowi
Jan	3,661	94	0	3,567	(1,126)	61	205	23	2,197
Feb	2,415	0	147	2,562	(716)	45	235	21	1,587
Mar	839	0	152	991	1,657	35	40	18	2,592
Apr	493	493	0	0	2,047	18	27	20	2,021
May	0	0	0	0	3,449	31	19	19	3,419
Jun	10,866	0	243	11,109	(7,618)	154	26	17	3,328
Jul	21,605	494	0	21,111	(19,391)	248	1	19	1,490
Aug	17,570	43	0	17,528	1,918	368	298	61	18,841
Sep	11,170	0	376	11,545	(5,425)	182	144	40	5,835
Oct	10,134	5,068	0	5,066	(1,322)	89	160	28	3,523
Nov	13,850	9,754	0	4,097	(2,954)	55	61	30	1,055
Dec	3,875	0	245	4,121	(1,712)	67	58	26	2,311
Annual	96,479	15,946	1,163	81,697	(31,193)	1,353	1,274	322	48,199

[1] Units in ac-ft.

Table 7: 2024 SJCP Monthly Water Operations at Nambé Falls Reservoir[1]

Month	Inflow	Outflow Bypassed	Outflow Storage Release Operational	Outflow Storage Release Irrigation	Reservoir Losses	Total Outflow + Losses	Content
Dec 2023	262	53	0	0	3	54	1,277
Jan	246	32	0	11	13	56	1,415
Feb	266	31	0	0	7	38	1,643
Mar	336	292	0	20	13	324	1,655
Apr	1,037	1,009	0	25	2	1,036	1,655
May	1,584	1,562	0	12	7	1,582	1,657
Jun	1,342	1,314	0	40	6	1,360	1,640
Jul	568	564	0	388	3	955	1,252
Aug	749	453	0	183	-6	629	1,371
Sep	791	646	0	108	3	757	1,406
Oct	605	438	0	111	7	557	1,454
Nov	521	461	0	71	1	532	1,443
Dec	370	311	0	9	3	324	1,489
Annual	8,415	7,113	0	978	59	8,150	-

All daily operations decisions were made using provisional data available at the time of the decision. Because of this, reservoir data in the final accounting model, which uses Compact-approved data, may differ from reservoir data used to make daily operational decisions. Therefore, the dates mentioned above may differ from those found using final 2024 data.

2025 San Juan-Chama Project Outlook

On January 1, 2025, the allocable SJCP water in Heron Reservoir was 0 ac-ft, and the contractors were notified that there would be no initial allocation. Allocations must leave sufficient water in SJCP storage to cover both the dead pool and anticipated reservoir evaporation from January 1 until runoff begins in the spring. Water scarcity was contemplated in the San Juan-Chama Project Authorization (P.L. 87-483), and all SJCP water contracts state that "when the actual available water supply may be less than the estimated firm yield, [contractors] shall share in the available water supply in the ratio that the above allocation bears to the firm yield." Subsequent allocations are made monthly beginning in April. Allocations continue monthly until December, unless a full allocation is made earlier. The March 2025 NRCS' most probable forecast for the Rio Blanco and the Navajo River at the diversion are for 27,000 and 30,000 ac-ft (56 percent and 54 percent of median), respectively, and Reclamation anticipates that this is likely to result in allocation shortages.

[1] Units are in ac-ft; Content for End of Month.

Facility Review and Safety of Dams Program

Nambé Falls Dam

There are no significant dam safety-related O&M issues associated with Nambé Falls Dam. The Annual Site Inspection was completed in June 2024 and resulted in two new Category 2 and one new Category 3 O&M recommendations. There is currently one incomplete Safety of Dams recommendation and three incomplete Category 2 O&M recommendations for Nambé Falls Dam.

To address the Safety of Dams recommendation, Reclamation initiated a seismic hazard study in 2021 with completion anticipated in 2025. The Nambé Falls Dam Facility Reliability Rating was completed in September 2024 with the dam receiving a score of 96 which equates to an overall rating of "good." Extensive work by PVID to remove woody vegetation on the dam embankments is ongoing. The spillway inspection and repairs, a Category 2 O&M recommendation, are scheduled for July 2025. A snowstorm in November 2024 caused a loss of communication with the weather station. Repairs began in December 2024 and were completed in January 2025.

Heron Dam

There are no significant dam safety related O&M issues associated with Heron Dam. The PFR was completed in May 2024, resulting in three new Category 2 O&M recommendations and five new Category 3 O&M recommendations. The Facility Reliability Rating was completed in September 2024 with Heron Dam receiving a score of 86, which equates to an overall rating of "Good." An Emergency Action Plan Tabletop Exercise is scheduled for Heron Dam in 2025.

Middle Rio Grande Project, New Mexico

The MRGP consists of El Vado Dam and Reservoir, three low-hazard diversion dams (Angostura, Isleta, and San Acacia); over 1,000 miles of canals, laterals, and drains; 260 miles of the Rio Grande channel; 57 miles of LFCC; and Reclamation's River Maintenance program from Velarde, NM, to Caballo Reservoir (see Figure 4). The MRGP delivers water for irrigation, maintains valley drainage, and provides flood protection. The MRGCD has O&M responsibility for the entire project between the outlet works at Cochiti Dam and the southern extent of the MRGCD's benefitted area at Bosque del Apache National Wildlife Refuge (BdA), including all conveyance features, the LFCC within the MRGCD boundaries, and the three diversion dams. Reclamation owns and administers the storage permit, lands, and right-of-way activities of the El Vado area. Upon completion of title transfer in 2021, MRGCD assumed ownership of all MRGP lands and facilities south of the Pueblo of Isleta except for the LFCC.

El Vado Dam and Reservoir Operations

El Vado Reservoir began 2024 at an elevation of 6,784.88 ft (1,870 ac-ft) and ended the year at 6,809.72 ft (16,076 ac-ft). The maximum elevation for the year was 6,810.28 ft (16,523 ac-ft) on November 27, and the minimum elevation was 6,783.94 ft (1,555 ac-ft) on April 17. The only water in storage in El Vado on January 1, 2024, was ABCWUA SJCP water. End-of-year storage was also entirely SJCP water: 12,519 ac-ft for ABCWUA, 2,295 ac-ft for MRGCD, and 1,262 ac-ft for the City of Santa Fe. Table 8 provides a summary of monthly operations and water accounting for El Vado Reservoir.

El Vado was not utilized to store water for Prior and Paramount (P&P) lands of the Six MRG Pueblos in 2024. This water was instead retained in Abiquiu Reservoir until released for delivery to Elephant Butte Reservoir.

As in 2023, debris periodically clogged or reduced flow through the outlet works during spring runoff in 2024. The debris had to be physically removed from the intake to allow unrestricted releases.

Because of the debris issues, a continuous release from Heron was made to allow a steady release of 500 cfs from El Vado for most of the season after runoff. This steady release provided continuous flows at levels high enough for boating while also moving waivered SJCP water out of Heron Reservoir, passing through El Vado, and downstream into storage in Abiquiu Reservoir.

Reclamation did not store any native water for MRGCD or for any other purpose during the year due to both Compact restrictions and the reservoir restriction[1] MRGCD operated using natural flow of the Rio Chama and Rio Grande and their 2024 SJCP allocation as well as a small amount of SJCP from previous years and from depletions offsets.

[1] See El Vado Dam Safety of Dams Project Section below.

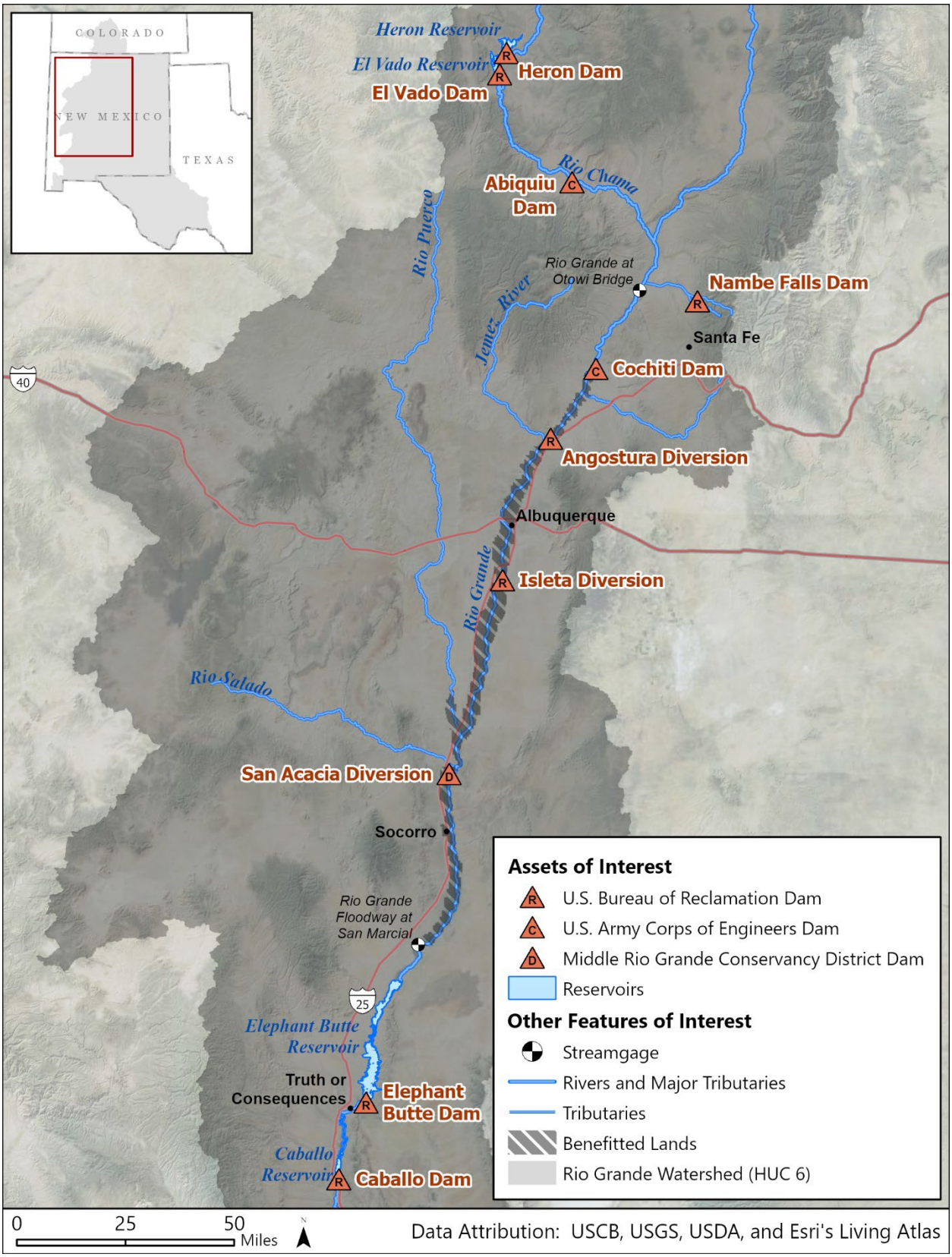


Figure 3: Map of the Middle Rio Grande Project in New Mexico.

Due to ongoing construction[1], the elevation at El Vado Dam was again restricted to 6,785 ft +/- 1.5 ft (1,420 ac-ft to 2,476 ac-ft) at the beginning of the year. Unforeseen conditions halted construction, and the contract was terminated later in 2024. On October 21, with construction on hold, an evaluation to allow some storage in the reservoir began. This "first fill" operation is being completed in stages with hold periods to evaluate the performance of the dam. The first stage, to 6,800 ft (9,405 ac-ft), was successful. The second stage brought the reservoir to 6,810 ft (16,297 ac-ft) on November 26. Results were also successful, and the reservoir may be tested at 6,820 ft (25,185 ac-ft) later in 2025.

Table 8: 2024 Reservoir Operations for El Vado Dam[2]

Month	Rio Grande Inflow	SJCP Inflow	Rio Grande Outflow	SJCP Outflow	Rio Grande Losses	SJCP Losses	Rio Grande Content	SJCP Content	Total Content
Dec 2023	2,886	3,661	2,927	4,904	41	(1,723)	0	1,937	1,937
Jan	2,548	3,661	2,548	3,567	0	0	0	2,031	2,031
Feb	3,290	2,415	3,091	2,562	161	(22)	38	1,906	1,944
Mar	6,500	839	6,281	991	37	37	221	1,716	1,937
Apr	38,832	493	39,041	0	(148)	89	161	2,120	2,281
May	62,364	0	62,551	0	(217)	91	191	2,029	2,220
Jun	17,153	10,866	17,527	11,109	(184)	108	1	1,679	1,680
Jul	7,686	21,605	7,917	21,111	(232)	122	2	2,051	2,052
Aug	7,425	17,570	7,371	17,528	56	35	(1)	2,058	2,058
Sep	2,534	11,170	2,761	11,545	(228)	81	0	1,601	1,601
Oct	2,880	10,134	2,855	5,068	22	37	3	6,631	6,634
Nov	2,165	13,850	2,120	4,097	46	43	1	16,342	16,343
Dec	2,621	3,876	2,624	4,229	(2)	(87)	0	16,076	16,076
Annual	155,998	96,479	156,687	81,807	(689)	534	-	-	-

All daily operations decisions were made using provisional data available at the time of the decision. For that reason, reservoir data in the final accounting model, which uses Compact-approved data, may differ from reservoir data used to make daily operational decisions. Therefore, the information mentioned above may differ from those found using final 2024 data.

Prior and Paramount Operations

Reclamation typically retains native water in El Vado Reservoir for use on the P&P acreage of the Six MRG Pueblos when natural Rio Grande flows may not meet irrigation demand. Due to storage limitations at El Vado during construction, the U.S. Army Corps of Engineers (USACE) issued a deviation in 2022 to allow for the storage of native water in Abiquiu.

The Bureau of Indian Affairs' (BIA) call for P&P in 2024 was 14,845 ac-ft. In January, retention of native water for P&P started at Abiquiu, and the full volume was retained on May 4. The entire volume was stored when Article VII[3] restrictions were in effect. There was no call for the release of

[1] See El Vado Dam Safety of Dams Project section below.
[2] Units are in ac-ft, Content for End of Month.
[3] See the Article VII section under Rio Grande Project.

P&P water during the irrigation season, indicating that the irrigation demand of the P&P lands was met with available natural flows. Evaporation losses were 918 ac-ft, and a volume of 11,851 ac-ft was released to Elephant Butte Reservoir from December 17 to 31. The release started later than what is typical because of a sediment plug in the Rio Chama below Abiquiu Dam. The remaining 1,548 ac-ft, along with 2144 ac-ft incidental native water storage in Abiquiu on December 31, became Compact Debit water on January 1, 2025. On the same day, the Texas Commissioner called for the release of Compact Debit water. A total volume of 3,692 ac-ft was released from January 3 to 6, 2025.

Emergency Drought Water

Under Article VII[1] of the Compact, when New Mexico relinquishes Accrued Credit Water to Texas and Texas accepts that relinquishment, New Mexico may store a like amount in upstream post-Compact reservoirs when Article VII storage restrictions are in effect. New Mexico has allocated this water through a series of Emergency Drought Water (EDW) agreements with Reclamation, MRGCD, and others. Under a 2016 multi-party EDW Agreement, MRGCD agreed to jointly manage Reclamation's EDW allocation for the sole purpose of Endangered Species Act (ESA) compliance.

The following EDW amounts remain available to the MRGP for capture and storage at El Vado in the future: 19,000 ac-ft for Reclamation and 53,767 ac-ft for MRGCD. In 2016, the United States assigned 5,000 ac-ft of Reclamation's remaining allocated EDW to the ABCWUA as repayment for water released during the early 2000s pursuant to the Supplemental Order in litigation titled *Rio Grande Silvery Minnow v. United States*. No EDW was stored in El Vado during 2024.

Compact Debit Water

Under Article VI[2], native water in El Vado Reservoir for the MRGP may be retained to the extent of New Mexico's accrued debit. As noted above, there was no native water in storage at El Vado at the beginning of the year. Because of construction at El Vado, native water normally stored there was stored in Abiquiu Reservoir. No Compact Debit water was stored in El Vado during 2024.

As decribed in the Prior and Paramount Operations section above, 3,696 ac-ft of native water (1,548 ac-ft of P&P and 2,148 ac-ft of incidental native water storage) in Abiquiu Reservoir became Compact debit on January 1, 2025. The Texas Commissioner called for the release of Compact Debit water on that day, so it was released from January 3 to 6.

2025 Middle Rio Grande Project Outlook

The March 2025 NRCS March to July runoff forecast for the Rio Grande at Otowi is 205,000 ac-ft (36 percent of median) and El Vado Reservoir inflow of 71,000 ac-ft (38 percent of median). This is lower than 2024, when observed March to July volume at Otowi, excluding SJCP flows and adjusted for upstream storage, was 414,800 ac-ft (73 percent of median) and El Vado's March to July native inflow was 133,436 ac-ft (72 percent of median). MRGCD irrigation demand should be met through

[1] See the Article VII Restrictions section under Rio Grande Project.
[2] Refers to the Rio Grande Compact of 1938, Article VI.

early June from natural flows and their SJCP allocation. After that, their supply will be variable and dependent on rain from the monsoon season.

El Vado Dam Facility Review and Safety of Dams Program

The PFR was completed in May 2024, resulting in three new Category 2 and three new Category 3 O&M recommendations. The El Vado Dam Facility Reliability Rating was completed in September 2024 with the dam receiving a score of 57 resulting in an overall rating of "Poor." The "Poor" rating is due to one incomplete Safety of Dams recommendation which results in a 2023 Dam Safety Priority Rating of 2, denoting an "Urgent Priority." There are also eight incomplete Category 2 O&M recommendations for El Vado Dam. The current El Vado Dam, Safety of Dams Project, see section below, and resulting modifications will address the outstanding incomplete Safety of Dams recommendations and several of the Category 2 O&M recommendations.

Debris periodically clogged or reduced flow through the outlet works during spring runoff in 2024. The debris had to be physically removed from the intake to allow unrestricted releases. After the 2024 runoff, a temporary anchor was installed on the left abutment for anchoring a log boom to prevent debris from building up around the intake structure for the upcoming 2025 spring runoff. A "first fill" operation was initiated in October 2024 and is described in the El Vado Dam and Reservoir Operations section above. An Emergency Action Plan internal alert status was initiated during the first fill process and remains in effect. An Emergency Action Plan Tabletop Exercise is scheduled for El Vado Dam in 2025.

El Vado Dam, Safety of Dams Project

The current construction project at El Vado Dam was prompted in response to the Safety of Dams recommendations to reduce the unacceptable amount of risk that has formed with the aging of the dam. The dam was originally constructed by MRGCD in the 1930's, when steel was economically the best option for the dam's face plate at this time.

The steel face plate is unique, which carries its own set of challenges when determining the appropriate corrections for El Vado Dam. The site selected for the El Vado Dam, also brought a unique challenge: the left abutment of the dam sits atop a historic landslide that settled here. The site has been stabilized for a very long time, but the large boulders and rocks that settled here have created fissures and crevasses that, despite extensive grouting and excavation, have left space for seepage. This seepage, in combination with a severely aged and degrading face plate, has allowed for an unsustainable amount of seepage to percolate, raising risk concerns above a tolerable threshold.

Planned actions to address the Safety of Dams recommendations are split into two separate projects. The first is a seepage reduction project, and the other is a spillway replacement project. The seepage reduction proposal originally entailed placing grout behind the steel faceplate, performing remedial foundation grouting, and installing a geomembrane liner over the faceplate. The second project, which will not start until completion of the seepage reduction corrections, will involve the removal of the existing spillway including the gates and bridge and replacing it with a reinforced concrete spillway, new gates, and a new bridge. Other improvements include widening of the crest,

realignment of the roadway to better convey traffic across the right abutment, and installation of a new emergency fuse plug dike southwest of the facility.

In September 2021, the El Vado Seepage Reduction Modification Project, Phase 1, was awarded to Carpi USA, Inc., for $31.2M to carry out the selected method(s) to remedy the seepage problems at the dam. This contract was awarded to grout beneath the faceplate, perform repairs to the face plate itself, and install a geomembrane liner over the repaired faceplate. This method was selected as the best option out of a list of 16 alternatives considered in the Corrective Action Study. This option was the most economical and selection followed the standardized Safety of Dams process.

As work progressed, unforeseeable conditions were encountered, including discovery that the faceplate and its anchors were deteriorated further than expected, the grouting caused too much pressure to push up underneath the plates themselves, and the grouting required significantly more grout than originally anticipated. Ultimately, a stop work order to Carpi USA, Inc. was issued on March 20, 2024.

The Dam Safety Advisory Team in May 2024 ruled to demobilize all construction work and prompt a new evaluation of alternatives to proceed. Currently, Reclamation is following the Safety of Dams process to select a new alternative to best complete El Vado's repairs.

Related Reservoir Operations

Abiquiu Dam and Reservoir

Abiquiu Dam and Reservoir is a USACE facility. In 2024, SJCP water storage reached a maximum of 100,044 ac-ft on December 31, and total reservoir storage reached a maximum of 6,200.94 ft (114,674 ac-ft) on December 16.

