

2003

2003 Calendar Year Report to the Rio Grande Compact Commission

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2003 Calendar Year Report to the Rio Grande Compact Commission

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Hal D. Simpson

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John R. D'Antonio

TEXAS
Joe G. Hanson

FEDERAL CHAIRMAN
Bill Ruth



**UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION**



**Upper Colorado Region
Albuquerque Area Office
March 5, 2004**

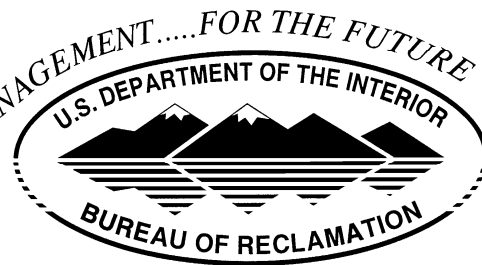
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UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

Upper Colorado Region

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March 5, 2004

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Top: Elephant Butte Reservoir, 1951

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U.S. Bureau of Reclamation
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INTRODUCTION

The Albuquerque Area Office of 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*, the *Middle Rio Grande Project*, and the *Rio Grande Project* (Figure 1).

The *San Luis Valley Project* consists of the Conejos and Closed Basin Divisions. The Conejos Division, which includes Platoro Dam and Reservoir, provides water for approximately 86,000 acres within Conejos Water Conservancy District. The Closed Basin Division is a ground water salvage project located near Alamosa, Colorado which pumps water from a shallow unconfined aquifer.

The *San Juan-Chama (SJ-C) Project* consists of a system of storage dams, 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 SJ-C Project provides water for municipal, domestic, industrial, recreation, fish and wildlife purposes, and supplemental water for irrigation. Another component of the project is the Pojoaque Irrigation Unit and Nambé Falls Dam. The Pojoaque Irrigation Unit provides water for approximately 2,800 acres in the Pojoaque Valley.

The *Middle Rio Grande Project* consists of El Vado Dam and Reservoir and irrigation and drainage facilities in the middle Rio Grande valley. The project also entails river channel maintenance from Velarde, New Mexico, southward to Caballo Reservoir, and the Low Flow Conveyance Channel (LFCC) south of San Acacia, New Mexico. Irrigation water is provided to MRGCD which supplies water to 50,000 to 70,000 acres of land.

The *Rio Grande Project* includes Elephant Butte and Caballo Reservoirs and Percha, Leasburg, Mesilla, and Riverside Diversion Dams. The Project resides in the lower Rio Grande valley of southern New Mexico to just south of El Paso, Texas. The *Rio Grande Project* provides an agricultural water supply for approximately 178,000 acres of land within the Elephant Butte Irrigation District in New Mexico and the El Paso County Water Improvement District No. 1 in Texas. Water is also provided for diversion to Mexico by the International Boundary and Water Commission-United States Section. Drainage waters from the Rio Grande Project lands provide a supplemental supply for approximately 18,000 acres of land within the Hudspeth County Conservation and Reclamation District No. 1 in Texas. Elephant Butte Dam also provides generation of electrical power for communities and industries in southern New Mexico. Reclamation transferred title to the canal and drainage facilities to the districts in 1996.