A sediment plug in the Rio Chama below Abiquiu near Medanales, NM, on June 21 limited the reservoir release through late July. During this period, incidental Rio Grande storage peaked at 6,843 ac-ft on July 8 and was subsequently evacuated by July 29 following pilot channel construction downstream. A second sediment plug formed downstream of the first on in September, again limiting the release. The channel was not cleared until December, resulting in incidental Rio Grande storage reaching 2,148 ac-ft at the end of the year, which then became Compact Debit storage and was released in early 2025 with the remaining P&P water. Table 9 provides a summary of monthly operations and water accounting for Abiquiu Reservoir. As noted above in the Prior and Paramount Operations section, USACE issued a deviation to allow native water retention through 2024.

In December 2024, Reclamation and MRGCD entered into an agreement with the ABCWUA for the storage of native Rio Grande water in Abiquiu Reservoir until the completion of Safety of Dams related construction at El Vado Dam (Abiquiu Storage Agreement). The Abiquiu Storage Agreement is awaiting approval by USACE. The authority to store native Rio Grande water in Abiquiu Reservoir was congressionally authorized at the end of 2020 (P.L. 116-260, Sec 337), ABCWUA completed the acquisition of real property (fee simple ownership and water storage easements) for the increased storage in 2023, and the updated water storage contract between the USACE and ABCWUA in June 2024, all of which were necessary precursors to this new Abiquiu Storage Agreement.

Table 9: 2024 Reservoir Operations for Abiquiu Dam[1]

Month	Rio Grande Inflow	SJCP Inflow	Rio Grande Outflow	SJCP Outflow	Rio Grande Losses	SJCP Losses	Sediment Content	Rio Grande Content	SJCP Content	Total Content
Dec 2023	3,947	867	3,487	651	1	(2,301)	986	419	75,225	76,629
Jan	3,903	3,520	924	2,394	8	131	984	3,390	76,220	80,596
Feb	4,491	2,648	1,124	1,931	30	250	985	6,726	76,687	84,399
Mar	7,502	980	3,724	2,638	60	309	985	10,444	74,720	86,151
Apr	45,018	0	39,874	2,047	209	838	1,040	15,379	71,836	88,257
May	66,449	0	66,930	3,449	289	1,028	1,122	14,609	67,359	83,091
Jun	19,369	10,445	14,786	2,827	220	781	1,136	18,972	74,196	94,305
Jul	8,684	20,572	13,332	1,181	301	1,029	1,150	14,023	92,557	107,731
Aug	8,325	17,484	8,301	19,402	127	562	1,160	13,919	90,077	105,158
Sep	3,330	11,896	3,595	6,471	159	703	1,166	13,495	94,800	109,463
Oct	3,167	5,081	3,728	3,759	115	523	1,167	12,820	95,599	109,587
Nov	3,017	4,031	2,138	1,077	(3)	(16)	1,167	13,702	98,570	113,440
Dec	2,775	4,147	12,730	2,435	45	237	1,167	3,702	100,044	104,914
Annual	176,030	80,804	171,186	49,611	1,560	6,375	-	-	-	-

Cochiti Dam and Reservoir

Located downstream from the confluence of the Rio Chama and the Rio Grande, Cochiti Dam and Reservoir is another USACE facility. Congress authorized a permanent pool of 1,200 surface acres for fish and wildlife recreational purposes, called the recreation pool. This pool is comprised of SJCP water, and evaporation losses are replaced with additional SJCP water to maintain 1,200 surface acres. Recreation pool water may be released from Heron Reservoir and temporarily stored in Abiquiu, then released over the winter to provide flows in the Rio Chama between Abiquiu and the confluence with the Rio Grande.

The 2024 allocation of 4,290 ac-ft was released from Heron between October 25 and November 25. The year ended with a deficit of 3,549 ac-ft needed to reach 1,200 surface acres. Table 10 is a summary of monthly operations and water accounting for Cochiti.

[1] Units are in ac-ft, Content for End of Month.

Table 10: 2024 Reservoir Operations Cochiti Dam[1]

Month	Authorized SJCP Area (acres)	Authorized SJCP Content Capacity (ac-ft)	Wetlands Elevation (ft)	Wetlands Area (acres)	SJCP Content (ac-ft)	SJCP Area (acres)	SJCP Losses (ac-ft)	SJCP Demand (ac-ft)	SJCP Delivery (ac-ft)	Hold Pool= SJCP Pool + Sediment (ac-ft)
Dec 2023	1,200	44,137	5,354	0	43,832	1,183	18	305	0	45,260
Jan	1,200	44,137	5,354	0	43,767	1,179	65	370	0	45,199
Feb	1,200	44,137	5,354	0	43,594	1,167	173	543	0	45,033
Mar	1,200	44,137	5,354	0	43,368	1,149	226	769	0	44,816
Apr	1,200	44,137	5,354	0	42,940	1,111	428	1,197	0	44,478
May	1,200	44,137	5,354	0	42,467	1,074	473	1,670	0	44,142
Jun	1,200	44,137	5,354	0	42,113	1,056	354	2,024	0	43,801
Jul	1,200	44,137	5,354	0	41,744	1,041	369	2,394	0	43,447
Aug	1,200	44,137	5,354	0	41,323	1,014	421	2,814	0	43,045
Sep	1,200	44,137	5,354	0	40,998	980	325	3,139	0	42,732
Oct	1,200	44,137	5,354	0	40,762	954	236	3,375	0	42,500
Nov	1,200	44,137	5,354	0	40,700	947	62	3,437	0	42,447
Dec	1,200	44,137	5,354	0	40,589	936	111	3,549	0	42,348
Annual	-	-	-	-	-	-	3,243	-	-	-

[1] Data for End of Month

MRG River Gage Operation and Maintenance

Data from river gages help MRG water management agencies meet the needs of water users, fulfill the requirements of the Compact, support ESA operations, and provide information necessary for improving the daily management of the river system from Cochiti Dam to Elephant Butte Reservoir. Data from these gages are available to the public at New Mexico water conditions - USGS Water Data for the Nation

Reclamation continues to fund four gages operated and maintained by the U.S. Geological Survey (USGS) primarily to support ESA operations: Rio Grande near Bosque Farms, NM (08331160); Rio Grande at State Hwy 346 near Bosque, NM (08331510); Rio Grande at bridge near Escondida, NM (08355050); and the Rio Grande above U.S. Hwy 380 near San Antonio, NM (08355490).

MRGCD continues to operate and maintain gages on many of their facilities. These gages monitor diversions and return flows to the river and drains, and it provides insight on how water is moving through the irrigation system. Reclamation hosts a website that includes schematics of MRGCD's system and associated gage data at Water Management Schematics | Bureau of Reclamation.

River Maintenance and River Efficiency Projects

Reclamation has authorization for maintenance of the Rio Grande from Velarde, New Mexico, to the headwaters of Caballo Reservoir. Responsibilities include maintenance of the river channel and floodplain. Project purposes include improving water delivery and sediment transport, protecting riverside facilities and property, and preventing flooding. River maintenance consists of any work done in the channel and floodplain, including habitat restoration. Reclamation conducts an annual assessment of sites and reaches after the spring runoff and summer monsoon events to identify maintenance needs.

Maintenance needs are prioritized based on the geomorphic trends and conditions, public and infrastructure risk, and water delivery effects for the 260-mile reach of the MRGP. Maintenance projects involve planning, design, environmental compliance, construction, and adaptive management. Most maintenance projects require adaptive and recurring maintenance over the life cycle of each project's intended design life.

Reclamation is attempting to improve its ability to acquire Clean Water Act (CWA) compliance for river maintenance projects, utilizing the various types of permitting approaches including individual permits, nationwide permits, regional permits, and Letters of Permission.

Middle Rio Grande River Maintenance Plan

The MRGP River Maintenance program has developed a long-term Comprehensive Plan and Guide (CP&G) that assists in accomplishing project purposes in an environmentally and economically sound manner. A final report is posted at the following web address: https://www.usbr.gov/uc/albuq/envdocs/reports/mrgRivMaint/CompPlan/start.pdf.

This maintenance plan is an engineering and geomorphic document that can be used to readily implement the most cost effective and environmentally sound strategies that reduce Reclamation's long-term commitment of resources. Ongoing work on the CP&G involves evaluating reach-based strategies for feasibility, prioritization, and effects of implementation between reaches, including both upstream and downstream.

Reach-based planning across multiple reaches is ongoing, including concepts for managing channel capacity and width, as well as river bars, islands, and bank-attached bars. Reach-based planning is underway to evaluate the geomorphic reaches from Angostura to Montaño Bridge, and Isleta Diversion Dam (IDD) downstream to Elephant Butte, including the ongoing Lower San Acacia Reach Improvements[1] (LSARI) evaluating alternatives in the high priority San Acacia Reach to improve water and sediment conveyance and meet ecological goals.

River Maintenance Sites

Reclamation is actively working on the planning, design, construction maintenance, adaptive management, and monitoring for 26 sites within the MRGP reach. There are five active sites that require an annual review of channel capacity and possible maintenance due to sediment accumulation.

Reclamation's efforts at all 26 maintenance sites include data collection, geomorphic and sediment investigations, design studies, alternative evaluations, design and development of construction drawings, material supply and development, lands access, environmental compliance, project and construction management, construction maintenance, and adaptive maintenance and monitoring.

In the following sections, the terms "new," "existing," "interim", and "adaptive" are used to describe the various river maintenance sites and reach status. "New" sites developed following high flow events on the Rio Grande in the previous year. "Existing" sites are in the process of completion. "Interim" sites are locations where precautionary work is needed to limit potential damages before the next significant hydrologic event and the work is temporary or a stop-gap measure; these sites will require a long-term project to be planned and designed. "Adaptive" sites have been substantially completed and are being monitored for function and performance.

Determination of River Maintenance Needs

Using a rating system that considers geomorphic trends and conditions, public and infrastructure risk, and water delivery effects, Reclamation completed its "Determination of River Maintenance Needs" process for sites and reaches along the river channel in the 260-mile reach of the MRGP in 2014. All monitored, existing, and completed sites were rated using the system and criteria again in 2024. Monitoring during the spring runoff and monsoon season in 2024 and work progress were considered in the 2024 site and reach ratings. These ratings help prioritize project development and implementation. This approach for the ratings and maintenance class designation complements what is in the CP&G and the 2016 MRG Biological Opinion (MRG BO) for River Maintenance Actions.[2]

[1] See the Lower San Acacia Reach Improvements Project section below.
[2] See the Programmatic Water Operations and River Maintenance ESA Compliance section.

Ohkay Owingeh RM 270.8 (New, Interim)

Bank erosion was observed at the Ohkay Owingeh fishing ponds following relatively high runoff flows in the spring and summer of 2023. Given the proximity of the erosion to existing infrastructure Reclamation in conjunction with Ohkay Owingeh Pueblo determined the site required immediate bank stabilization to provide protection from future high flows. Roughly 330 feet of bankline had eroded as of Reclamation's site visit on July 12, 2023 (see Figure 5).

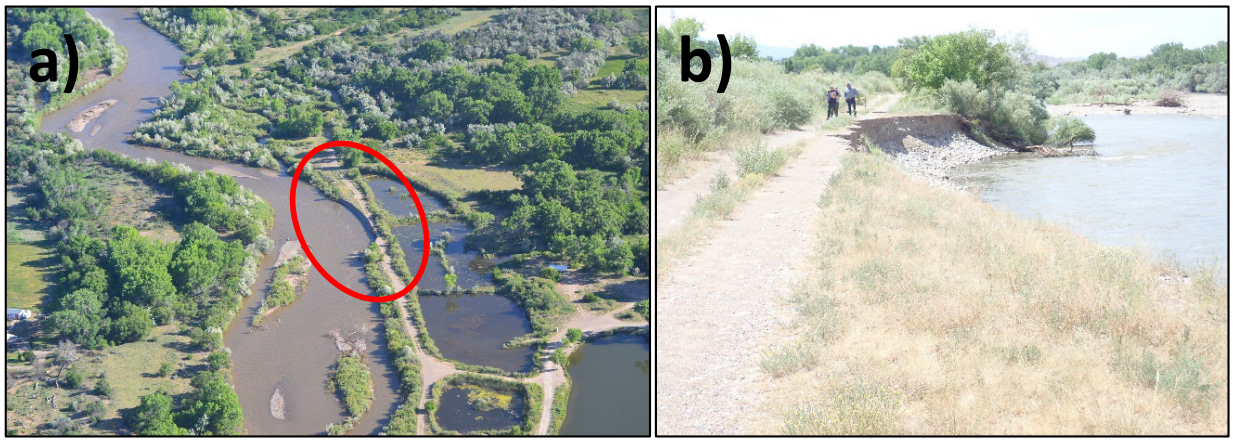


Figure 4: Photos of the eroded area at RM 270.5 in Ohkay Owingeh. a) is an aerial photo taken in June 2023 looking north with the eroded area highlighted in red. Panel b) was taken from the ground on June 12, 2023 looking south toward the eroded area from the roadway.

Reclamation provided a bank stabilization design consisting of rock lining of the slope with backfill to restore the pre-existing roadway. Reclamation used existing reach data to create a hydraulic model which was used to determine the required size of riprap which was then sourced from the Velarde stockpile. The kickoff meeting was held in early January 2024 and construction was completed by February 2024 (see Figure 6). Given the development of upstream meander bends the location of eastern bankline where the Pueblo's groundwater fishing ponds will need to be protected via a long-term river maintenance project.

Figure 5: Photo looking north toward completed bank stabilization work at Ohkay Owingeh Pueblo (Reclamation, 2024)

San Ildefonso RM 257.8 (New, Interim)

In 2023, bank erosion was observed in the San Ildefonso reach near collector well structures built as part of the Pojoaque Basin Regional Water System (PBWRS) project. While the wells themselves are protected from erosion with buried riprap, the access roadway and underlying pipeline are not protected from erosion and may be in the path of future bank erosion. The site underwent overbank flooding during the spring runoff of 2023 with bend development and bank erosion toward the access road (see Figure 6 and Figure 7).

To prevent further migration of the bend and the resulting threat to the infrastructure Reclamation provided a design for a temporary bank protection structure consisting of a self-launching riprap windrow set back from the bank. In the event of a high runoff and mobilization of the bank the proposed structure would provide temporary bank protection to protect the existing infrastructure. As of January 2025, construction access to the site and questions around material to be used for the riprap windrow must be further resolved with the Pueblo of San Ildefonso to implement the work. Given the development of a localized meander bend and bar deposition the location of eastern bankline will need to be protected via a long-term river maintenance project for the PBWRS infrastructure located in the floodplain.

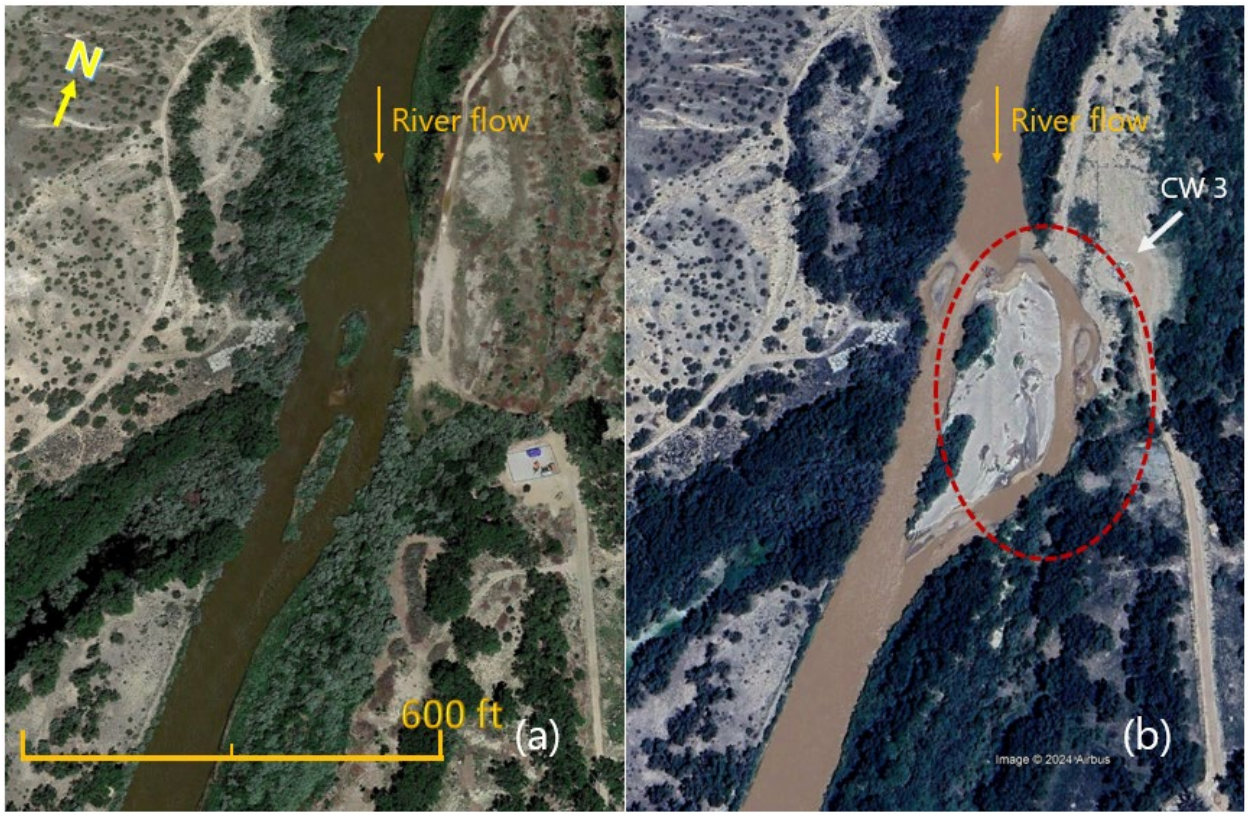


Figure 6: RM 257.8 Google Earth Imagery in June 2017 (on left) at the time of project designing and July 2024 (on right) during construction; visible erosion threatening infrastructure is circled in red. "CW 3" denotes the location of the existing collector well just northeast of the new erosion.

Figure 7: Photo taken September 17, 2024, looking downstream toward the eroded area.

San Felipe Pueblo (Existing)

A total of 10 river maintenance sites have been identified on the Pueblo of San Felipe. Seven sites have been completed, and three are ready for construction. The remaining three sites are RM 211.3, RM 212.8, and RM 214.4. Construction on longitudinal fill stone toe protection at RM 211.3 began in the fall of 2015 and was partially completed by March 2016. The work was put on hold at that time by the Pueblo of San Felipe for a review of impacts to vegetation of traditional or medicinal value. All construction work at the remaining sites is currently pending permission by the Pueblo of San Felipe. During the 2019 spring runoff, the bank eroded towards the levee at the two eastern bends at RMs 212.8 and 214.4. Again, work at these locations is currently on hold. A letter was sent to the Pueblo of San Felipe on October 31, 2019, informing the Pueblo of the potential risk to riverside facilities presented by conditions at these locations.

In 2024, the Pueblo of San Felipe received a grant from Reclamation's Aquatic Ecosystem Restoration Program in the amount of $400,000. The funding will help the Pueblo in their environmental management of their 10-mile reach of the Rio Grande system. Reclamation continues to monitor these sites related to potential impacts to the adjacent riverside levee, drain, and canal systems.

Angostura to Montaño Reach Planning (Existing)

In 2014, Reclamation identified the reach of the Rio Grande from RM 201 to Montaño Bridge for hydraulic and geomorphic assessment and project planning. This reach is transitioning, with riverbed incision and migrating bends that have caused problematic erosion at numerous locations. The goal of this reach planning is to analyze the current geomorphic and hydraulic trends and identify potential river projects that both minimize the need for future river maintenance and improve habitat value. Two hydraulic models of this reach were created using 2015 and 2017 hydrographic data. The hydraulic and geomorphic report is complete and located at the following website: Hydraulic and Geomorphic report at https://www.usbr.gov/uc/envdocs/reports/AngosturaDamtoMontanoBridge-GeomorphicandHydraulicAnalysis.pdf.

Sandia Pueblo RM 201.8 (New, Interim)

Bankline erosion has been observed along the eastern bank of the river at RM 201.8 since 2021 (see Figure 8). At this location the eastern levee has a point that comes within 200 feet of the existing active channel, presenting a risk to the levee should the bank migration continue eastward. Erosion at this bend was expected to be alleviated by the construction of the two downstream side channels in the western floodplain which concluded the Sandia RM 202 (Sandia Priority Site) rehabilitation work. While the side channels were activated by runoff flows in 2024, continued erosion at this outer bend was observed which triggered the decision to implement temporary bank protection at this bend.

Reclamation provided a design based on the known hydrology. The purpose of the proposed temporary bank protection is to halt the migration of the outer bend should runoff flows mobilize it securing time and space to construct a permanent solution. As of January 2025, this project is planned for implementation in spring 2025 but must first be formally presented to and approved by Sandia Pueblo's Tribal Council. Given the development of a localized meander bend and bar deposition the location of eastern bankline will need to be protected via a long-term river maintenance project.

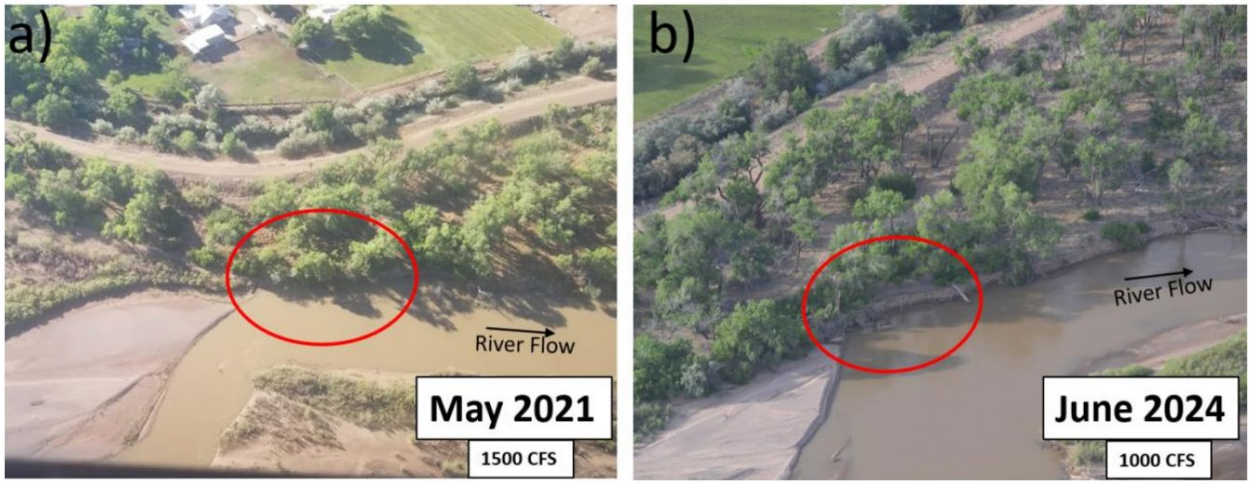


Figure 8: Observed bank erosion at Sandia RM 201.8 between May 2021 and June 2024.

Corrales Siphon and Bankline Repair (Adaptive)

The Corrales Siphon at RM 199.7 is in Corrales, New Mexico, just north of Albuquerque and about 700 ft downstream of the Arroyo de la Barranca confluence. The siphon was constructed in the early 1930s by the MRGCD to supply irrigation water to the Corrales Main Canal. During river reconnaissance in 2012, Reclamation discovered that degradation in the area had exposed the siphon. Reclamation placed riprap at the site to serve as temporarily protection during the 2016 runoff. In 2020, MRGCD placed more riprap, extending it the entire width of the river and keying a short distance into the bankline.

In 2022, the some of the siphon's wood stave pipe failed near the western inlet rendering it inoperable. This negatively affected flows in the Corrales main canal, and MRGCD deployed temporary pumps to provide irrigation water during the 2022, 2023, and 2024 irrigation seasons. They will be used again in 2025. MRGCD had a feasibility study performed and is seeking a long-term solution with a new subsurface siphon with an anticipation construction start in fall 2025.

River Mile 199 (Existing)

In 2017, Reclamation identified a new erosion site near RM 199 in the Corrales area. The Pueblo of Sandia's Tribal Council approved the project in 2021, allowing access for construction on their lands. Reclamation completed a value engineering study on the project in February 2022. The 90% design was completed in 2024 (see Figure 9), and environmental compliance is ongoing. Construction is targeted for fall 2025.

In spring 2023, erosion of the western bank of the Corrales Siphon Bend, the northern most bend, toward the levee following runoff flows raised concern that future runoff flows could threaten the levee and the Corrales main canal.

In fall 2023, Reclamation implemented a short-term project to provide bank stabilization sufficient to withstand at least one similar runoff season. A riprap windrow was constructed along the eroded bankline to limit the erosion. The riprap was sized to withstand flow rates up to the 2-year return flood flow and construction was completed January 2024.

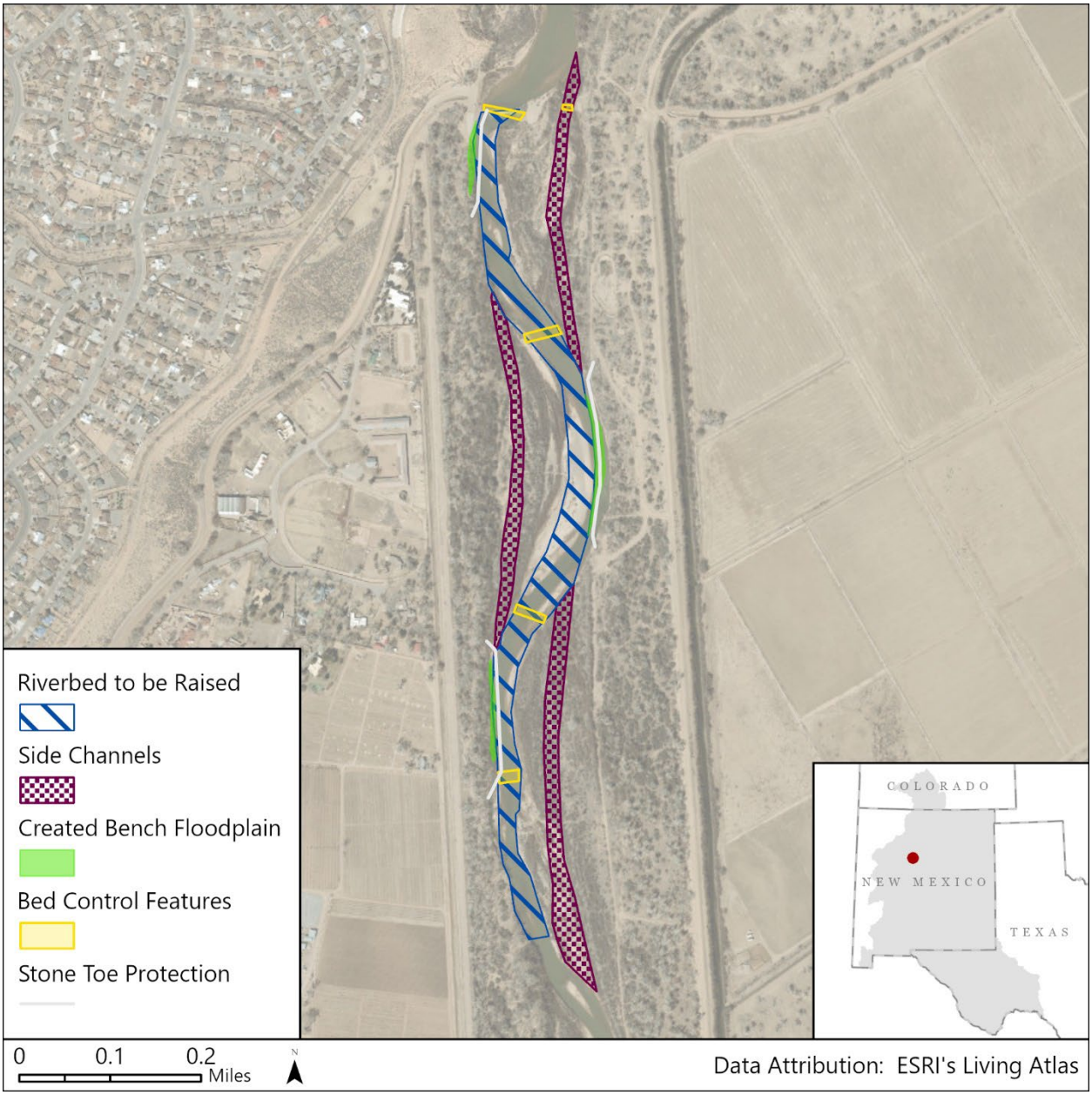


Figure 9: Plan view of design layout for RM 199 maintenance project.

Isleta to San Acacia Reach Planning (Existing)

In 2014, Reclamation identified the Rio Grande stretch from the IDD to the San Acacia Diversion Dam (SADD) for further investigation of geomorphic and hydraulic trends. This investigation was especially relevant given the observed overbank flooding in portions of the reach during the 2017 and 2019 runoffs. Geomorphic and hydraulic analysis reports for this reach were completed in March and December 2018, respectively. These analyses will be used to identify projects that have river maintenance and habitat value.

A 2021 Reclamation report identifies sites that may need river maintenance or be suitable for habitat restoration in support of the MRG BO. It included a focused study on the Los Lunas subreach that identified Los Lunas RM 163 and RM 161 for future river maintenance work.

The reach report can be found at the following: Geomorphic and hydraulic assessment of the Isleta to San Acacia Reach report at https://www.usbr.gov/uc/envdocs/reports/20181200-IsletaSanAcaciaHydraulicModeling-Report-AAO.pdf.

Los Lunas River Mile 163 (Existing)

In 2020, Reclamation analyzed the hydrology, hydraulics, and habitat of the Los Lunas subreach. The Los Lunas subreach overbanks at low flows and the overbanked water often becomes trapped against the levee. Data shows that the flow at which overbanking occurs has gotten lower over time. This investigation identified five locations along the eastern floodplain that overbank at flows less than the two-year return flow.

RM 163 is one of the first locations where water overbanks and saturates the levee toe as flow increases. In collaboration with New Mexico Interstate Stream Commission (NMISC) and MRGCD, Reclamation plans to lower the banks of the channel to improve aquatic habitat and water conveyance. Reclamation completed project designs in fall 2022 (see Figure 10). After a long process to get CWA approval, construction began in February 2025.

Figure 10: Plan view of bank lowering (BL) berm design for RM 163 maintenance project.

Cañas Arroyo RM(s) 95.2, 94.5, 94.3 (New, Interim)

Several river bends near the confluence of the Cañas Arroyo and the Rio Grande have continued to erode on the western riverbank since monitoring in this area began in 2008. These eroding bends are progressing laterally towards the San Acacia and Low Flow Conveyance Channel levees and pose a threat to this infrastructure if unhalted (see Figure 11). Construction of launchable rock windrows will be installed by Reclamation at these locations in Spring 2025 to serve as interim bank protection

measures while work continues to determine a long-term solution to manage sediment transport imbalances in this reach.

Figure 11: Satellite imagery 2013 to 2023 of bankline erosion near the Cañas Arroyo confluence.

Highway 380 to Elephant Butte Reservoir Reach Planning (Existing)

Continued monitoring efforts are underway to identify any new river maintenance and habitat restoration sites along this 50-mile stretch of the Rio Grande. This river reach has essential habitat for several federal threatened and endangered species, including the Rio Grande Silvery Minnow

(RGSM), the Southwestern Willow Flycatcher (flycatcher), and the Yellow-billed Cuckoo (cuckoo). Riverside infrastructure in this reach delivers irrigation flows to the BdA to support terrestrial habitat for the endangered New Mexico Meadow Jumping Mouse (jumping mouse). In addition to providing critical habitat for these endangered species, this reach of the Rio Grande is critical for the delivery of surface water flows to Elephant Butte Reservoir. Reclamation's planning in this reach is intended to balance water conveyance with habitat creation for the listed species. This reach planning effort complements the ongoing LSARI effort.[1]

The reach report on recent geomorphic, hydraulic, and vegetative trends can be found at the following location: Rio Grande Channel Analysis at https://www.usbr.gov/uc/DocLibrary/Publications/20200500-RioGrandeChannelAnalysisHighway380ElephantButteDelta-508-AAO.pdf.

Bosque del Apache River Realignment Upstream Phase (Existing)

Planning work is underway for the approximately 4.5-mile river realignment on the Rio Grande, extending from just downstream of the Highway 380 bridge near San Antonio, NM, near RM 86, to just below the north boundary of the BdA near RM 81. This realignment is intended to reduce the chance of sediment plug formation in the main channel by redirecting river flows to a lower point of the active floodplain east of the existing channel. Like the downstream phase of this project, see section below, the upstream phase is intended to reduce river perching and reconnect floodplain with the main channel flow. It is expected that this project will improve riverside habitat and conveyance. Vegetation clearing and heavy excavation work on the realignment channel is expected to begin sometime in fiscal year 2026.

Bosque del Apache River Realignment Downstream Phase (Adaptive)

During the 2008 and 2017 spring runoffs, sediment plugs formed in the main channel of the Rio Grande at RM 81, within the BdA. In 2014, a multi-agency project team developed a plan to realign the current channel to the east to address river maintenance concerns. This project moved 2.5 miles of the river channel and reconnected it with the current channel. The excavation phase of the project was completed in September 2020 and moving excavation spoil into the old river channel was completed in March 2021.

Most likely due to poor spring runoff conditions within the reach, a section of the realigned channel did not mobilize sediment as intended. Work at this location, called the "knickpoint" site, began in 2022 and was completed in February 2023. Ongoing habitat monitoring continues within the project's wetland mitigation area with most of the Year 3 habitat recovery metrics met under the project's CWA permit with the USACE.

Bosque del Apache, Tiffany, and San Marcial Levee and Delta Channel Capacity Analyses (Adaptive)

The hydraulic channel capacity criteria used in the analysis of levee systems in this reach is to effectively and safely pass the two-year flow of 7,700 cfs. The maintenance design criteria of the San Marcial Delta Water Conveyance Channel Project (Delta Channel) used in the analysis was to

[1] See the Lower San Acacia Reach Improvements Project section.

effectively convey a normal spring runoff peak flow of 4,000 to 5,000 cfs to the Elephant Butte Reservoir pool.

The Tiffany and San Marcial Levee sections continue to maintain sufficient channel capacity. Realignment of a section of the river through the BdA has been delayed as is detailed in an earlier section of this report; this effort should restore sufficient channel conveyance capacity through the BdA section of the river.

Several severe river bends in the lower reach, Fort Craig Bend at RM 64.2, RM 63.4, and RM 60, continue to be monitored, particularly after runoff. Launchable riprap at two of these bends have seen multiple runoff seasons and much of this rock has already launched into the river. Some of this bank protection may need to be replenished in the future.

Fort Craig Bend RM 64 (Adaptive), RM 63.8 (New, Interim), RM 63.4 (New, Interim), and River Mile 60 (Adaptive)

Historically, the Rio Grande between Fort Craig and RM 60 was a wide, braided, and relatively straight river channel, but recently has developed a more sinuous planform. This has caused the formation of multiple bends, including Fort Craig Bend near RM 64 and the S-curve bend at RM 60. The outer side of these bends are near the west edge of the confined floodplain, adjacent to the spoil levee and the LFCC. Continued bank erosion and lateral channel migration at these locations threaten to breach the spoil levee and cause damage to the LFCC and access road. This could negatively affect water delivery and endangered species. In 2012, a rock windrow was placed on the west bank of the river as a temporary solution to bank toe erosion near the abandoned Fort Craig pump site. Observations show that some of the rock has dropped into the channel. Interim placement of launchable riprap material is planned in Spring 2025 at two bends (RM 63.8 and RM 63.4) to prevent further migration of the channel at these locations.

Currently the rock-lined Fort Craig and RM 60 bends appear to be stable. Reclamation plans to monitor these two bend locations during the runoff season but does not plan to place additional rock in 2025. The multi-disciplinary interagency LSARI team has developed alternatives to reduce maintenance frequency, increase water salvage, and enhance habitat throughout the San Acacia Reach. The alternatives are being evaluated via a feasibility-level study and through the LSARI effort, see LSARI section below.

River Mile 60 Operations

The goal of operations at RM 60 is to increase water delivery to Elephant Butte Reservoir without negatively impacting federally-listed bird habitat along the LFCC West. This will be accomplished by managing flow distribution between the river and the LFCC West.

Reclamation developed an experimental gate operations plan in 2023. The plan was implemented by Reclamation and MRGCD in January 2024. In August 2024, alterations were made to the existing operations plan. MRGCD is overseeing operations, and Reclamation is monitoring and analyzing them.

Monitoring will occur monthly, and includes the following:

- Three flow measurements above and below RM 60,
- Three flow measurements in the LFCC and LFCC West,
- Ten ground water monitoring wells throughout the LFCC West,
- Ten surface water transducers - three in the river and seven in the LFCC and LFCC West.

Delta Channel Maintenance (Adaptive)

Reclamation and NMISC provide funding for joint Delta Channel maintenance, river maintenance projects, and riverside irrigation drain improvements with water salvage potential within the MRGP, and reservoir vegetation management in the RGP.

In 2024, work continued through the Delta Channel to maintain a 20-mile temporary channel into the Elephant Butte Reservoir pool for effective water delivery. The maintenance work was conducted by Reclamation and focused primarily on sediment excavation from the channel, sandbar de-vegetation, and vegetation removal along channel berms to maintain berm integrity between RM 46 and RM 54. Reclamation provided necessary engineering services, environmental compliance, and construction inspection associated with Delta Channel Maintenance in accordance with the technical service agreement.

Truth or Consequences (Existing)

Reclamation annually excavates sediment from the river channel to maintain the authorized 5,000 cfs channel capacity in the reach between Elephant Butte Dam and Caballo Reservoir. Maintenance is conducted each fall after releases are shut off from Elephant Butte Dam. Primarily, sediment is removed at arroyo mouths. Secondary activities include sediment removal in other areas throughout the reach and bank stabilization with riprap at selected sites. Work completed in winter 2024-2025 involved sediment removal at the mouths of two major tributaries (Mescal and Cuchillo Negro) and is estimated at roughly 5,000 cubic yards of sediment.

In addition, during periods of non-release, Reclamation installs a dike in the river to increase the alluvial groundwater levels for the benefit of the artesian hot spring bathhouse owners in Truth or Consequences.

Other Major River Maintenance Activities

Aggradation/Degradation Data Acquisition and Hydraulic Analysis

In 2022, Reclamation hired a contractor to acquire Digital Imagery and LiDAR data for the MRGP from Cochiti to Elephant Butte Reservoir. Topographic data was collected along 1,800 historic range lines established to monitor sediment aggradation and degradation along the floodway and levee system. The LiDAR data was modified to approximate the underwater bathymetry covered by the water surface at the time of data acquisition and a hydraulic analysis to evaluate the bankfull flow rate was completed. Reclamation is conducting the analysis in partnership with NMISC, USACE, and MRGCD and hopes both Federal and non-Federal partners may agree on the current hydraulic conveyance conditions and capacities. A report was finalized in January 2025.

Lower San Acacia Reach Improvements Project

The goals of the LSARI Project are to improve water delivery, ecosystem function, and the benefits of maintenance actions by working with geomorphic trends. The project area begins near the south boundary of BdA at RM 74 and continues south to the confluence of the Rio Grande with the LFCC west at RM 54.5.

Within the San Acacia Reach, sediment supply exceeds transport capacity. About 33 million cubic yards of cumulative sediment have deposited in the river between BdA's south boundary and RM 60 from 1962 to (Holste, 2023). The long-term and prevailing condition is a depositional environment despite periods of channel incision caused by low reservoir levels. Attaining an equilibrium condition or transporting all sediment delivered from upstream is likely not possible and it is important to manage how sediment is deposited in the project area to ensure water is delivered and environmental resources are conserved (Holste, 2023).

Key issues the project targets include channel perching, conveyance losses, and decline in ecosystem health. Channel perching maintains the riverbed at an elevation above the water table, causing seepage loss that may increase river drying. Perching increases sediment concentration in the main channel, allowing sediment plugs to form leading to levee breeches and significant losses as water spills into low-elevation areas disconnected from the main channel. Several factors contribute to conveyance losses. Transpiration, evaporation, seepage from the river channel, and stranded water on the floodplain after high flow events all significantly reduce river flows. Historically a wide and shallow river, the Rio Grande in this reach presents a narrow and uniform channel that has contributed to the decline in ecosystem health. The RGSM and the flycatcher and their habitat require frequent floodplain inundation to thrive. Less frequent floodplain inundation stresses native vegetation and allows invasive phreatophytes to dominate riparian areas, reducing native habitat availability.

The LSARI Project completed the technical feasibility-level analysis in November 2024. The Draft Environmental Impact Statement (EIS) is being prepared and will be available for public comment in the summer of 2025. The final EIS and Record of Decision are anticipated to be complete by the summer of 2026. If an action alternative (see Figure 12) is selected as the preferred alternative, construction may begin in December 2026.