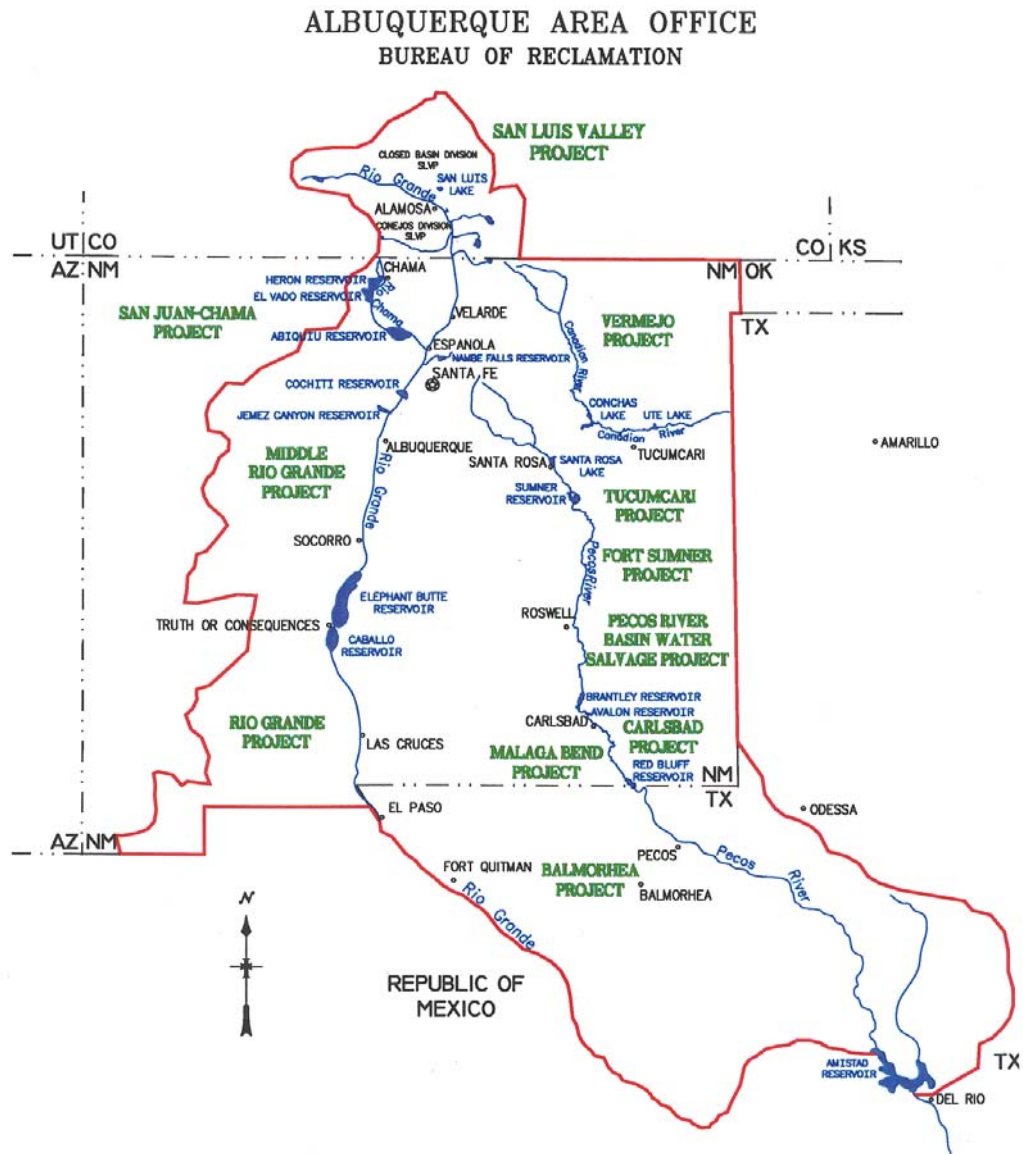


Figure 1: Project Map of Reclamation's Albuquerque Area Office

SAN LUIS VALLEY PROJECT, COLORADO

Conejos Division, Platoro Reservoir

The Conejos Water Conservancy District operates the Conejos Division portion of the San Luis Valley Project, which includes Platoro Dam and Reservoir (Figure 2). The Conejos Water Conservancy District's office is located in Manassa, Colorado.

Platoro Reservoir began the year at an elevation of 9,964.73 and a content of 10,800 af. Supplemental releases to meet water demand were made throughout out the summer and fall. A total of 3,282 af of supplemental water was released during 2003, essentially depleting the pool. A significant portion of the released water was lost to ground water discharge, although losses were not as severe as those experienced during 2002. There were no flood control operations in 2003.

Platoro Dam experienced power outages as the result of lightning strikes twice during 2003. It took several days to restore power following one lightning outage that occurred in the fall.

Platoro Dam Facility Review and Safety of Dams Programs

A Comprehensive Facility Review (CFR) is a review performed on a high or significant-hazard dam every 6 years, which includes a field examination and a state-of-the-art review of a structure's design assumptions, construction practices, and integrity under various loading conditions. A CFR includes a detailed examination performed by a senior dam engineer. Comprehensive facility reviews are designed to gather together appropriate technical disciplines for a brief but intensive assessment of a dam's performance history, the dam safety analyses that have been performed to date, and the current condition of the dam and damsite. The comprehensive facility review covers both operation and maintenance as well as dam safety issues.

A Periodic Facility Review (PFR) is a review performed on a high or significant-hazard dam every 6 years that entails a thorough examination from both operation and maintenance and dam safety perspectives. A PFR is generally completed without the involvement of a senior dam engineer. The periodic facility review covers both operation and maintenance and dam safety issues. The regional office has primary lead responsibility for these reviews. A PFR is on a schedule that is staggered from the CFR schedule, such that either a CFR or PFR is scheduled every 3 years. The last CFR for Platoro Dam was completed in 2001, and the next PFR is scheduled for 2004. A Table-top exercise for Platoro Dam is scheduled to occur in 2004.

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SAN LUIS VALLEY PROJECT

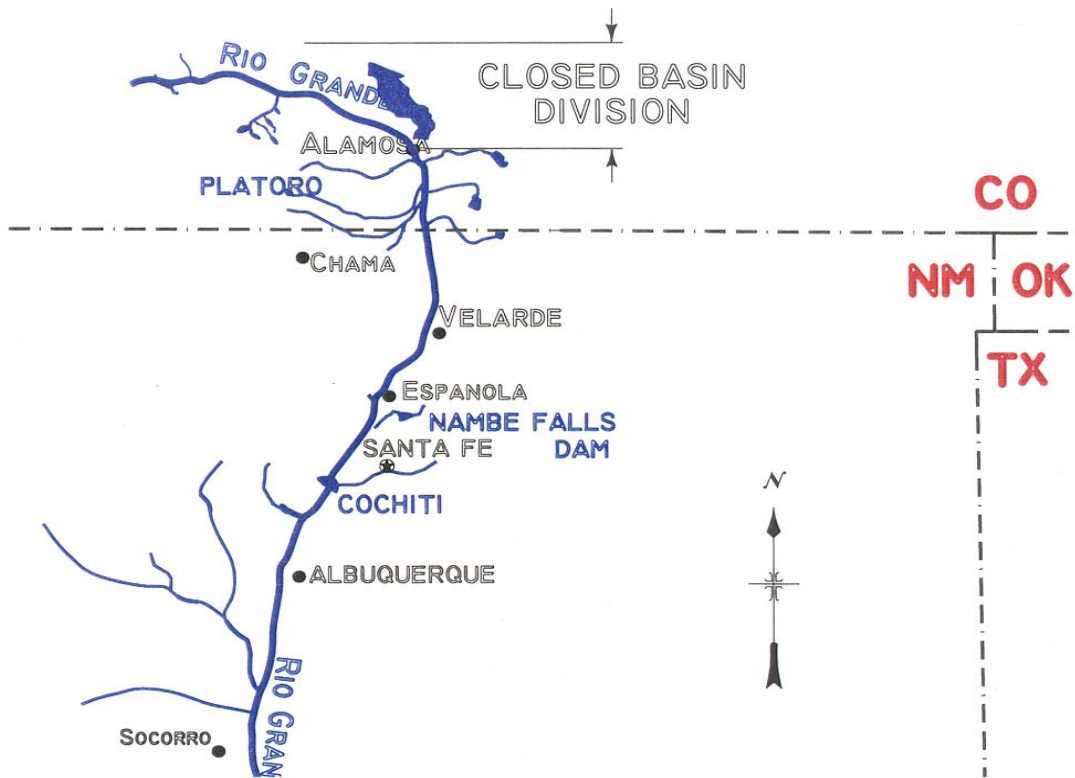


Figure 2: Area Map of San Luis Valley Project

During 2003 the following work was completed for Platoro Dam:

- The Annual Examination was completed in the fall of 2003
- The Conejos Water Conservancy District and Reclamation's Albuquerque Area Office and Denver Technical Service Center are in the design phase of upgrading the current manometer data collection system
- The new manometer data collection system is scheduled for installation in the spring of 2004
- New monitoring points and bench marks were established with planned monitoring

Closed Basin Division

The Alamosa Field Division of the Albuquerque Area Office operates and oversees the maintenance of a water salvage project constructed in the Closed Basin area of the San Luis Valley, Colorado (Figure 2). The purpose of the project is to salvage unconfined ground water from the Closed Basin that would otherwise be lost to evaporation and evapotranspiration. The salvaged water is pumped from 170 salvage wells and delivered through a conveyance channel to the Rio Grande to assist Colorado in meeting its commitment under the Rio Grande Compact. The project also provides for the delivery of mitigation water to the Alamosa National Wildlife Refuge and Blanca Wildlife Habitat Area, and stabilization of San Luis Lake. Reclamation continues to work under the guidance of the Closed Basin Division Operating Committee in management of Closed Basin operations and water deliveries.