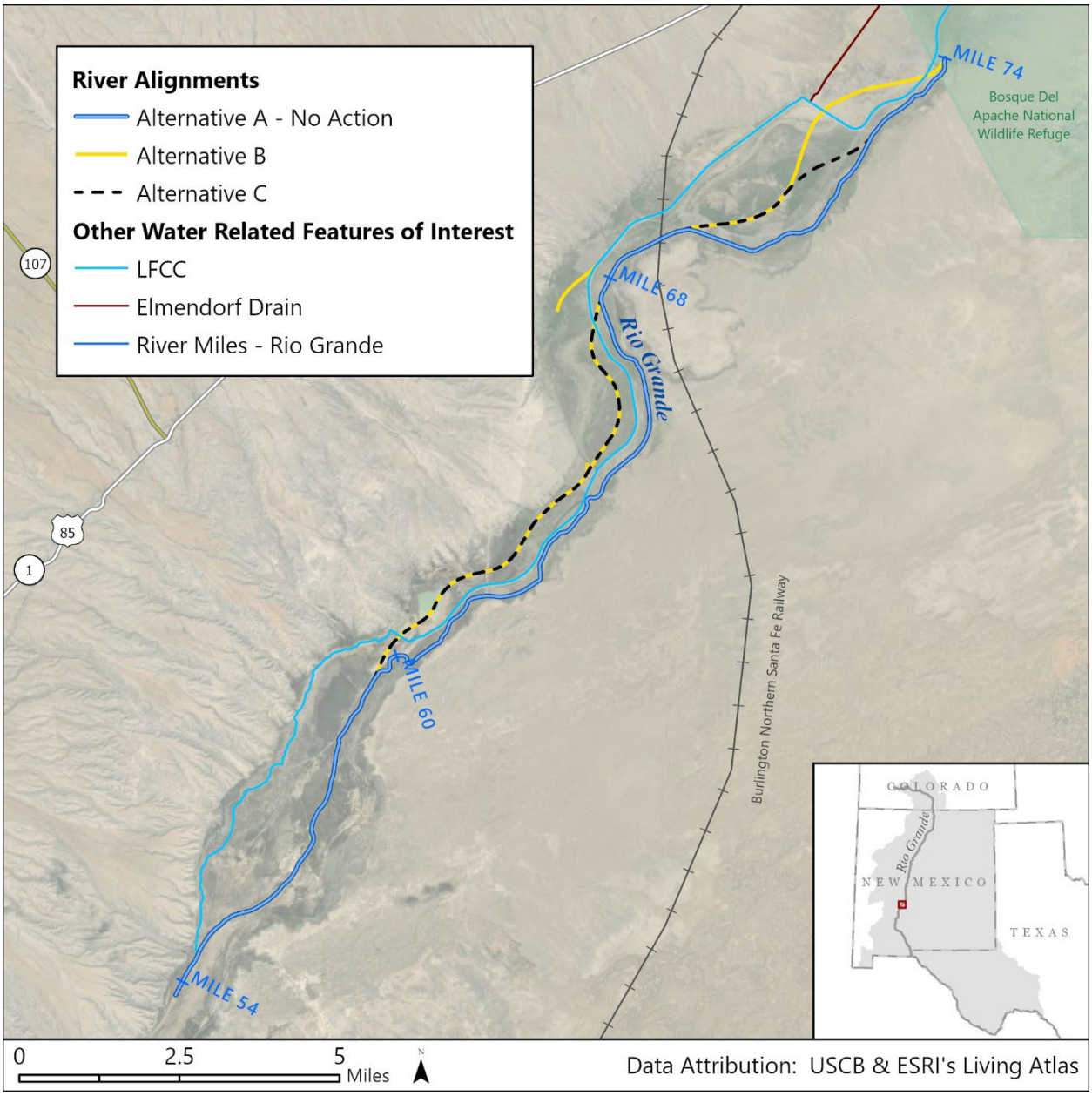


Figure 12: LSARI alternatives map.

Programmatic Water Operations and River Maintenance ESA Compliance

The USFWS issued a final *Biological and Conference Opinion for Bureau of Reclamation, BIA, and Non-Federal Water Management and Maintenance Activities on the Middle Rio Grande* (Consultation Number 02ENNM00-2013-F-0033; 2016 MRG BO) on December 2, 2016. The non-jeopardy determination in the MRG BO is based on the Proposed Action and mandatory accomplishment of numerous commitments (i.e., 86 Conservation Measures, 11 Reasonable and Prudent Measures, and 50 Terms

and Conditions) by Reclamation and the MRG BO Partners (BIA, NMISC, and MRGCD). The USFWS provided an Incidental Take Statement for the RGSM, flycatcher, and cuckoo.

In 2024, Reclamation and the MRG BO Partners continued implementing the commitments set forth in the 2016 MRG BO. The 2024 MRG BO annual report submitted to the USFWS in March 2025 provides information on the implementation of MRG BO requirements and the proposed action.

Rio Grande Silvery Minnow

Since 1993, Reclamation has funded or supported the systematic sampling of the fish community in the MRGP with a focus on the endangered RGSM (*Hybognathus amarus*). With some exceptions (e.g., 1998), fish sampling by seining has been conducted monthly from April to November at 20 standard monitoring sites along the river (Dudley et al., 2024a). For comparison among years, seasons, and sites, the catch of RGSM is standardized as density or catch-per-unit-effort (CPUE) (RGSM/100m^2). In 2017, 10 additional sites (30 total) were added to the survey protocol during October with 10 additional sites (40 total) added to the survey protocol in October 2023 (Dudley et al., 2024b). CPUE is reported for the 20 standard sites, 30 sites, and 40 sites (Standard, Standard and Additional 10, Standard and Additional 20).

Incidental take of RGSM is authorized for the Proposed Action if October density is greater than or equal to 1.0 fish per 100 m^2 for 10 of the 15 years of the MRG BO's duration, October density is less than 1.0 fish per 100 m^2 for no more than five of the 15 years, and October density is less than 0.3 fish per 100 m^2 for no more than two of the 15 years. Incidental take for the RGSM will be considered exceeded if these densities and time limits are not met because of the Proposed Action.

Based on monitoring data from the 20 standard sites, RGSM were present at 14 of 20 sites with an overall CPUE of 0.71 RGSM/100 m^2 during October 2024 (Dudley et al., 2024b, Dudley et al., 2025). At these 20 standard sites, the October 2024 CPUE was substantially lower than the October 2023 CPUE of 3.4 RGSM/100 m^2.

Based on the 30 sampling sites, RGSM CPUE in October 2024 was 0.60 RGSM/100 m^2 (Dudley et al., 2024). This estimate was lower than the 20 standard site CPUE estimate of 0.71 RGSM/100m^2. The species was present at 21 of those 30 sites in October 2024 (Dudley et al., 2024b).

Based on the 40 sampling sites, RGSM CPUE in October 2024 was 0.55 RGSM/100m^2 (Dudley et al., 2025) This estimate was lower than the 20 standard site CPUE estimate of 0.71 RGSM/100m^2, and the 30 site estimate of 0.60 RGSM/100m^2. The species was present at 25 of 40 sampling sites (Dudley et al., 2024b).

In the annual report, RGSM status, trends, and mixture model estimated RGSM CPUE are used for long-term analyses, mesohabitat associations, sampling variation evaluation, and modeled to evaluate their relationships to flows or other environmental conditions (see Dudley et al., 2024a). A two-model approach is used to separate presence or absence of RGSM from their actual abundance so that the errors are properly estimated.

The changes in the occurrence and estimated CPUE of RGSM were reliably predicted by seasonal differences in flows across years (1993–2024; Dudley et al., 2024a). Extended high flow during spring runoff appears to be crucial in explaining why some years had dramatically elevated RGSM

CPUE. In contrast, poor spring runoff and extended low flow during summer were key to explaining reductions in the occurrence of this species across years. Prolonged high flow during spring runoff was most predictive of increased CPUE and prolonged low flow during summer was most predictive of decreased CPUE of RGSM over time in the river (Dudley et al., 2024a). See Figure 13.

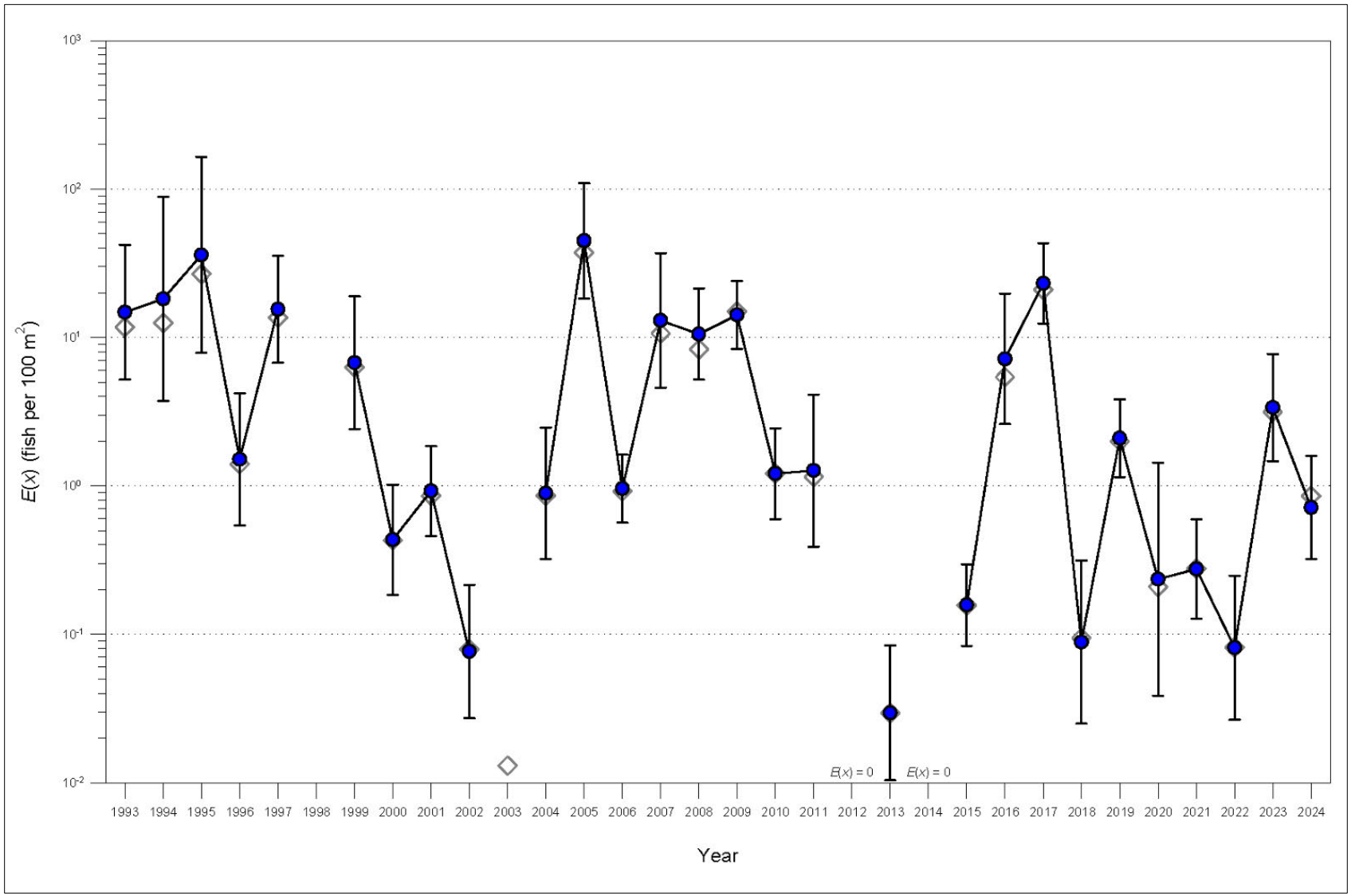


Figure 13: RGSM estimated CPUE (E(x)) using stand site (20 sites) October data for 1993-2024 (Dudley et al., 2024b, Dudley et al., 2025).

Literature Cited:

Dudley, R.K., S.P. Platania, and G.C. White. 2024a. Rio Grande Silvery Minnow Population Monitoring during 2023. Annual Contract 140R4019P0048 Report to Bureau of Reclamation, American Southwest Ichthyological Researchers, Albuquerque, NM.

Dudley, R.K., S.P. Platania, and G.C. White. 2024b. Rio Grande Silvery Minnow Population Monitoring during October 2024. November Contract 140R4019P0048 Report to Bureau of Reclamation, American Southwest Ichthyological Researchers, Albuquerque, NM.

Dudley, R.K., S.P. Platania, and G.C. White. 2025. Rio Grande Silvery Minnow Population Monitoring during 2023, Annual Summary Written Communication. Annual Contract 140R4019P0048 Report to Bureau of Reclamation, American Southwest Ichthyological Researchers, Albuquerque, NM.

San Acacia and Isleta Diversion Dams Projects

The goals of the SADD and IDD Improvement Projects are to provide upstream fish passage for the RGSM at both diversion dams as well as improve the existing east bank sluiceway and diversion works of the IDD. The SADD is located near RM 116 of the Rio Grande, within the village of San Acacia, NM, approximately 15 miles north of Socorro, NM. The IDD is located near RM 169, just downstream of the NM-147 bridge within the Pueblo of Isleta, approximately 15 miles south of Albuquerque, NM. See Figure 18 for the project vicinity map.

Within the MRG BO, several conservation measures commit Reclamation and the MRGCD to facilitating fish passage at SADD and IDD to improve river channel connectivity and to provide fish passage between reaches in order to improve habitat access for the RGSM. In 2016, a settlement agreement[1] was reached between Reclamation, MRGCD, the Pueblo of Isleta, and the BIA which resolved multiple issues related to the construction and operation of the IDD. The proposed construction of fish passage and sluiceway modifications at IDD fulfills some of the commitments from that settlement.

Reclamation awarded a design-build contract in February 2023 for the design and construction of the SADD/IDD projects. Through 2023 and 2024, the contractor completed a Design Criteria Technical Memorandum, an Alternatives Analysis Technical Memorandum, a Value Engineering Study, computation fluid dynamics modeling of the fish passage internal hydraulics, and then began to prepare the design packages. The SADD fish passage structure is nearing final design, the IDD fish passage structure is at a 60% design level, and the IDD sluiceway improvements are nearing a 90% design level. Environmental compliance, permitting, and access agreements are underway for all three work areas. Construction of the SADD fish passage is currently scheduled to begin in Spring 2025, the IDD sluiceway in November 2025, and the IDD fish passage in Spring 2026. All construction is expected to be completed by late 2026.

Concurrent with the design-build process, Reclamation completed a physical model and modeling report in 2023 of the IDD sluiceway, which informed that portion of the design. Reclamation is also currently preparing two-dimensional numerical modeling of the IDD structure and fish

[1] See Isleta Settlement section.

passage to provide gate operations and maintenance guidance. Numerical modeling will be completed in late 2025.

MRGCD currently operates both SADD and IDD to control irrigation diversions and will ultimately be responsible for O&M of the SADD and IDD fish passage structures once they are complete.

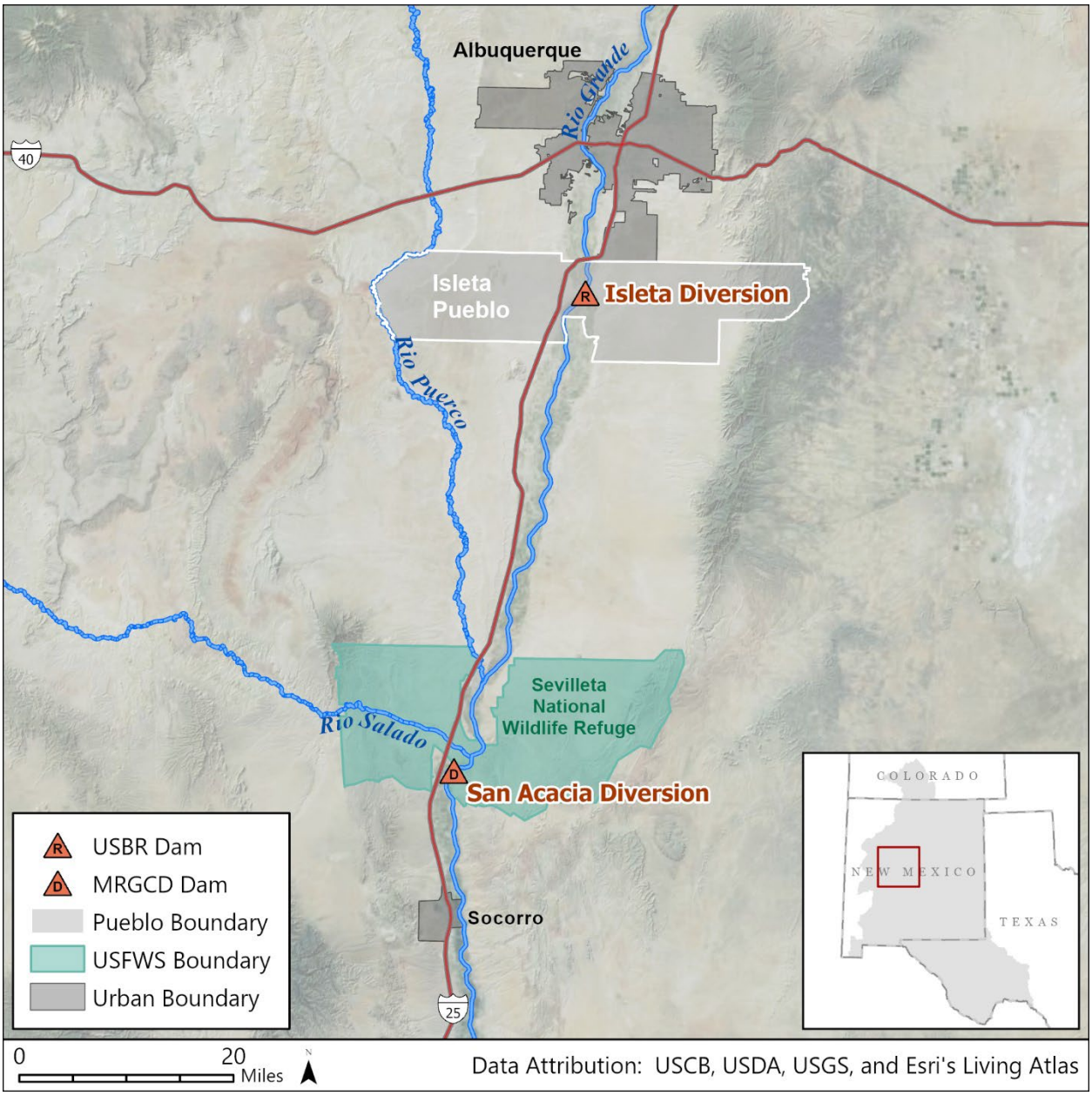


Figure 14: IDD and SADD Project Vicinity Map.

Southwestern Willow Flycatcher

The flycatcher (*Empidonax traillii extimus*) was listed as endangered by the USFWS effective in March 1995. The 2013 final designation of critical habitat defines two units located along the Rio Grande in

New Mexico: the Upper Rio Grande Management Unit and the Middle Rio Grande Management Unit. No critical habitat was designated for the Lower Rio Grande Management Unit from Elephant Butte Dam to El Paso, TX.

Incidental take of flycatcher would be considered exceeded if more than 26 flycatcher territories are displaced in any year because of the Proposed Action, or if more than 2,071 acres of suitable flycatcher habitat are impacted because of the Proposed Action over the 15-year MRG BO duration.

In 2024, incidental take occurred from temporary and permanent impacts to vegetation from several project related activities on the MRG including mowing along the LFCC near the Ft. Craig Transmission Line, clearing vegetation from the Ft. Craig Road and two associated bridges in the RM 60 and Transmission Line area, and removing vegetation from the Delta Channel berms and road access points for maintenance. A total of 6.91 acres of moderately suitable habitat, and 7.05 acres of suitable habitat were impacted for the flycatcher. There was no incidental take of flycatcher nest territories in 2024 from on-the-ground project activities.

During the summer of 2024, Reclamation conducted surveys and nest monitoring of flycatchers in 14 distinct reaches along approximately 230 miles of the Rio Grande, between the Isleta Pueblo and El Paso, TX (see Table 11). Surveys were performed to contribute to the baseline population data of the flycatcher along the Rio Grande, and to meet Reclamation's ESA compliance commitments for the MRG BO as well as the ESA compliance for the RGP[1].

In 2024, a total of 907 resident flycatchers were documented. These flycatchers established 562 territories, of which 463 had pairs. This represents a 20 percent increase in territory numbers from 2023, although comparisons are difficult as only selected sites were surveyed in certain reaches both years. As in previous years, the San Marcial Reach was by far the most productive, containing 589 resident flycatchers and 340 territories, of which 293 were pairs – a 6 percent increase in territories from 2023.

[1] see ESA Compliance for Operating Agreement and Storage of SJCP Water.

Table 11: Southwestern Willow Flycatcher Territories 2015-2024[1]

Location[2]	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Frijoles	N/S[3]	N/S	N/S	N/S	N/S	N/S	0	0	0	0
Belen	10	12	95	85	25	N/S	20	17	20	17
Sevilleta	18	N/S	17	N/S	N/S	N/S	12	4	5	8
San Acacia	0	N/S	0	N/S	N/S	0	0	0	0	0
Escondida	16	2	5	2	3	9	4	8	5	7
BdA	40	27	35	39	35	24	24	16	14	11
Tiffany	0	1	N/S	N/S	N/S	0	0	0	5	1
San Marcial	340	321	352	252	200	293	277	257	302	300
MRGP Subtotals	**424**	**363**	**504**	**378**	**263**	**326**	**337**	**302**	**351**	**344**
Caballo Reservoir	31	20	12	18	11	9	7	8	9	14
Caballo to El Paso, TX	107	84	96	107	109	91	77	60	41	31
RGP Subtotals	**138**	**104**	**108**	**125**	**120**	**100**	**84**	**68**	**50**	**45**
Total	**562**	**467**	**612**	**503**	**383**	**426**	**421**	**370**	**401**	**389**

Other studies continued or updated in 2024 for ESA compliance in the MRGP and RGP areas include:

- flycatcher nesting hydrology and habitat variability study
- river maintenance impact monitoring
- saltcedar leaf beetle (Diorhabda spp.) impact monitoring
- Elephant Butte delta hydrology monitoring.