Closed Basin - Operations and Maintenance

Operations

A total of 18,854 af of project water was delivered in Calendar Year (CY) 2003. Total deliveries of Compact water to the Rio Grande for CY2003 equate to 13,413 af.

Closed Basin water deliveries in CY2003 included deliveries to the Blanca Wildlife Habitat Area, Alamosa National Wildlife Refuge, San Luis Lake, and the Rio Grande.

Natural inflows to San Luis Lake (SLL) are measured by the SLL inlet flume or estimated at the spillway and culverts. Natural inflow to San Luis Lake during CY2003 totaled 1,029 af. A total of 2,015 af was pumped from SLL through the San Luis Lake Pumping Plant.

Total water deliveries to the BLM Blanca Wildlife Habitat Area for CY2003 equate to 1,364 af. Of this total; 800 af was for annual mitigation and 564 af was pumped out of San Luis Lake to assist the Colorado Division of Wildlife fishery reclamation activities.

Total water deliveries to the Alamosa National Wildlife Refuge for CY2003 equate to 4,077 af. Of this total, 2,664 af was for annual mitigation and 1,413 af was pumped out of San Luis Lake to assist the Colorado Division of Wildlife's fishery reclamation activities. Closed Basin Division water accounting for the 2003 calendar year is summarized in Table 1.

Table 1: San Luis Valley Project - Closed Basin Division Water Accounting

(UNIT = ACRE-FEET)

SLV CBD	BLANCA WILDLIFE HABITAT AREA			PARSHALL FLUME		ALAMOSA NAT'L WILDLIFE REFUGE (ANWR)				DELIVERY TO THE RIO GRANDE			PROJECT TOTALS
	CH03 STA. 730+00	CH04 STA. 798+60	MONTH TOTALS	TOTAL PASSING FLUME	CREDIT-ABLE AMOUNT AT FLUME	CH01 CHICAGO TURN-OUT	CH02 MUM TURN-OUT	PUMPING PLANT	MONTH TOTALS	TOTAL AT FLUME MINUS DEL. @ ANWR	Credit. Amt. del. to RGrande & not used by ANWR	NON-CREDIT-ABLE @ LOBATOS	
MONTH	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
JAN	0	0	0	1,670	1,670	0	0	0	0	1,670	1,670	0	1,670
FEB	0	0	0	1,763	1,763	0	0	0	0	1,763	1,763	0	1,763
MAR	0	0	0	2,031	2,031	0	0	0	0	2,031	2,031	0	2,031
APR	0	0	0	1,755	1,755	206	0	0	206	1,549	1,549	0	1,755
MAY	43	52	95	1,309	1,309	0	0	0	0	1,309	1,309	0	1,405
JUN	0	0	0	1,549	1,549	29	0	0	29	1,520	1,520	0	1,549
JUL	124	120	244	1,214	1,214	391	142	232	765	449	449	0	1,458
AUG	203	260	463	1,513	667	423	440	388	1,251	262	262	0	1,976
SEP	132	128	260	709	0	215	327	167	709	0	0	0	969
OCT	138	164	302	1,180	198	473	491	153	1,117	63	63	0	1,482
NOV	0	0	0	1,385	1,385	0	0	0	0	1,385	1,385	0	1,385
DEC	0	0	0	1,412	1,412	0	0	0	0	1,412	1,412	0	1,412
ANNUAL	640	724	1,364	17,490	14,953	1,737	1,400	940	4,077	13,413	13,413	0	18,854

The project continues to provide Priority 1 (Compact) and Priority 2 (Mitigation) water deliveries. The San Luis Valley is in the midst of a severe drought and the water table in the unconfined aquifer has dropped significantly in some areas. Pumping levels are expected to remain at or near maintenance levels to allow the water table to recover while minimizing impacts to the surrounding area and preserving the integrity of existing project wells.