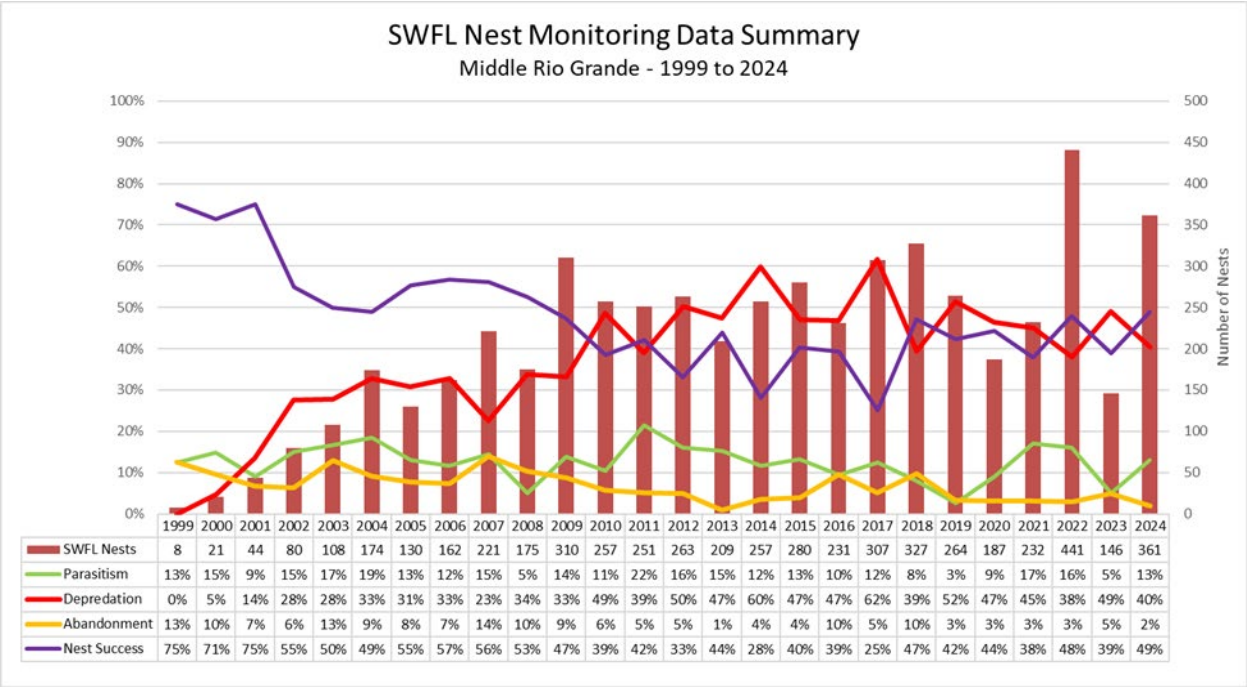
These studies are designed to provide insight into potential threats and habitat requirements of the flycatcher and cuckoo populations.

At Elephant Butte Reservoir, flycatchers have expanded their occupied habitat south, to near Mitchell Point at RM 38. Flycatcher-occupied areas in the Elephant Butte Reservoir delta from RM 60 downstream to RM 54 were previously mostly in dense Goodding's and coyote willow of various age classes, with water provided by the LFCC outfall. However, much of this willow-dominated habitat has declined in quality during the past 12 years due to drought and natural succession. Invasive saltcedar is also encroaching and becoming a larger component of occupied habitat. Although this provides some habitat characteristics for flycatchers, observations indicate that breeding flycatchers are not as successful or productive in saltcedar-dominated habitats. Additionally, the presence of the saltcedar leaf beetle is an issue as it will likely defoliate saltcedar during nesting periods, reducing foliage cover, and making nests more vulnerable to predation, parasitism, and changes in microclimate.

[1] Breeding season only.
[2] Table does not include detections outside of the active floodplain at BdA.
[3] N/S = not surveyed.

Habitat modeling since 2016 has shown that some suitable habitat remains unoccupied, thus indicating that habitat is not a limiting factor for this population. However, an overall reduction in the quality of the habitat is likely reducing success and productivity. It is likely that flycatchers do not expand into all areas of suitable habitat due to their nest site fidelity and overall population size.

Nest success in the MRG has remained between 38 and 48 percent for the past six years following a study period low of 25 percent in 2017 (see Figure 15).

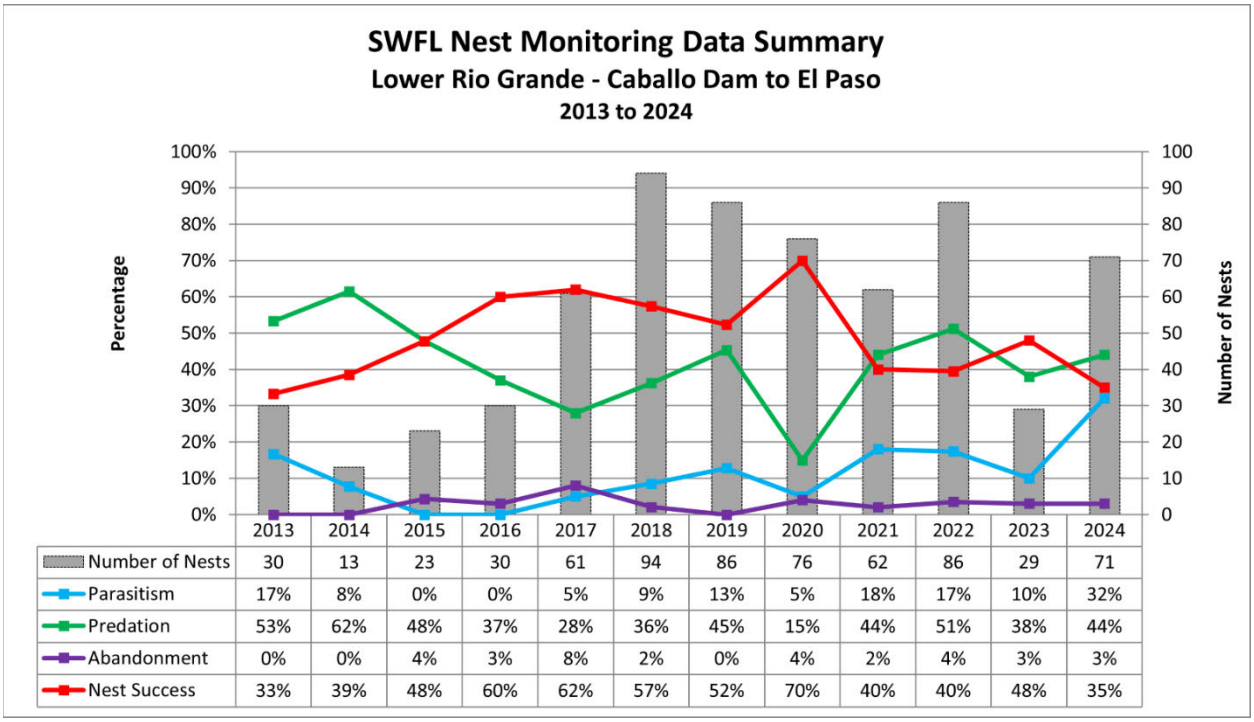


	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SWFL Nests	8	21	44	80	108	174	130	162	221	175	310	257	251	263	209	257	280	231	307	327	264	187	232	441	146	361
Parasitism	13%	15%	9%	15%	17%	19%	13%	12%	15%	5%	14%	11%	22%	16%	15%	12%	13%	10%	12%	8%	3%	9%	17%	16%	5%	13%
Depredation	0%	5%	14%	28%	28%	33%	31%	33%	23%	34%	33%	49%	39%	50%	47%	60%	47%	47%	62%	39%	52%	47%	45%	38%	49%	40%
Abandonment	13%	10%	7%	6%	13%	9%	8%	7%	14%	10%	9%	6%	5%	5%	1%	4%	4%	10%	5%	10%	3%	3%	3%	3%	5%	2%
Nest Success	75%	71%	75%	55%	50%	49%	55%	57%	56%	53%	47%	39%	42%	33%	44%	28%	40%	39%	25%	47%	42%	44%	38%	48%	39%	49%

Figure 15: Summary of flycatcher nesting in the MRGP from 1999 to 2024.

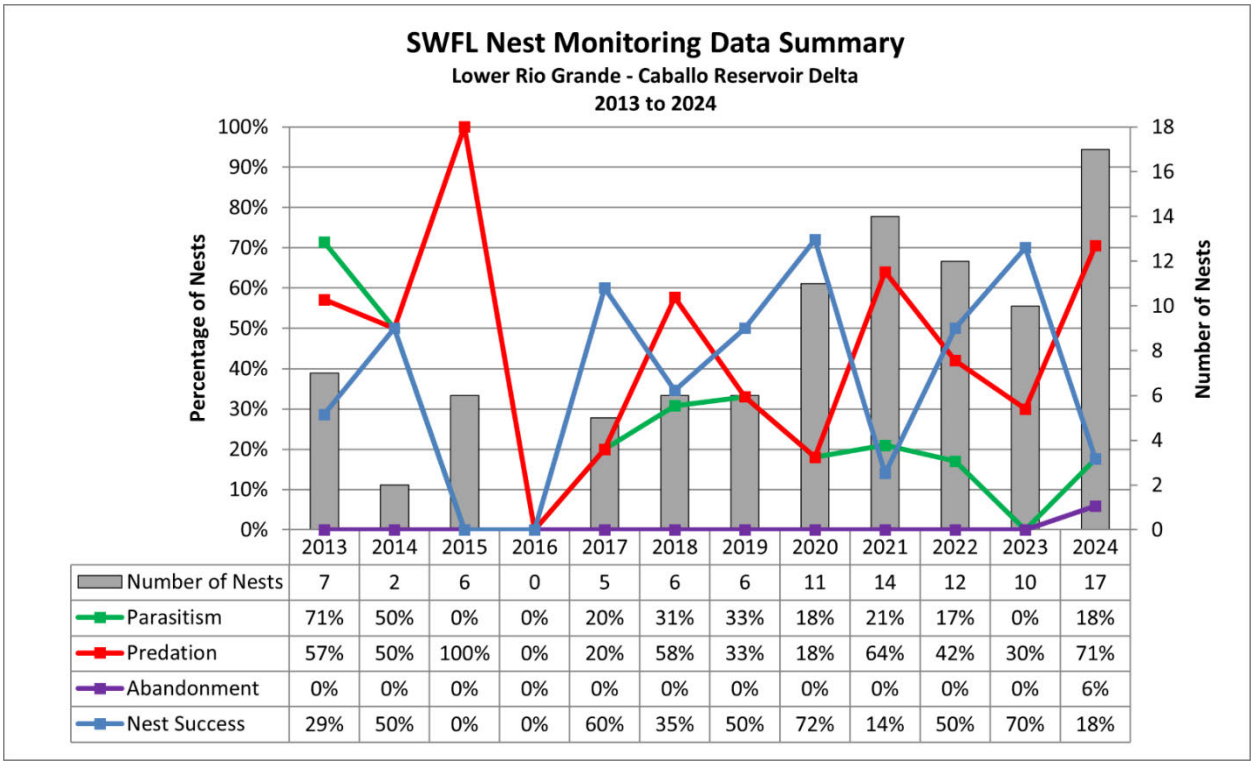
The decline in nest success from 2006 to 2017 may be related to the decline in habitat suitability and quality in heavily populated areas. Depredation, the biggest source of nest failure, averaged 27 percent from 1999 to 2011. Since 2012, the depredation rate has nearly doubled, averaging 49 percent. The depredation rate in 2017 was 62 percent, the highest recorded since 1999, but dropped back to 39 percent in 2018.

These changes may be a result of reduced habitat quality because of lower flows. Drought conditions, which typically result in reduced discharge and groundwater levels, reduce plant vigor and canopy cover. This reduces nest concealment, exposing the nest to predators and changes in microclimate conditions. The saltcedar defoliation by the saltcedar leaf beetle has similar effects and may be of greater concern in the future. Nest success in the RGP area, both within the Caballo Reservoir Delta and downstream of Caballo Dam, has been highly variable in recent years, ranging from 14 to 72 percent between 2017 and 2024 (see Figure 16 and Figure 17). Nest success downstream of Caballo Dam has generally been higher than in the reservoir delta.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Number of Nests	30	13	23	30	61	94	86	76	62	86	29	71
Parasitism	17%	8%	0%	0%	5%	9%	13%	5%	18%	17%	10%	32%
Predation	53%	62%	48%	37%	28%	36%	45%	15%	44%	51%	38%	44%
Abandonment	0%	0%	4%	3%	8%	2%	0%	4%	2%	4%	3%	3%
Nest Success	33%	39%	48%	60%	62%	57%	52%	70%	40%	40%	48%	35%

Figure 16: Flycatcher nest variables, Caballo Dam to El Paso, TX, 2013-2024.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Number of Nests	7	2	6	0	5	6	6	11	14	12	10	17
Parasitism	71%	50%	0%	0%	20%	31%	33%	18%	21%	17%	0%	18%
Predation	57%	50%	100%	0%	20%	58%	33%	18%	64%	42%	30%	71%
Abandonment	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	6%
Nest Success	29%	50%	0%	0%	60%	35%	50%	72%	14%	50%	70%	18%

Figure 17: Flycatcher nest variables, Caballo Reservoir delta, 2013-2024.

During three of the past eight years (2017, 2019, 2023), the Rio Grande and LFCC both saw higher flows compared to the past several years, resulting in extensive overbank flooding and higher

groundwater levels in some areas. This improved plant vigor, structure, density, and overall habitat quality. Conversely, Rio Grande and LFCC flows were extremely low in 2018 and 2020 which likely had negative impacts on habitat quality. Also, during 2020, a 330-acre fire burned suitable occupied flycatcher habitat in the vicinity of Fort Craig, including an area that in 2019 contained 14 flycatcher territories. Fire has repeatedly impacted occupied habitat, burning roughly 100 acres near Bosque, NM, in 2021 and burning almost 400 acres downstream of Fort Craig in 2022.

Western Yellow-billed Cuckoo

The western distinct population segment of the cuckoo (*Coccyzus americanus occidentalis*) was listed as a threatened species by the USFWS in October 2014. Critical habitat for the cuckoo was designated in April 2021.

Along the Rio Grande, two critical habitat units are included in the designation:

- Unit 35 (NM-4), Upper Rio Grande 1, Rio Arriba County: a continuous 5-mile segment of the Upper Rio Grande from Lyden to Alcalde in Rio Arriba County (518 acres)

- Unit 37 (NM-6B), MRG, Sierra and Socorro Counties: a continuous 109-mile segment, from RM 54 within the Elephant Butte Reservoir pool upstream to Bosque Farms. The largest breeding population of cuckoos north of Mexico is within this reach (46,595 acres)

Incidental take of cuckoos would be considered exceeded if more than 11 cuckoo territories are displaced in any year because of the Proposed Action, or if more than 2,071 acres of suitable cuckoo habitat are impacted because of the Proposed Action over the 15-year MRG BO duration.

There was no incidental take of cuckoo nest territories in 2024 due to construction activities from Reclamation's MRG projects. In 2024, incidental take occurred to suitable cuckoo habitat from temporary and permanent impacts due to clearing vegetation along the Ft. Craig Road edge and two associated bridges in the RM 60/Ft. Craig Transmission Line area and removing vegetation from the Delta Channel berms and road access points for maintenance. A total of 7.04 acres of suitable habitat was impacted for the cuckoo.

During 2024, Reclamation conducted cuckoo surveys in 14 distinct reaches of the Rio Grande, within sites also surveyed for flycatcher, from the south boundary of the Pueblo of Isleta to El Paso, Texas (see Table 12). Surveys were conducted to contribute to baseline population data of the cuckoo along the Rio Grande and to meet Reclamation's ESA compliance commitments for the MRG BO and ESA compliance commitments for the RGP[1]. In 2024, there were an estimated 157 breeding territories, all assumed to be pairs, derived from 631 cuckoo detections. The estimated territories and documented detections were most concentrated in the southern portion of the San Marcial Reach, i.e., Elephant Butte Reservoir pool, and in the delta of Caballo Reservoir.

[1] see ESA Compliance for Operating Agreement and Storage of SJCP Water.

Table 12: Cuckoo Detections/Estimated Territories 2015-2024[1]

Location[2]	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015
Belen	1/0	10/1	40/11	22/5	15/3	N/S	41/10	34/4	54/12	39/10
Sevilleta	20/3	N/S[3]	50/11	N/S	N/S	N/S	41/10	12/4	32/10	18/5
San Acacia	19/4	N/S	24/6	N/S	N/S	28/8	47/14	50/13	23/8	27/8
Escondida	38/9	14/6	3/1	13/2	16/5	51/11	55/10	44/11	58/16	62/16
BdA	64/16	98/28	46/14	70/15	49/11	59/14	46/13	43/10	32/11	40/12
Tiffany	18/5	2/0	N/S	N/S	N/S	0	0	2/0	9/0	2/0
San Marcial	351/88	322/79	317/79	198/45	68/17	190/42	193/49	227/56	220/59	215/59
MRG Subtotal	**511/125**	**452/114**	**480/122**	**303/67**	**148/36**	**328/75**	**423/106**	**412/98**	**428/116**	**403/110**
Caballo	64/19	56/16	100/25	90/18	72/16	47/11	58/13	64/16	62/15	48/15
Percha	20/4	13/3	11/2	13/2	22/4	13/2	7/1	8/2	3/1	1/0
Hatch	15/3	27/8	11/3	10/2	21/4	11/2	17/6	11/1	6/2	4/1
Radium Springs	11/4	10/4	7/2	8/1	19/5	9/3	25/7	10/4	16/6	10/4
Las Cruces	7/1	1/0	5/1	0	0	12/2	10/3	9/3	N/S	N/S
Mesilla	0	0	0	0	1/0	5/1	9/2	0	N/S	N/S
RGP Subtotal	**121/32**	**107/31**	**141/35**	**121/23**	**135/29**	**101/21**	**126/32**	**93/23**	**87/24**	**63/20**
Total	**632/157**	**559/145**	**621/157**	**424/90**	**283/65**	**429/96**	**549/138**	**505/121**	**515/140**	**466/130**

[1] Breeding season only.
[2] Table does not include detections outside of the active floodplain at BdA.
[3] N/S = Not Surveyed.

New Mexico Meadow Jumping Mouse

The jumping mouse (*Zapus hudsonius luteus*) was listed as an endangered species under the ESA in June 2014, with final critical habitat designation following in March 2016. While designated critical habitat units for the species occur in Colorado, New Mexico, and Arizona, only Unit 6, BdA, is within the MRGP. Unit 6 consists of 995 acres along 13.1 miles of ditches and canals associated with managed irrigation for wildlife purposes on BdA in Socorro County, NM. This unit begins in the northern part of the BdA and generally follows the Riverside Canal to the southern boundary of the refuge. Jumping mice have not been found on the Rio Grande in this area. The BdA habitat adjacent to the Riverside Canal is the only known occupied mouse habitat within the MRG Valley.

Except for BdA, systematic surveys for jumping mice and their habitat have not been conducted throughout the riparian corridor of the MRGP. However, since its listing, surveys for suitable jumping mouse habitat have occurred in selected areas as part of environmental compliance activities for specific projects, such as the Delta Channel maintenance. The Delta Channel is located outside the southern edge of the geographic area that the jumping mouse could potentially inhabit. The habitat assessment determined that the Delta Channel area is not a suitable natural environment based on the herbaceous vegetation composition and structure, lack of soil moisture, high frequency and long history of disturbance, and lack of regular inundation necessary to support jumping mouse habitat. It is therefore unlikely that suitable or occupied jumping mouse habitat exists south of BdA, and no additional populations have been identified along the MRGP.

While the MRG BO does not provide any supportive analysis for jumping mouse ESA requirements, Reclamation is committed to support efforts by the BO Partners or others seeking to provide water to BdA when it is available, dependent on available water supply and the water rights of BdA and other users. Reclamation continues to partner with BdA and MRGCD to support water delivery infrastructure improvements on the refuge that are supportive of mouse habitat. Reclamation's activities have included design and construction support, planning, and compliance technical services to facilitate BdA infrastructure improvements.

Literature Cited:

Reclamation. 2014. River Maintenance Program: San Marcial Delta Water Conveyance Channel Maintenance Project Biological Assessment. Bureau of Reclamation, AAO, September 2014, 80 pp.

MRG Litigation Settlement Agreement

On November 30, 2022, the WildEarth Guardians filed a lawsuit against the USFWS and Reclamation regarding the MRG BO. A Settlement Agreement was approved by the Court on November 19, 2024, and the case was dismissed with prejudice. Pursuant to the Settlement Agreement, Reclamation sent a letter on December 10, 2024, to USFWS requesting reinitiation of ESA Section 7(a)(2) consultation on its MRG operations and maintenance activities. During the pendency of the reinitiated consultation, Reclamation will prioritize and continue to implement the remaining conservation measures in the 2016 MRG BO. Reclamation and USFWS will complete the consultation with a new biological opinion by October 30, 2028.

Middle Rio Grande Endangered Species Collaborative Program

In response to ESA species listings in the MRG, ESA-related litigation, and the 2001 and 2003 BOs, the Middle Rio Grande Endangered Species Collaborative Program (Collaborative Program) was formed, bringing various groups together to support ESA compliance for the RGSM and flycatcher, and address environmental issues.

The Collaborative Program consists of stakeholders representing diverse interests including federal, state, and local government entities, Pueblos and Tribes, and non-governmental organizations working to protect and improve the status of listed species in the MRGP valley while protecting existing and future regional water uses in compliance with applicable state and federal laws, including Compact delivery obligations.

The Collaborative Program is not included in the MRG BO and does not have responsibility or authority for meeting requirements. However, Reclamation and the BO partners work with the Collaborative Program to provide science recommendations in support of adaptive management. The Collaborative Program also hosts an annual symposium for entities conducting science within the basin to share information and maintains the online portal and common database management system as common repositories for information, reports, and data.

In 2024, Reclamation funded third-party management of the Collaborative Program as well as ongoing monitoring activities and studies related to listed species. The 2024 accomplishments include the following:

- Minnow Action Team meeting;
- Captive propagation of RGSM at multiple facilities;
- Annual monitoring of endangered species, reproductive success, and habitats;
- Ongoing genetics studies of RGSM;
- RGSM rescue and salvage efforts during river drying;
- Annual Science Symposium- Scaling Up: Adapting Species Management for a Changing Ecosystem;
- A collaborative workshop focused on Management of Vegetated Islands and Bars and a Seminar presenting data on RGSM Population Monitoring (1993-2024).

RiverEyes and River Drying

The RiverEyes program was developed to provide current information on river flows and river drying, allowing water management agencies to react quickly to changing river conditions. The MRG BO does not set specific flow targets or maximum rates of drying and instead focuses on thresholds of RGSM density in October. Water operations coordination is critical to maintaining RGSM densities, and RiverEyes facilitates coordination among agencies that may prevent unexpected drying and helps prepare for and initiate RGSM salvage.

For the 2024 irrigation season, RiverEyes monitored river conditions along the Rio Grande from Albuquerque into the full pool elevation of Elephant Butte Reservoir. Field monitoring occurred from mid-July through late October.

There were three periods of drying in the San Acacia Reach: July 14 to July 21, August 1 to August 29, and September 1 to October 24. In 2024, only one segment dried in the San Acacia reach, from south of Otero Street in Socorro, near RM 97, and extending downstream to south of Fort Craig near RM 63.

The continued decline in natural flow during the summer led to drying in the Isleta Reach beginning on August 4. Two segments dried in that Reach. In the area near the Peralta Wasteway outfall, 5.91 unique river miles dried between August 4 to 10, August 13 to 29, September 2 to 5, September 11 to 23, and October 10 to 12. The channel near the Abeytas heading had 2.27 unique miles dry between August 9 to 11, August 21 to 23, September 16, and September 18 to 23.

The total number of river miles affected by drying at some point in 2024 was 41.71 miles: 33.53 miles in the San Acacia Reach and 8.18 miles in the two segments in the Isleta Reach. Flow measured at the Central Avenue Bridge in Albuquerque was at times quite low, but monitoring did not find channel drying in the Angostura Reach in 2024.

Monsoon season precipitation in 2024 was near normal. There were numerous and scattered events but few that brought precipitation to the entire basin. Storms did, however, occur at opportune times, and helped to keep the Angostura Reach connected, reduce the days of drying in the Isleta reach, and fully reconnect the river from Cochiti Dam to Elephant Butte Reservoir on October 25, 2024, 11 days earlier than in 2023.

Supplemental Water Program

Reclamation initiated its Supplemental Water Program in 1996 to support water needs of the ESA-listed species in the MRGP. The program originally included water acquisition, reservoir storage, and release of water to support river flows. From 2001 to 2020, it also included operation of a pumping network in the San Acacia Reach to pump water from the LFCC to the river. The Supplemental Water Program supports the MRG BO.

Water Acquisition and Management

In 2024, a total of 9,761 ac-ft of supplemental water was released for endangered species purposes. Of that volume, 2,346 ac-ft was water that Reclamation leased from 2023 SJCP contractor allocations and 7,415 ac-ft came from 2024 leases.

The release of supplemental water began July 29 at 50 cfs. River conditions were stable by August 7, so the release was decreased to 40 cfs on that day until September 5. The release was increased to 90 cfs from September 6 to 13 when MRGCD released the last of its SJCP water. The release was stopped from September 14 to 17 because of precipitation that reconnected the Isleta reach.

The release resumed at 90 cfs on September 18 and continued as needed at rates between 20 and 100 cfs until October 18. A series of storms across New Mexico allowed the release to be shut off for the year on October 19. The river reconnected from Cochiti Dam to Elephant Butte Reservoir on October 25 and remained connected through the remainder of the year.

Reclamation's supplemental water account ended 2024 with 3,831 ac-ft in storage in Heron and 843 ac-ft in storage in Abiquiu leased from 2024 SJCP contractor allocations. In 2025, Reclamation is negotiating leases of approximately 11,500 ac-ft from SJCP contractor allocations. However, water available from those leases could be less than that, depending on the overall SJCP allocation.

Other Sources of Supplemental Water

In addition to the water released by Reclamation, four other sources of water were used to support the needs of the SJCP leased and listed species in 2024. These sources included pre-1907 native water rights leased by Reclamation, pre-1907 native water rights conveyed to Reclamation as part of a settlement with the City of Rio Rancho (RR-SWA), and the Environmental Water Leasing Program (EWLP), a fallowing program within the MRGCD largely funded by Reclamation. 2024 also includes a small amount of water generated from an on-farm conservation project in partnership with MRGCD, which Reclamation hopes to expand in the future. Water from all sources was released to the river via MRGCD wasteway outfalls and was coordinated closely. Potential points of release for this water were the following: IDD, 240 Wasteway, Los Chavez Wasteway, New Belen Wasteway, Storey Wasteway, and San Francisco Drain.

As shown in Table 13, approximately 6,188 ac-ft was released to the river by MRGCD at various locations. Most of the release came from the EWLP. All releases were made in the Isleta Reach.

Table 13: 2024 MRGCD Outfall Deliveries

Delivery Dates, 2024	Delivered Water Volume, ac-ft	Water Source
July 29 – August 14	139.61	Native water acquired, permitted, and used for offset
July 31 – August 3	29	On-farm conservation
August 5 – 28	500	Native water acquired by RR-SWA
July 14 – October 31	5,519	Native water acquired by EWLP
TOTAL	6,187.61	-

Reclamation leased 139.61 ac-ft of pre-1907 native water rights from the Town of Bernalillo, which are permitted for offset via the NMISC's Strategic Water Reserve. The offset water was released from the Los Chavez Wasteway outfall from July 29 to August 14.

Reclamation is piloting a partnership with MRGCD to acquire water through conservation projects, such as laser leveling fields and improving irrigation turnouts. In 2024, this program resulted in 29 ac-ft that was released from the New Belen Wasteway from July 31 to August 3.

A protest of a permit application by RR-SWA resulted in a May 2019 *Settlement and Cooperative Water Agreement* under which Reclamation leases 500 ac-ft of pre-1907 consumptive use water rights from Rio Rancho. In 2024, the water rights offset releases from the 240 Wasteway from August 5 to 28.

In 2024, there were 1,786.39 acres enrolled in the EWLP for the full season and 403.42 acres for the partial season. During the irrigation season, the EWLP received a credit, in ac-ft, for all enrolled acres, prorated to account for water availability. The extent to which MRGCD supply, defined as the release from Cochiti Dam available for MRGCD use and not including supplemental water and

ABCWUA's release, covers MRGCD's daily demand. MRGCD and Reclamation then coordinated the release of EWLP water. The 2024 credit was 5,914 ac-ft, of which 5,519 ac-ft were released. The remaining 395 ac-ft of EWLP credit was not released and does not carry over.

Pumping to the River

The Neil Cupp pumping site, originally developed by Reclamation for temporary pumping operations from the LFCC to the river, was converted to a permanent pumping site by MRGCD after Reclamation ceased LFCC-to-river pumping in 2020. It is owned and operated by MRGCD and is capable of pumping to both the river and irrigation facilities. In 2024, MRGCD pumped 389 ac-ft on 13 days in three periods from the Neil Cupp site to the river to help maintain river connectivity.

Pumping began on June 26 at 20 cfs and was intended to reduce the rate of river drying. It ceased on June 30 after a large rain event increased flows. Pumping resumed at 20 cfs on July 11 as drying in the San Acacia reach again seemed imminent. River drying began July 14, and the pumping rate was decreased by 5 cfs daily from July 13 until it was stopped on July 16. In coordination with USFWS, MRGCD operated the pumps from August 18 to 20 at rates of 5, 10, and 20 cfs, respectively. USFWS was determining the wetted extent resulting from the various pumping rates.

Rio Grande Project, New Mexico – Texas

Reclamation is responsible for the oversight of the RGP and operates and maintains Elephant Butte and Caballo Dams and the Elephant Butte Powerplant (see Figure 18). Reclamation determines the release from Elephant Butte Dam to meet irrigation demand while supporting hydropower production, maintaining compliance, and achieving other benefits. The release from Caballo Dam is based on irrigation demand to make water deliveries at the canal headings for the EBID, EPCWID, and the Republic of Mexico under the 1906 Convention.

EBID operates and maintains Reclamation's diversion dams on the Rio Grande – Percha, Leasburg, and Mesilla in New Mexico – under contract with Reclamation. The IBWC owns, operates, and maintains the American Diversion Dam and the American Canal in Texas, which delivers to EPCWID, and operates the International Diversion Dam, which diverts irrigation waters into the Acequia Madre head gates operated by Mexico. and in accordance with the International Treaties with Mexico (1906 and 1933).

The irrigation and drainage system of the RGP is owned, operated, and maintained by EBID in New Mexico and EPCWID in Texas. Reclamation owns and administers the lands and right-of-way activities of the reservoirs and diversion dam areas in New Mexico and retains the title and O&M responsibilities for Elephant Butte and Caballo Dams and the Elephant Butte Powerplant.

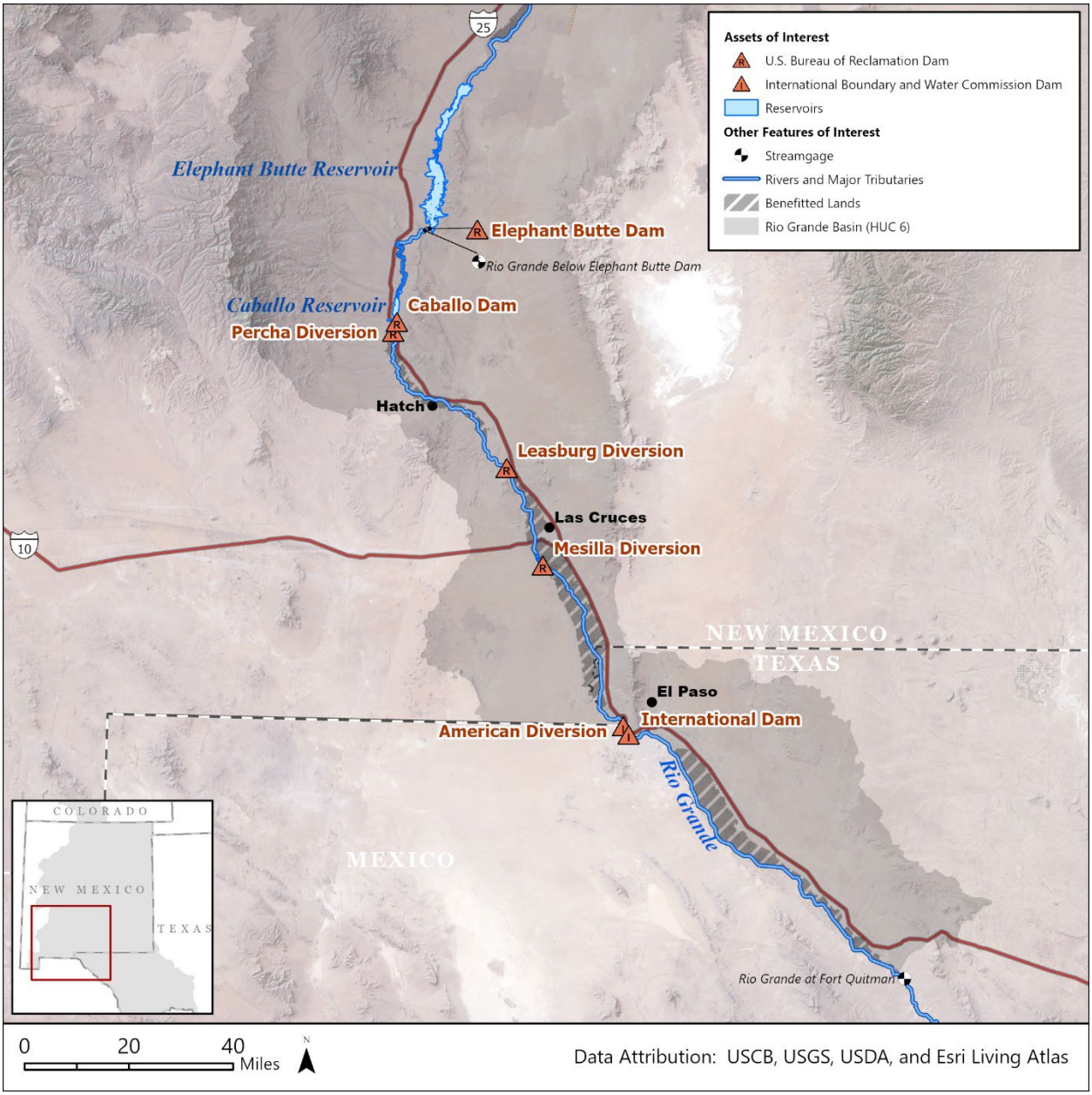


Figure 18: Map of the Rio Grande Project in New Mexico and Texas.

Rio Grande Project Operations

Combined total storage of SJCP, Compact Credit, and RGP in Elephant Butte and Caballo Reservoirs began 2024 with 477,674 ac-ft, 21 percent of total capacity, and ended with 205,698 ac-ft (9 percent of total capacity). Maximum combined total storage was 538,237 ac-ft (24 percent) on March 7 and minimum was 129,950 ac-ft (6 percent of total capacity) on September 26. Reclamation communicated with stakeholders to provide information and projections of reservoir elevations throughout the irrigation season.

Water Accounting for RGP Operations

Reclamation performs daily accounting of SJCP, Compact Credit, relinquishment credit, and native Rio Grande water for the Rio Grande in New Mexico, including the composition of water in reservoirs from Heron to Caballo. This accounting is needed to make informed daily water operations decisions. To perform this accounting, Reclamation utilizes the interagency Upper Rio Grande Water Operations Model (URGWOM). In URGWOM, an account with a non-zero value is assessed gains and losses, so for Elephant Butte accounts, end-of-year debits from the previous year are given a value of zero for the current year as to avoid incorrectly adding gains and losses to the debit.

Compact Credit Water

Compact credit water for Colorado and New Mexico is stored in Elephant Butte Reservoir and not included as RGP water. New Mexico began 2024 with a debit of 121,500 ac-ft, and Colorado began 2024 with a debit of 1,100 ac-ft, therefore no credit water was stored in Elephant Butte Reservoir in 2024.

Usable Water Accounting for RGP Operations

RGP supply is determined from the usable water on January 1, as defined in Compact Article I, and is tracked daily for increases from inflows and decreases from evaporation and releases. In 2024, the usable water in RGP storage, Elephant Butte and Caballo Reservoirs combined, was 470,229 ac-ft on January 1, reached a high of 531,331 ac-ft on March 7, and ended the year at 201,139 ac-ft on December 31.

Article VII Restrictions

Article VII of the Compact stipulates that when usable water in RGP storage, using Compact the accounting method, is below 400,000 ac-ft, no native Rio Grande water will be stored in post-1929 reservoirs upstream of Elephant Butte Reservoir unless accrued credit water has been relinquished. Article VII restrictions were not in place from January 1 through June 24 when RGP storage was above 400,000 ac-ft. Article VII restrictions were in effect on from June 25 through December 31. No relinquishment credit was stored in a post-1929 upstream reservoir in 2024.

Elephant Butte Dam, Reservoir and Powerplant

In 2024, the minimum elevation at Elephant Butte Reservoir was 4,299.53 ft (112,586 ac-ft) on September 26. The maximum elevation was 4,342.38 ft (510,200 ac-ft) on February 14 and 15.

Reclamation began releases at Elephant Butte Dam on February 12 and continued through September 26. During this period, a release of 649,611 ac-ft was recorded by the USGS' Rio Grande below Elephant Butte gage. The Elephant Butte powerplant record showed releases of 553,958 ac-ft. Note that Elephant Butte operators consistently record a lower discharge than the USGS gage. The 2024 annual volume measured by the USGS gage, including the seepage outside of releases, was 649,848 ac-ft.

The total gross hydropower generation in 2024 was 58,199,203 kilowatt-hours (kWhr). Net hydropower generation was 57,744,536 kWhr.

Caballo Dam and Reservoir

Caballo Reservoir started 2024 at 4,131.48 ft (10,012 ac-ft), which was also the minimum storage for the year. It ended the year at 4,136.16 ft (18,997 ac-ft). During 2024, the maximum elevation was 4,147.36 ft (53,323 ac-ft) on April 8 and 9.

The irrigation release period extended from March 8 through September 28, releasing 625,417 ac-ft as measured at the Rio Grande below Caballo Dam gage. During that period, Reclamation operated Caballo Reservoir to maintain storage levels adequate to respond to irrigation calls while protecting facilities and cultural sites. The calendar year 2024 release volume measured at the Caballo gage, including the seepage outside of releases, was 625,614 ac-ft.

The diversion from Caballo Dam for Bonita Lateral irrigation was 1,228 ac-ft from January through December.

RGP Warren Act Deliveries

Through a Warren Act contract, Reclamation sells drainage flows from the RGP lands as supplemental irrigation water for approximately 18,000 acres of the HCCRD. Drainage flows out of the RGP to HCCRD are measured at three gaging stations near the Hudspeth County line: the Hudspeth Feeder Canal, the Tornillo Canal at Alamo Alto, and the Tornillo Drain. For 2024, 57,261 ac-ft of RGP drainage flow was measured flowing into Hudspeth County. During the charged contract period, March 1 through September 30, a volume of 43,966 ac-ft was measured.

Rio Grande Project Accounting

In December 2023, Reclamation allocated 21,993 ac-ft as the initial 2024 allocation to Mexico. The provision of the 1906 Convention for extraordinary drought was applied and Reclamation provided Mexico with monthly updated allocations until May 2024, the last in-season allocation to Mexico, when a full allocation of 60,000 ac-ft was made. Mexico's allocation is calculated from the anticipated release of RGP water, and once allocated to Mexico, the U.S. cannot reduce the allocation even if the anticipated or actual release is significantly less than originally anticipated. If the actual release is less than the anticipated, an over delivery to Mexico is calculated only for the purposes of RGP water accounting, not as part of the 1906 Convention. This is further explained below in this section of the report. For 2024, an over delivery to Mexico did not occur.

The U.S. Districts, EBID, and EPCWID were provided an initial allocation in January 2024. Reclamation provided the U.S. Districts with updated allocations monthly as RGP water in storage increased. The last in-season allocation was in May, as spring runoff inflow ended.

Releases from Caballo for irrigation deliveries began on March 8 and ended on September 28. EPCWID and Mexico began the season on March 12 and 13, respectively, with coordinated orders for release. EBID began orders and diversions on May 31, and ended their surface water diversions on August 18. Mexico ended their diversions on September 20, and EPCWID ended their diversions on September 29.

The total Caballo release for RGP water accounting was 625,613 ac-ft, which was used to calculate the diversion ratio, a quantitative measure of delivery performance. For 2024, the calculated

diversion ratio was 0.85. The allocation balances at the beginning of 2024 were for 83,277 ac-ft for EBID and 175,801 ac-ft for EPCWID. See Table 14 for a summary of the 2024 water accounting.

Table 14: 2024 Rio Grande Project Water Accounting[1]

	Final Allocation	Final Charges	Caballo Release for Irrigation	Calculated Diversion Ratio	Adjustment for Over Delivery to Mexico	Account Balance for 2025
EBID	203,769	170,150	-	-	-	33,619
EPCWID	362,116	303,344	-	-	-	58,772
Mexico	60,000[2]	57,390	-	-	-	-
Total	625,885	530,7884	625,613	0.85	-	-

2025 Rio Grande Project Outlook

Reclamation determined the 2025 initial allocation to Mexico was 0 ac-ft. In February 2025, allocation to Mexico was 8,949 ac-ft (15% of full) and including the carryover from 2024 the water available for allocation to EBID and EPCWID was less than 145,000 ac-ft combined. Official initial allocations to EBID and EPCWID are expected to be set in March. Subsequent allocations are made monthly and continue monthly until inflows are insufficient to increase allocations and finalized using October 31 data after the end of the irrigation season. With the anticipated below average snowmelt runoff, Reclamation expects a less than 400,000 ac-ft release from Caballo for 2025. The 2025 irrigation releases from Caballo Reservoir are expected to begin on June 1 for both Districts and Mexico. The length of the release season will depend on inflow to Elephant Butte Reservoir. Elephant Butte Reservoir will likely reach peak storage in late-May right before releases begin and usable storage in Elephant Butte and Caballo Reservoirs will remain below 400,000 ac-ft for the year.

RGP River Gage Operation and Maintenance

EBID and EPCWID operated and maintained gages for flow measurements at canal headings, river stations, and lateral headings during 2024. Reclamation operated and maintained the Rio Grande gaging station below Caballo, and coordinated and maintained central control of releases, river operations, and water accounting. To accomplish the water allocation accounting, the U.S. Districts collect field flow measurements and coordinate data from all water user entities. Utilizing the summarized flow data submitted by the U.S. Districts for their areas of responsibility, Reclamation calculated and summarized the monthly and end-of-year RGP water supply use and accounting for 2024.