Since the project became fully operational in the fall of 1993, production has gradually decreased due to biofouling in the wells. Initial "as built" well capacities were designed to yield a maximum of 75,000-80,000 af. Currently, 50 percent of the wells are at or below 20 percent of their design capacity. After exhausting chemical treatment with limited success, the Bureau of Reclamation has undertaken a rigorous well re-drill effort.

The Alamosa Field Division successfully re-drilled sixteen (16) salvage wells with the new well design. Production from these wells is ranging from 250 to 500 gpm. These are positive steps in recovering salvage well production.

The project continues to operate at levels that are consistent with normal or appropriate well operation practices, with the exception of 34 Salvage Wells that are operated at reduced levels. Operation of the wells is based on current Closed Basin monitoring data, hydrologic conditions near the project, and recommendations from the Closed Basin Operating Committee.

The United States Geological Survey's (USGS) Pueblo Colorado Office continues to provide quality assurance/quality control (QAQC) of the observation well(s) network data for Reclamation. Reclamation received an excellent rating through the 2003 QAQC program.

Reclamation began an intensive program in 2002 to identify, re-survey, and verify observation well measuring points throughout the project area. This activity continued through 2003.

The 2002 annual report on vegetation monitoring within the project boundary summarized that an average of 2,573 acres within the project boundary indicated a significant decrease in vegetation from the pre-project baseline. This amount is much less than the 8,460 acres that were predicted in the Final Environmental Impact Statement, and subsequently mitigated. An average of 743 acres within the project boundary indicated significant increase in vegetation from the pre-project baseline.

Alamosa Field Division participated in a collaborative effort between the Colorado Division of Wildlife, Colorado Division of Parks and Outdoor Recreation, Reclamation, and Rio Grande Water Conservation District in the San Luis Lake Chemical Reclamation Project. The purpose of this project was to re-establish a sport fishery and improve water quality at San Luis Lake. The objective of this project is to remove all fish by treatment with a fish toxicant, and restore the fishery to trout and warm water fish species. Following successful reclamation, the lake will be stocked with rainbow trout, largemouth bass, bluegill, channel catfish and tiger muskie. Removal of common carp and white sucker will decrease water turbidity and total dissolved solids. The project area will be confined to a 500 acre residual pool at San Luis Lake.

The Alamosa Field Division continues to work with OSHA on becoming a Voluntary Protection Program (VPP) site.

Maintenance

Routine preventive maintenance and repair activities continued at salvage and observation well sites, canal structures, pumping plants, and shelterbelts. Other work included aquatic and noxious weed control, rodent control, and ice removal.

Excessive algae growth along the canal continues to be a problem. The algae have been identified as blue-green algae called *Oscillatoria* (non-branching filamentous

algae). In the summer of 2000 a treatment utilizing barley straw, which creates hydrogen peroxide as it decomposes, was applied to a 6 mile stretch of the canal with limited success. Barley straw treatment was continued in 2001. Barley straw treatment was not utilized in 2002 as part of an ongoing study. As of 2003, the effectiveness of these treatments is not conclusive.

In 2003 the maintenance group and the Rio Grande Water Conservation District lowered the water level of San Luis Lake, utilizing the pumping plant and two 9,000 gpm Gator pumps. This effort was to assist the Colorado Division of Wildlife fishery reclamation activities.

Water Quality

Water quality monitoring of Closed Basin Division salvage wells, the Rio Grande, San Luis Lake, Head Lake and the conveyance channel continued throughout 2003. In addition to the standard water quality parameters, dissolved oxygen, nitrogen, and carbon dioxide continue to be monitored to assist canal grass carp survival studies and dissolved nitrogen reduction endeavors, in cooperation with Reclamation's Denver Technical Service Center personnel.

The Water Quality Laboratory participated in the Spring and Fall USGS Evaluation Program for Standard Reference Water Samples. The overall laboratory rating for these audits was between good and excellent.