Reclamation installed an acoustic flow meter within the Bonita Lateral pipe in 2023. The new flowmeter transmits a digital signal that Reclamation receives, and that may be available publicly

[1] Volumes in ac-ft
[2] Based on non-extraordinary drought conditions per 1906 Treaty

once data validation is completed. In 2024, instantaneous flow values were collected along with quality control metadata. These flow data are being compared with the legacy analog flow meter for another year to validate accuracy before becoming the instrument of record.

Drought Resilience Efforts in the Rio Grande Project Area

Congress recognized the increasing stresses on water supplies in the Western U.S. with the passage of the Science and Engineering to Comprehensively Understand and Responsibly Enhance (SECURE) Water Act in 2009 (P.L. 111-11). The law authorizes Federal water and science agencies to work together with state and local water managers to plan for threats to water supplies, as well as take action to secure water resources for the communities, economies, and ecosystems they support.

In response to prolonged aridification of the RGP area and the need for collaborative solutions in support of water users and habitat in the area, Reclamation began several collaborative projects to improve water supply resilience for RGP water users. Reclamation started to work on post-fire sediment modeling in the Black Range of the Gila National Forest, established the RGP Area Drought Resilience Team (RGPA-DRT) and entered into cooperative agreements with the NMISC and the National Fish and Wildlife Foundation (NFWF).

Caballo Post-Fire Mitigation

Two major and devastating fires have occurred in the past ten years in the Black Range: the Silver Fire of 2013 and the Black Fire of 2022. The Black Range is located about thirty miles east of Elephant Butte and Caballo Reservoirs in the Gila National Forest in South Central New Mexico with tributaries that flow into these reservoirs and provide additional water for the RGP. The Silver Fire burned approximately 138,698 acres with 57,724 acres being classified as medium to high severity burned areas. The Black Fire burned 327,263 acres with 74,594 acres being classified as medium to high severity burned areas. Combined, these two fires burned 465,961 acres.

In 2016, a precipitation event in the Black Range caused a woody debris arroyo flow from the Silver Fire to wash into Caballo Reservoir. This woody debris flow resulted in the trash rack of the Caballo outlet works to be clogged, restricting releases to farmers and municipalities downstream of Caballo Reservoir. During the event, efforts to unclog the trash rack during releases proved to be highly unsafe, and somewhat ineffective. Future post-fire debris flow flooding could completely overwhelm Caballo Reservoir's ability to release to the RGP water users or even make RGP releases impossible during extended periods of an irrigation season. This would have disastrous impacts for the RGP's farmers and municipalities, specifically the City of El Paso, TX, and the Republic of Mexico since the main source of water for the Mexican farmers and the City of El Paso is the RGP water.

Through an internal competitive funding process, Reclamation applied and was awarded funding in 2023 to conduct an extension of a geomorphological and sedimentation flow study of the Eastern slopes of the Black Range to assess future sediment deposition and debris flow scenarios into Caballo Reservoir. The modeling effort may lead to planning projects that can help mitigate possible future debris flow events. Reclamation will also seek to foster strategic partnerships through dialogue and communications with current partners that includes U.S. Forest Service, USGS, and others on further post-fire mitigation cooperation, planning, and collaboration for mitigating post fire consequences. By partnering and cooperating with others, Reclamation can participate in forest

rehabilitation planning and processes to attempt to reduce sediment deposition into Caballo Reservoir.

Rio Grande Project Area Drought Resilience Team

RGPA-DRT is a multi-agency technical team established in 2021 to:

- enhance the resilience of the aquifer and stream system in order to improve RGP performance;
- improve water management;
- explore water conservation opportunities;
- enhance habitat;
- allow for information sharing between governmental agencies and RGP water users;
- foster coordination and cooperation between Federal, State, and local agencies with jurisdiction in the RGP area, including exploration of and support for joint funding opportunities.

Four subgroups have evolved out of the RGPA-DRT to focus on specific resilience topics. These subgroups are: a brackish aquifer reuse and desalination, ecological restoration, stormwater capture, and Rincon Lateral conceptual design.

The main participants in the RGPA-DRT and the various subgroups are: Reclamation, the New Mexico Office of the State Engineer, NFWF, NMISC, EBID, IBWC, NRCS, New Mexico State Lands Office, City of Las Cruces, New Mexico State University, and Doña Ana County.

RGP Drought Resilience Projects

In 2023, Reclamation entered into five-year cooperative agreements with NMISC to hire water resource professionals to work on drought resilience projects and NFWF for water conservation and ecological restoration projects with wildlife benefits. In 2024, Reclamation entered into an additional five-year cooperative agreement with NMISC for implementing drought resiliency projects in the RGP and the MRGP EWLP. These cooperative agreements include the planning and implementation of stormwater capture projects at RGP area sediment dams, off-channel storage projects, demand management and exploring desalination and reuse opportunities for brackish aquifers.

Active Rio Grande Project Litigation

Lower Rio Grande Adjudication

Since 2010, interested parties have been proceeding with Stream System Issue No. 104, which involves the United States' water interests in the Lower Rio Grande in New Mexico. In 2012, the court determined that the United States did not have a groundwater right associated with the RGP.

However, the court did rule that the United States did have rights in Project return flows which would have to be determined by the State Engineer. Also, the court did not rule on whether the various groundwater inflows into the Rio Grande are considered "project water," which – if so, determined by the court – would mean the United States has a right to such inflows once they become surface water again. Stream System Issue No. 104 has been stayed since 2017. The United States and New Mexico have drafted a proposed order however a final order cannot be filed until the stay is lifted. The court issued an order requiring objections to lifting this stay be filed with the court by February 14, 2025 and setting a hearing on those objections for March 13, 2025.

State of New Mexico v. United States

On August 8, 2011, the State of New Mexico filed a lawsuit against the United States (*State of New Mexico v. United States et al.*, D.N.M. Civ. No. 11-0691) regarding the RGP 2008 Operating Agreement and a purported change in accounting of the water to be delivered to Texas from the Rio Grande. The case is stayed pending ruling by the Supreme Court on *Texas v. New Mexico*.

Texas v. New Mexico

In 2013, Texas submitted a request to file a complaint in the Supreme Court of the United States (SCOTUS) alleging violations of the Compact by New Mexico (*TX v. NM*). Colorado joined the case automatically as a defendant due to its involvement in the Compact. The United States joined the case as a plaintiff upon its request which was approved by SCOTUS in 2018. Texas claimed that New Mexico was interfering in the delivery of water to Texas by pumping New Mexico groundwater which intercepts RGP flows upstream of the New Mexico/Texas state line. The United States took part in several rounds of settlement talks. *TX v. NM* trial phase 1 was held in Fall 2021; phase 2 was postponed due to the United States and the Compacting States (Texas, New Mexico, and Colorado) resuming settlement talks from December 2021 through September 2022. These settlement talks had significant progress, but no final agreement was reached with the United States. The Compacting States filed a proposed Consent Decree in November 2022, which the United States opposed. The Special Master held oral arguments in February 2023. In July 2023, the Special Master filed a report recommending adoption of the proposed Consent Decree; the United States briefed its opposition to the Special Master's report. SCOTUS heard oral argument on March 20, 2024, On June 21, 2024, SCOTUS denied the States' motion to enter their proposed Consent Decree because it would dispose of the United States claims without the consent of the United States. The rejection of the proposed Consent Decree means that *TX v. NM* remains active before a new Special Master, D. Brooks Smith, appointed by SCOTUS on July 17, 2024. After an October 23, 2024 status conference before the new Special Master, the parties were ordered to mediation with the first session held December 10-12, 2024. Mediation is on-going and the Special Master has set a trial date of June 9, 2025.

Facility Review and Safety of Dams Program

Elephant Butte Dam

There are no significant dam safety-related O&M issues associated with Elephant Butte Dam. There are currently two incomplete Safety of Dams recommendations and four incomplete Category 2 O&M recommendations.

In 2024, the legacy coatings in the service conduits were removed for visual inspection and assessment of the embedded steel conduit condition. The steel conduits were recoated with a modern marine coating for longevity and dependable use of the balance valve service conduits.

In the fall of 2024, the Elephant Butte Dam complex replaced the 25-year-old asphalt parking lot at the facility. This is intended to move surface drainage away from the powerplant and maintain access to all parts of the facility complex.

Reclamation installed an index velocity meter for use at Elephant Butte. The data collected will study the effects of diurnal powerplant operations on discharge during peak power generation. Multi-year data analysis will support the operation of the USGS Rio Grande Below Elephant Butte Gage and may be validated as a cost-effective alternative to in-situ flow meter replacements inside the powerplant.

Caballo Dam

There are no significant dam safety-related O&M issues associated with Caballo Dam. No Safety of Dam recommendations currently exist for Caballo Dam. There are currently two Category 2 O&M recommendations for Caballo Dam scheduled for completion in the spring of 2025.

Bonita Lateral Irrigation Pipe Project

The design and construction of Caballo Dam incorporated a pipe, the Bonita Lateral Irrigation Pipe, to deliver water to the Bonita Lateral to irrigate lands upstream of the first diversion dam. Due to the increasing need for repairs, Reclamation determined that replacement of the gate valve and the original 1939 wooden stoplogs is necessary. There is no immediate threat to the structure of the dam, however, without remediation the potential for piping through the earthen dam could compromise the structure.

In 2024, Reclamation worked on Phase 2 of the Bonita Lateral Irrigation Pipe Project, including a feasibility study, a value engineering study, and a constructability review. Construction is tentatively scheduled to start in October 2026.

Reservoir Vegetation Management

Reclamation maintains areas previously cleared at Caballo Reservoir to limit consumption of water by woody phreatophytes like salt cedar. In 2024, approximately 1,350 acres of phreatophyte vegetation at Caballo was managed utilizing mowers and mulchers; including 230 acres that have been treated with spray application herbicide.

ESA Compliance for Operating Agreement and Storage of SJCP Water

The USFWS issued a final *Biological and Conference Opinion on effects of actions associated with the proposed continuation of the Rio Grande Project Operating Agreement and storage of San Juan-Chama Project water in Elephant Butte Reservoir, NM* (Consultation Number 02ENNM00-2015-F-0734, RGP BO) on May 25,

2016. The non-jeopardy determination in the RGP BO is based on the mandatory accomplishment of numerous commitments by Reclamation (nine Conservation Measures, four Reasonable and Prudent Measures, and nine Terms and Conditions). The USFWS provided an Incidental Take Statement for the flycatcher and cuckoo.

In accordance with the RGP BO, incidental take of flycatcher will be considered exceeded if more than 33 flycatcher territories or 24 nests (calculated as 96 eggs and nestlings) are taken because of high surface water events above the 2014 baseline. If more than 81 acres of occupied suitable or marginally suitable habitat are inundated for two to five years, take may also be exceeded. Incidental take of cuckoos will be considered exceeded if more than five cuckoo territories or three nests, calculated as 12 egg and nestlings, are taken because of high surface water events above the 2014 baseline. If more than 606 acres of occupied suitable or marginally suitable habitat are inundated for two to five years, take may also be exceeded. Take from reservoir level inundation may be avoided if natural revegetation occurs as reservoir levels go down.

In 2024, Reclamation continued implementing the commitments set forth in the RGP BO. There was no incidental take of flycatcher or cuckoo nest and territories in 2024. Annual survey data for the RGP BO is included in the MRG BO section of this report.

Related Reclamation Programs

Native American Affairs Programs

Reclamation has numerous projects underway with Pueblos and Tribes. These projects fall under several categories including the Native American Affairs (NAA) Program, planning, water rights settlements to include assessments and implementation, cooperative ventures with other Federal agencies, Rio Grande Pueblos Irrigation Infrastructure, and other special projects funded through Congressional legislation.

NAA and other programs have provided funding to various Pueblos for water resource related issues. In addition, the U.S. Department of the Interior's Indian Water Rights Office funded various needs related to active tribal water rights assessment teams throughout New Mexico.

Contained in the Omnibus Public Land Management Act of 2009, P.L. 111.11, authorized a study of the 18 Rio Grande Pueblos' irrigation infrastructure and construction through 2019. The Study Report was submitted to Congress in June 2022. Authorization of the program has been extended annually. Several new Pueblo irrigation contracts and added scope and funding to existing contracts were accomplished with 2024.

Isleta Settlement

IDD was built by the MRGCD on Pueblo of Isleta land in 1934 and rehabilitated by Reclamation in 1954. Long-standing issues from dam construction and operation on Pueblo lands were resolved in an October 21, 2016, settlement signed by Reclamation, the Pueblo of Isleta, and the MRGCD. This settlement granted the United States a 100-year easement for the dam; provided the Pueblo of Isleta with a lump sum for compensation of damages; established a team to plan and implement diversion dam modifications to better manage sediment transport into irrigation canals and provide fish passage through the dam; and allowed for bosque and riverine restoration. The settlement commitments are scheduled to be completed by 2026.

Reclamation is working on a project to construct fish passage and sediment management improvements at IDD, see the San Acacia and Isleta Diversion Dams Projects section of this report.

Indian Water Rights Settlements

The Claims Resolution Act of 2010 was signed into law on December 8, 2010, authorizing the settlement of two long-running New Mexico Indian water rights cases. Title V, the Taos Pueblo Indian Water Rights Settlement Act, authorizes implementation of the Abeyta settlement (involving Taos Pueblo). Title VI, the Aamodt Litigation Settlement Act, authorizes implementation of the Aamodt settlement (involving Pojoaque, Nambé, Tesuque, and San Ildefonso Pueblos). Reclamation is working with BIA, the Pueblos, the State of New Mexico, and other involved parties to implement the provisions of these settlements.

Abeyta Indian Water Rights Settlement

The Abeyta Settlement Agreement resolved Taos Pueblo's water rights claims in the *United States v. Abeyta* adjudication of the Rio Pueblo de Taos and Rio Hondo stream systems. The Settlement Agreement was signed by the Pueblo, the United States, and several non-Pueblo parties, including the Town of Taos (ToT), EPWSD, Acequia Madre del Rio Lucero y del Arroyo Seco, Acequia Madre del Prado, Acequia del Monte, Acequia Madre del Rio Chiquito, Upper Ranchitos Mutual Domestic Water Consumers Association, Upper Arroyo Hondo Mutual Domestic Water Consumers Association, and Llano Quemado Mutual Domestic Water Consumers Association (the Settlement Parties). The Claims Resolution Act of 2010, Public 111-291, 124 Stat. 3064 (the Settlement Act), authorized the United States to enter into the Abeyta Settlement Agreement and established a trust fund for the Pueblo, the Taos Pueblo Water Development Fund, which the Pueblo is authorized to use for multiple purposes, including to acquire water rights, develop water and wastewater related infrastructure, implement watershed protections, and administer a Pueblo water rights program.

Four of eight non-Pueblo parties who have projects assigned to them by the Taos Pueblo Settlement Agreement have received their grant funding and are actively working on their projects: El Prado Water and Sanitation District (EPWSD), ToT, Llano Quemado Mutual Domestic Water Consumer Association (MDWCA), and Acequia Madre del Rio Chiquito/Acequia del Monte del Rio Chiquito (Rio Chiquito). Each of these parties are at different stages in implementing their projects. EPWSD and ToT are drilling wells and/or constructing well infrastructure. EPWSD is nearing completion of one of their two well projects and have nearly expended all their settlement funds; they have sought funding from the New Mexico State Legislature to continue construction. EPWSD proposed a new location for the Rio Grande Well, for which an exploratory well was drilled in 2018 but did not produce sufficient water. Reclamation and BIA have reviewed the proposal and returned comments to EPWSD. The new proposed location is still being discussed with EPWSD and the other settlement parties. Llano Quemado MDWCA is currently waiting for their driller to arrive at the Rio Grande Del Rancho Mitigation Well site. Rio Chiquito is working on securing land for their Rio Chiquito Mitigation Well site.

Upper Ranchitos and EPWSD signed an assignment agreement in October 2024, wherein Upper Ranchitos assigned and EPWSD assumed all Upper Ranchitos MDWCA's rights and obligations with respect to funding, planning, permitting, design, construction, operation, maintenance, and ownership of the Rio Lucero/Rio Pueblo de Taos Mitigation Well. The remaining three non-Pueblo parties, Upper Arroyo Hondo MDWCA, Acequia Madre del Rio Lucero y del Arroyo Seco, and Acequia Madre del Prado. have neither applied for funding nor been active in the monthly all-parties meetings.

Current settlement funding will not be sufficient to complete their projects as described in the Settlement Agreement. The non-federal parties are seeking legislation to address the funding shortfall. The non-federal settlement parties' sought legislation in 2024 to increase the Taos spending ceiling and gain congressional support towards new legislation.

Pojoaque Basin Regional Water System (Aamodt Settlement)

The Aamodt Settlement Agreement provides for settlement of water rights claims in the Pojoaque Basin including claims of the Pueblos of Nambé, Pojoaque, San Ildefonso, and Tesuque; Santa Fe County; and the City of Santa Fe. The Aamodt Litigation Settlement Act authorized Reclamation to

plan, design, and construct a Regional Water System (RWS). The RWS will consist of a water diversion on the Rio Grande, water treatment facility, storage tanks, and transmission and distribution pipelines that will supply up to 4,000 ac-ft of water annually to Pueblo and non-Pueblo customers within the Pojoaque Basin.

Reclamation has split the RWS construction project into three phases. Phase 1 includes an intake, a water treatment plant, storage tanks, and pipelines on the northern end of the project area in San Ildefonso Pueblo and the northern part of Pojoaque Pueblo. Phase 2 includes distribution tanks and pipelines within Nambé Pueblo (Stage 1), southern Pojoaque and Tesuque Pueblos (Stage 2), and Bishops Lodge in Santa Fe County (Stage 3). Phase 3 includes distribution piping for the Pueblos of San Ildefonso, Pojoaque, Nambé, and Tesuque, and Santa Fe County. Phase 1 is currently under construction while Phases 2 and 3 are at various levels of design.

Phase 1 construction started in 2020. In 2024, construction continued at the intake, the water treatment plant, and expanded to two tank sites, two pump stations, and two transmission pipeline corridors. In 2025, the schedule includes continuing work at both the intake and water treatment plant and expanding to more tank and pump sites and pipelines.

In 2024, Phase 2 Stage 1 went out for bid. Designs for Phase 2 Stage 2 tank and pump sites were finalized, and designs for Phase 2 Stage 2 pipelines were advanced from 60% to 90%. Goals for 2025 include awarding Phase 2 Stage 1, putting Phase 2 Stage 2 sites out to bid, finalizing Phase 2 Stage 2 pipelines design, and collecting data to advance Phase 2 Stage 3 design.

Discussions continue with Indian Health Service and Santa Fe County to determine priorities and funding for constructing Phase 3 distribution pipelines.

Hydrologic Models

Upper Rio Grande Water Operations Model

URGWOM is a computational model developed through an interagency effort. It simulates processes and operations in the Rio Grande Basin from the headwaters in Colorado to Fort Quitman, TX, and tracks the delivery of water allocated to specific users within New Mexico. URGWOM operates on the RiverWare software platform developed at the Center for Advanced Decision Support for Water and Environmental Systems (CADSWES).

The primary purpose of URGWOM is to facilitate more efficient and effective water management – accounting, forecasting, and flood risk management operations – in the Upper Rio Grande Basin. URGWOM was developed with individual accounts that track SJCP water separately from native Rio Grande water. URGWOM is used to simulate runs for the Annual Operating Plans that forecast storage and water delivery for the rest of the year and for long-term forecasts for planning studies. The model is also currently being used for the Rio Grande Basin Study.

The URGWOM Technical Team (Team) generally meets monthly. There is also an Executive Committee that meets annually. An Advisory Committee initially strengthened URGWOM's interagency nature, but no longer meets as attendees were consistently the same as those at the monthly Team meetings. The website that provides URGWOM updates can be accessed at http://www.spa.usace.army.mil/Missions/CivilWorks/URGWOM.aspx, and is updated with details

on recent activities, postings of the latest documentation, and meeting notes. Reclamation developed URGWOM training modules hosted on this website to allow those unfamiliar with URGWOM and RiverWare software to learn what it is used for and how it works.

Reclamation is funding West Gulf River Forecast Center in a multi-year effort to recalibrate their ensemble streamflow prediction forecast model for the Upper Rio Grande and the Pecos Basins. Reclamation is also providing funding to the National Center for Atmospheric Research (NCAR) for the improvement of their monsoon forecasting method in New Mexico as well as implementing their forecast into URGWOM runs.

In 2024, the URGWOM planning run database was updated through 2021. This allows the modeler to use data up to that year when doing forecast or planning runs. In addition, master scripts were created to allow easier script usability and better organization, and old and unused scripts were removed. Other minor changes and fixes were also completed such as the creation of additional storage accounts at Abiquiu Reservoir. URGWOM documentation is updated as needed and then reviewed, tracked, and finalized by the Team.

Rio Grande Transboundary Integrated Hydrologic Model (RGTIHM)

RGTIHM is an interagency effort between the USGS and Reclamation, funded by Reclamation. The model is being developed to simulate the availability and use of surface water and groundwater in the Rincon and Mesilla Valleys, including surface water deliveries by the RGP and groundwater for irrigation and non-irrigation uses. RGTIHM represents the dominant natural and human components of the hydrologic system, thereby providing a reliable assessment of surface water and groundwater conditions and processes that can inform water users and help improve planning for future conditions and sustained operations of the RGP.

Model development includes revision of the conceptual model of the flow system, construction of a Transboundary Rio Grande Watershed Model (TRGWM) water-balance model using the Basin Characterization Model platform, and construction of an integrated hydrologic flow model using the Modular Three-Dimensional Finite-Difference Groundwater Flow Model (MODFLOW) and One-Water Hydrologic Flow Model (MF-OWHM). The conceptual model identifies surface water and groundwater inflows and outflows, including the movement and use of water through both natural and anthropogenic processes. The groundwater flow system consists of a layered geologic sedimentary sequence combined with the effects of natural runoff and recharge, operation of the RGP, and groundwater pumping for irrigation and non-irrigation uses. Notably, operation of the RGP includes the application of surface water for irrigation, groundwater recharge from applied irrigation water, return flows through drains and wasteways, and reuse of return flows to meet irrigation demands lower in the RGP.

TRGWM and RGTIHM were developed for and calibrated to historical conditions of water and land use, and parameters were calibrated so that simulated values closely match observed values. The calibrated models were then used to assess the movement and use of surface water and groundwater in the Rincon Valley, Mesilla Basin, and northern part of the Conejos-Médanos Basin. Used together, RGTIHM and TRGWM provide a tool for analyzing the hydrologic system response to the historical evolution of water use in the region, including development of surface water and groundwater supplies for irrigation, municipal, industrial, and domestic uses. The models also provide a tool for evaluating the hydrologic system response to potential changes in water supplies and demands, including changes in irrigated acreage and cropping patterns, population and per

capita water use, local and regional climate and hydrologic conditions, and surface water and groundwater management.

In 2024, USGS and Reclamation continued to work on RGTIHM improvements as summarized below.

RGTIHM development

In 2024, the USGS continued work on updates to extend the model simulation period through 2023. Automated workflows are being developed to facilitate efficient extensions of the simulation period in the future so that RGTIHM remains a relevant modeling tool to plan for future conditions and sustained operations of the RGP.

Previous work includes estimating runoff and recharge from the watersheds surrounding the active boundary of RGTIHM by extending the simulation period of the Basin Characterization Model and updating the specified inflow to the Streamflow-Routing package by including wastewater-treatment plant effluent discharge to the Rio Grande and canals obtained from the U.S. Environmental Protection Agency.

Ongoing work includes estimating the crop irrigation requirement used to simulate the demand component of irrigated agriculture in the Farm Process using actual evapotranspiration obtained from OpenET, drafting a USGS Scientific Investigations Report documenting the methods used to extend the simulation period, and preparation of a USGS data release that will include the updated model input and output files and automated workflows.

MF-OWHM and related software development

The USGS continued implementation of the Surface-water Operations Process in RGTIHM in 2024.

Water Accounting Reports Projects

San Juan-Chama Project Water Accounting

In 2024, SJCP water accounting was accomplished using version 9.4.1 of RiverWare software, and version 9.4 of the URGWOM accounting module. All accounting data and information are stored directly in the final 2024 accounting model. The data are also sent to Reclamation's HDB via a DMI. Reclamation consulted with representatives of the NMISC and USACE -Albuquerque District to verify the accounting data throughout the year. This ongoing discussion minimized concerns regarding year-end data quality and accounting methods.

Oracle Hydrologic Database

HDB is a specialized relational database for storing and retrieving hydrologic data used by Reclamation in the management of river and reservoir systems. A generalized version of HDB was specifically developed for use by Reclamation with RiverWare models. HDB is an Oracle relational database application and includes connections to data sources such as Reclamation's hydrologic and meteorologic monitoring stations (HydroMet), domestic communications satellites, data storage systems, and modeling software like RiverWare. HDB was originally developed at the University of

Colorado's CADSWES. Reclamation's HDB has been customized for specific office and model requirements. Reclamation depends on HDB installations for data storage and retrieval.

Development of water accounting and reporting functionalities for Reclamation's HDB installation continued during 2024. After a successful model run, water accounting data and other output are directly transferred from URGWOM to HDB via a DMI.

Reclamation continues to maintain and update its public websites. These websites have been a great asset for internal and public use in reporting, visualizing, and exporting data from Reclamation's HDB. Reclamation has also begun utilizing Microsoft Power BI to create public dashboards, as discussed in the next section.

In 2024, Reclamation's Upper Colorado Basin Region instance of HDB was updated to Oracle 19 and Red Hat Enterprise Linux 9 for increased security and efficiency. A new data loader was developed to allow HDB to pull in data from online platforms that use OneRain. This provides a more efficient way to pull in the MRGCD's data and a way to begin pulling in data from EBID. There is an ongoing initiative to systematically review and clean up all Reclamation's data within HDB. Given the extensive volume of data stored in HDB, this is expected to be a multi-year effort.

In 2025, Reclamation will continue maintenance and data clean-up in HDB. Also, additional improvements to current Power BI dashboards and additional Power BI dashboards are in development.

Dashboards

Reclamation has developed several dashboards using Microsoft Power BI software over the past couple of years. Currently, two of these dashboards are publicly accessible and are utilized by the public and various agencies for operations. Below are descriptions and links to both dashboards.

The Water Operations Dashboard displays real-time reservoir and streamflow data in multiple formats for the Rio Grande and Pecos River to assist with water operations. Data is pulled from USGS, Colorado Diversion of Water Resources, and Reclamation's HDB every hour on the hour and every half hour between 6 a.m. to 6 p.m. Data is for the last seven days and in 15-minute increments. The Water Operations Dashboard may be accessed at https://app.powerbigov.us/view?r=eyJrIjoiZDFhMmM4MmMtYmMwZi00ZmQ3LWI1MWQtOGVkMzk2YTZjMDgyIiwidCI6IjA2OTNiNWJhLTRiMTgtNGQ3Yi05MzQxLWYzMmY0MDBhNTQ5NCJ9

The Rio Grande Annual Operating Plan (AOP) Projections pages display the results of Reclamation's Annual Operating Plan runs for the Rio Grande. The runs are completed in URGWOM using the NRCS's snowmelt forecast and historical data to reservoirs and streamflow to the end of the calendar year. Projections are updated monthly usually from February to August depending on the need and conditions.

The AOP projections may be accessed at https://app.powerbigov.us/view?r=eyJrIjoiNTkwMTJiZmEtYWMwYy00OTBmLWEwOWYtZTMyNjljYTQ1YjlhIiwidCI6IjA2OTNiNWJhLTRiMTgtNGQ3Yi05MzQxLWYzMmY0MDBhNTQ5NCJ9.

Both dashboards are also accessible under Data Tools and Dashboards in the Water Operations webpage at https://www.usbr.gov/uc/albuq/water/index.html.

RiverWare

Numerous improvements to RiverWare were accomplished in 2024 through contracts that Reclamation and USACE have with CADSWES. Work included creating a data extractor tool to provide an efficient way of pulling data from multiple saved model runs and additional improvements of the Quick Start dialog pop up allowing easy selection of models and data. Funding was also provided to improve window management, a general issue when working with RiverWare. In addition, improvements to the rules, scripting, and DMIs continue. CADSWES' annual report, distributed to the RiverWare user community at their annual meeting, summarizes all 2024 changes to RiverWare.

Evapotranspiration (ET) Toolbox

ET Toolbox was an extension of Reclamation's Agricultural Water Resources Decision Support system that provided high-resolution rainfall and real-time water use predictions and estimates via a dedicated website. It also provided schematics of the MRG with the latest MRGCD, USGS, USFWS, and ABCWUA gage data.

In 2019, Reclamation began collaboration with the NASA's Jet Propulsion Laboratory (JPL) to use their satellite-based ET product to replace ET Toolbox's calculated evapotranspiration. Security concerns delayed the project, and then the JPL contract ended. Reclamation is now attempting to use the process JPL developed to download and display their ET product.

A new MRG Water Management Toolbox was set up in 2022. It may be accessed at https://www.usbr.gov/uc/albuq/water/ETtoolboxV2/home.html. This new site does not calculate future ET or water use estimates. These estimates will be included once the work with JPL has been completed.

Aquatic Invasive Species- Zebra and Quagga Mussels

Dreissenid mussels, including the zebra mussel (Dreissena polymorpha) and quagga mussel (Dreissena rostriformis bugensis), are invasive, freshwater, bivalve mollusks. These aquatic invasive species (AIS) impair water infrastructure and are extremely costly to remove or prevent their attachment to infrastructure. It is estimated that zebra and quagga mussels cause over $1 billion annually in damages to water infrastructure and industries in the United States. Dreissenid mussels proliferate, attach to infrastructure surfaces like dams, water intakes, pipes, and canals, and impact water storage, water delivery, irrigation, and hydropower. Dreissenid mussels can also impair recreational use and aquatic ecosystems by destroying watercraft motors, becoming a beach nuisance, altering aquatic food webs, and fostering harmful algal blooms. A single mussel can produce hundreds of thousands of eggs, which hatch into microscopic larvae called veligers. Veligers spread within a waterbody in numerous ways, mainly by floating within the water column, and can be taken up by outboard motors, pumps, or other water intake and storage on watercraft. Transport

of dreissenid mussels can occur when watercraft used in an infested waterbody transport or discharge water-containing veligers or adult mussels into non-infested reservoirs.

Reclamation does not have authority to manage the importation, interstate transport, exclusion, control, or eradication of aquatic invasive species in New Mexico. On the Rio Grande, Reclamation supports AIS prevention activities by furnishing equipment and contractual support to the New Mexico Department of Game and Fish (NMDGF) for Elephant Butte Reservoir. Reclamation regularly collects water samples and analyzes them by microscopy and molecular methods, providing early detection that can be used to trigger immediate containment action.

Reclamation has contracted AIS monitoring for the following:

- inspections for watercraft entering Elephant Butte Reservoir;
- decontamination of watercraft considered "high risk" as defined by the NMDGF;
- coordination with law enforcement for issuance and removal of red warning tags.

Reclamation's AIS watercraft inspection and decontamination (WID) efforts have increased over time from 9,346 watercraft in 2013, to 21,852 in 2024, as have the contractual costs. With limited funding, Reclamation has prioritized AIS WID services at two boat ramps, Marina del Sur and Rock Canyon, in Elephant Butte because of this reservoir's extensive recreation, fishing, irrigation, power, and water infrastructure. In 2024, 4.2 percent of incoming watercraft were high-risk inspections (i.e., were not drained and dried, etc.), and 31 percent of those were infested and decontaminated. In 2024, there were no detections of invasive mussels or their genetic markers in water samples collected from Elephant Butte by Reclamation's Ecological Research Laboratory.

For more information on mussels and the damage they can cause, please see Reclamation's latest quarterly video at https:/www.youtube.com/watch?v=BoJiBhj1R90&t=206s

Planning Activities in the Rio Grande Basin

WaterSMART Program

Reclamation has selected several stakeholder-driven projects for funding in the Rio Grande Basin under the WaterSMART program. These programs can be accessed on the Reclamation website at https://www.usbr.gov/watersmart/. The total federal investment for ongoing projects in the Rio Grande Basin under the WaterSMART Program is $85,166,137. Below are descriptions of ongoing grants in each project.

Closed Basin Project

Colorado's Rio Grande Basin Water Cooperative Project has an ongoing Water Strategy Grant to develop a water marketing strategy to help reduce the risk of dry-up of historically irrigated land and address the current water supply and demand imbalance. This is the only WaterSMART grant in the CBD. The total award for this project is $212,757 and it will conclude in 2025.

Upper Rio Grande and San Juan-Chama Project

Stakeholders in the Upper Rio Grande and SJCP have been able to secure awards for projects that focus on restoration, watershed group development, irrigation efficiencies, wildfire mitigation, and

infrastructure planning and design. There are currently ten active projects with a federal investment of $12,688,375.

Middle Rio Grande Project

Within the MRGP stakeholders have received funding for projects such as floodplain reconnection, post-fire restoration, data management and collection, aquifer storage and recharge, water distribution system designs and construction, and water management plans. There are currently 18 active grants in the MRGP with a total federal investment of $20,821,855.

Rio Grande Project

Within the RGP stakeholders have received funding for projects such as aquifer storage and recharge, water distribution system improvements, and water recycling and desalination. There are currently 16 active grants in RGP with a total federal investment of $42,451,106.

Basin Study Program

Basin Studies are cooperative agreements between Reclamation and a recipient to address water supply and demand imbalances for stakeholders by developing state-of-the-art projections of future supply and demand by river basin, conducting analyses of how the basin's existing water and power operations and infrastructure will perform under multiple hydrologic scenarios, developing strategies to meet current and future water demands, and conducting trade-off analyses of strategies identified.

Santa Fe Basin Study

In 2015, Reclamation, in partnership with Santa Fe and Santa Fe County, released the Santa Fe Basin Study online at: https://www.usbr.gov/watersmart/bsp/docs/finalreport/SantaFe/Santa-Fe-Basin-Final.pdf. This study evaluated factors such as hydrologic uncertainty, population growth, and other stressors on the Santa Fe watershed and water supplies for the combined municipal water system of the Santa Fe and Santa Fe County.

Based on the Basin Study conclusions, Santa Fe received funding from Reclamation for a Title XVI Feasibility Study, completed in 2017, which describes alternatives for implementation of a water reuse project for Santa Fe. Santa Fe was also awarded funding from Reclamation for a Basin Study Update to determine the likely timeline for hydrologic impacts on Santa Fe's water supply over the coming century, empowering Santa Fe's water utility plan for the remainder of its adaptation portfolio. Additionally, Santa Fe was awarded a Water Management Options Pilot Project grant to redevelop the system dynamics model used to simulate its water supply sources and distribution. Work continues, but completion of the Basin Study Update has been postponed until the new system dynamics model is complete. Input from the Rio Grande Basin Study should be completed soon now that the Rio Grande Basin Study model is ready and available[1] to complete the assessments.

As a result of the Basin Study and Feasibility Study, several alternatives were identified for Santa Fe to acquire additional water. Santa Fe received Title XVI funds for a proposed water reuse project in 2022 and 2025. Reclamation is leading the environmental compliance process, which is expected to

[1]At the time of this report, the model is nearly complete.

be completed in 2025. Under Santa Fe's preferred alternative, they would consumptively use all of their contracted SJCP water allocation by receiving credit for water returned to the Rio Grande.

Rio Grande Basin Study: Lobatos to Elephant Butte

Reclamation has partnered with the MRGCD, eight Pueblos, and numerous other basin stakeholders, including State and municipal government entities, Pueblos and Tribes, irrigation districts, acequias, and non-governmental and community organizations, to perform a Basin Study from the Lobatos stream gage near the Colorado-New Mexico border to Elephant Butte Dam in south-central New Mexico. This basin study seeks to develop projections of future water supply and demand and collectively evaluate and model potential adaptations to the projected changes. No water management decisions will be made as part of the basin study; instead, the study partners will create an interactive decision-support tool for water managers to consider, along with other constraints such as political and economic factors, as they manage water in increasingly challenging conditions.

The study's Memorandum of Agreement was adopted by 35 non-Federal entities and signed by Reclamation on January 24, 2023. Reclamation's signature initiated the official start to the three-year study schedule. Since 2023, the number of signatories has grown to 39.

The non-Federal Partners in the basin study have organized into Sectoral Committees and are working on initial reporting to inform the partnership. Sectoral Committees and the Steering Committee meet monthly. Reclamation hosts All-Partner meetings quarterly. The Modeling Team, led by Reclamation, has been working extensively with the University of Massachusetts–Amherst on climate and hydrologic projection sets to inform the study and its partners. The various Sectoral Committees continue to work on value assessments to aid in the study's overarching goals of analyzing supply and demand scenarios and to assess various adaptation strategies. As of January 2025, model development is complete, and the Modeling Team is beginning analysis of water supply under projected conditions.

Science & Technology Program

Reclamation's Science and Technology (S&T) Program is a Reclamation-wide competitive, merit-based applied research and development program. The program focuses on innovative solutions for water and power challenges in the Western United States for Reclamation water and facility managers and the stakeholders they serve. The program has contributed many of the tools and capabilities Reclamation and Western water managers use today. S&T Program projects in the Rio Grande Basin that are ongoing or were completed in 2024 are listed below.

- FY 2019 Award – completed December 2023 with continued data collection into 2024, Using Remote Sensing and Ground Measurement to Improve Evaporation Estimation and Reservoir Management (Reclamation partnership with New Mexico State University). This project aims to improve reservoir evaporation monitoring and reservoir management through the comparison of evaporation estimates from in situ and remotely sensed measurements. The final data and reports are available on RISE: https://data.usbr.gov/catalog/8041/item/128703. Direct evaporation measurements at both reservoirs by the Eddy-Covariance method were lower than those estimated by the bulk-aerodynamic method. In contrast, evaporation by Class "A" evaporation pan was two to three times higher than both methods.

- FY 2020 Award – ongoing, An Experimental Monsoon Forecast for Water Management (Reclamation partnership with the NCAR); https://data.usbr.gov/catalog/7986. This project was tested in 2021–2023 and has received "Facilitated Adoption" program funding from Reclamation's Research and Development Office for an additional three years of refinement and testing in both New Mexico and western Arizona. The team is now focusing on development of seasonal monsoon forecasts to support Reclamation's annual operating plans. This project has been nominated for Reclamation Science & Technology Project of the Year.

- FY 2021 Award – ongoing, Utilizing Acoustic Sensors to Detect Streambed Mobilization (Reclamation partnership with USGS California Water Science Center and Christ in the Desert Monastery). This project deployed hydroacoustic sensors to determine the flows that initiate streambed mobilization on the Rio Chama. The goal is to improve management of high flow pulses by correlating the moment of mobilization to a flow rate. The project has been extended through FY 2025 to finish data processing and write the final report.

- FY 2023 Award – ongoing, Stochastic Streamflow Generation: A Complementary Approach for Hydroclimate Projections in Hydrologically Complex Basins (Reclamation partnership with University of Massachusetts Amherst). This project is developing tools and resources to support informed use of climate model projections and use of weather generators in water management applications in the Upper Rio Grande Basin, including the Lower San Acacia Reach Improvements Study and the Rio Grande Basin Study: Lobatos to Elephant Butte. The goal is to develop a generalized stochastic streamflow generation approach to complement Reclamation's present practices, that is applicable across river basins and the broader water resources planning community.

- FY 2023 Award – ongoing, Assessing Satellite Remote Sensing Products to Improve Spatial and Temporal Resolution of Snow Water Equivalence (SWE) Measurements in the SJCP's Source Watersheds (Reclamation partnership with University of New Mexico, University of Wyoming, University of Washington, and USGS New Mexico Water Science Center). This project builds upon a project in the headwaters of the SJCP, Assessing the Utility of New Satellites to Advance State of the Art Snow Forecasting Capabilities, funded under the Snow Water Supply Forecasting Program (see below). This S&T funding added three more years of data collection and remote sensing to support development of a comprehensive tool to assist Reclamation in its snow monitoring via remote sensing across the West. Research was presented at the 2023 American Geophysical Union Annual Conference. This project will conclude in 2025.

Snow Water Supply Forecasting Program

In addition to the S&T Program, Reclamation's Research and Development Office initiated a series of projects in 2022 aimed at developing a Snow Water Supply Forecasting Program that takes advantage of new technologies. Local Reclamation staff are participating in development of this program through two funded projects.

- A Testbed for Harnessing and Benchmarking Snow Data Observations and Watershed Modeling for Water Supply Prediction (Reclamation partnership with NCAR) – completed. Modeling study to test snow monitoring technologies using data from other Reclamation snow studies. The final report has been received for this project but is not yet posted.

- Assessing the Utility of New Satellites to Advance State of the Art Snow Forecasting Capabilities (Reclamation partnership with the University of New Mexico, University of Washington, University of Wyoming, and USGS New Mexico Water Science Center) – ongoing. The initial intent was to test the new NISAR satellite for snow monitoring, but launch was delayed. The project instead focused on comparison of satellite stereo imagery and satellite altimetry measurements of snowpack to ground-based snowpack measurements. A report will be submitted in February 2025. This project received additional funding via the S&T program; see "Assessing Satellite Remote Sensing Products to Improve Spatial and Temporal Resolution of Snow Water Equivalence (SWE) Measurements in the San Juan-Chama Project's Source Watersheds," above.

Wildfire Management Program

Wildfire has been growing in intensity and size throughout the western United States, impacting air quality, water quality, destroying fish and wildland habitat, and causing billions of dollars in damage to homes and infrastructure. Reclamation's Wildfire Management Program funded three projects in Rio Grande Basin. One is a cooperative agreement with The Nature Conservancy to create a comprehensive wildfire plan for the SJCP Headwaters, the second is a Reclamation-lead post-fire sediment modeling effort at Caballo Reservoir, see section on Caballo Post-Fire Mitigation, and the third was a restoration project on the Tiffany Burn scar just downstream of the Historic Fort Craig site upstream of Elephant Butte. Reclamation has also cost shared with New Mexico Forestry on their Water Trust Board funded Watershed Restoration and Management Project; Tiffany Fire Rehabilitation Phase II.