The laboratory has the capability to culture and identify "iron related bacteria" to support salvage well rehabilitation and bio-fouling mitigation efforts. All salvage wells are currently monitored for the presence of these bacteria. The laboratory will be cooperating with Reclamation's Denver Technical Service Center Earth Sciences and Research Laboratory to determine acceptable bio-fouling mitigation strategies. In addition, the laboratory is developing the ability to quantitate "sulfate-reducing" and "manganese-oxidizing" bacteria.

The "student volunteer" program with Adams State College (ASC), Alamosa, Colorado, is active. A student is working with the laboratory during the Fall 2003 and Spring 2004 semesters, concentrating primarily on microbiological and bio-fouling issues.

The laboratory has implemented a Laboratory Information Management System (LIMS). This state of the art software improves the efficiency and productivity of the laboratory, and makes data reports available electronically via the Internet.

Rio Grande Water Conservation District

The Rio Grande Water Conservation District (RGWCD) continues to perform civil maintenance on the project. Canal berms were maintained and some sections of the canal berms were resurfaced. Other work included maintenance of lateral access roads, mowing of canal berms and rights of way, removal of aquatic weeds from structures, repair of fences, and assisting Reclamation personnel with equipment maintenance. The RGWCD continued its involvement in the ground water monitoring program and continues maintenance of the irrigation systems for shelterbelt areas.

The Rio Grande Water Conservation District (RGWCD) continues to assist Reclamation in the re-drill and rehabilitation efforts. The RGWCD in partnership with Reclamation obtained a \$200,000 grant from the Colorado Water Conservation Board Construction Fund to assist Reclamation in well re-drilling activities that are being planned as a multi-year effort aimed at regaining lost project production.

SAN JUAN-CHAMA PROJECT, COLORADO-NEW MEXICO

Reclamation's Albuquerque Area Office Water Resources Division continued to maintain its Internet Web Page for Middle Rio Grande Water Operations during 2003. This web site provides the current year's monthly data for the operation and water accounting of the San Juan-Chama Project. To reach the Internet Web Page, type <http://www.usbr.gov/uc/albuq/water/> into a web browser

San Juan-Chama Diversion Dams

Work on the diversion dams included operation and maintenance of Blanco, Azotea, Oso and Little Oso diversion dams (Figure 3). Sediment and debris were removed from the diversion dams and from the inlets and outlets of the tunnels. Additional repairs completed during 2003 included the repair of the parshall flume downstream of Blanco Diversion Dam.

Heron Dam and Reservoir Operations

Diversions into Azotea Tunnel began on March 14 and operated continuously until July 15. Periodic diversions were made as late as October 13 to capture storm flows in excess of the minimum instream flow requirements at the diversions. The total volume diverted through the tunnel during 2003 was 62,707 af (Table 2). The running 10-year average discharge for Azotea Tunnel declined once again to an annual average of value of 80,721 af. Heron reservoir began the year at an elevation of 7,134.53 ft, (160,723 af) and finished the year at an elevation of 7,122.50 ft (123,227 af).

The February 2004 most probable streamflow forecasts for the Blanco and Navajo River Diversions are 104% and 101% respectively of the 30 year average. Based on the current forecast and low level of existing storage, it is unlikely that Heron Reservoir will fill for the ninth straight year. Reclamation will maximize diversions as water becomes available in 2004.

Delivery of most of the 2003 SJ-C allocations were delayed until June while the implications of the U.S. Fish and Wildlife Services (USFWS) 2003 Biological Opinion (2003 BiOp) were assessed in light of pending court decisions and anticipated hydrologic conditions during 2003. A portion of each SJ-C contractor's 2003 allocation was then reserved in Heron Reservoir past June to ensure that there would be sufficient water to meet the terms of the 2003 BiOp through the year. The reserved portions of the 2003 SJ-C contractor allocations were released beginning in October, after Reclamation documented that the year would be completed in full compliance with the terms of the 2003 BiOp.

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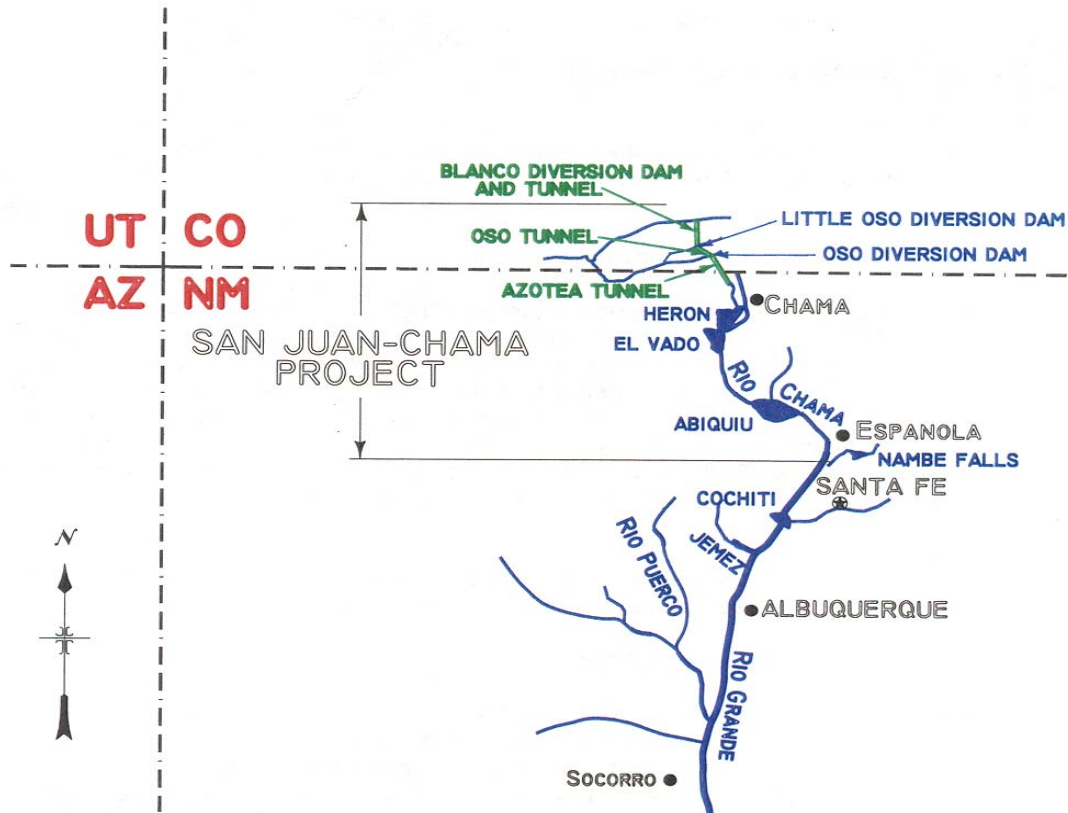


Figure 3: Area Map of the San Juan-Chama Project

Table 2: SJ-C Project - Diversions Through Azotea Tunnel

(UNIT = ACRE-FEET)

Azotea											
MONTH	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	10 YEAR TOTAL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
JANUARY	0	0	0	349	0	0	0	0	0	0	349
FEBRUARY	0	0	0	76	0	0	0	0	0	0	76
MARCH	0	0	1,400	9,299	2,329	4,152	536	1,512	743	1,170	21,141
APRIL	21,060	10,010	16,370	13,890	11,516	12,516	15,864	19,284	4,499	11,366	136,375
MAY	48,050	36,090	30,760	43,720	41,822	32,806	20,987	51,092	865	26,613	332,805
JUNE	12,320	37,200	5,820	48,442	28,598	39,659	5,019	29,283	204	18,816	225,361
JULY	780	1,900	2,620	11,634	8,846	12,734	106	4,643	0	669	43,932
AUGUST	0	1,050	70	9,108	1,668	13,019	229	4,455	0	487	30,086
SEPTEMBER	0	0	210	3,406	153	4,015	0	313	0	3,340	11,437
OCTOBER	0	0	270	2,350	200	0	0	0	0	246	3,066
NOVEMBER	0	0	980	0	1,188	0	0	0	0	0	2,168
DECEMBER	0	0	30	0	381	0	0	0	0	0	411
ANNUAL	82,210	86,250	58,530	142,274	96,701	118,901	42,741	110,582	6,311	62,707	807,207

Table 3: SJ-C Project - Water Deliveries from Heron Reservoir

(UNIT = ACRE-FEET)

SJ-C Heron Rel	MRGCD	SANTA FE	COCHITI	CITY OF ALBUQUERQUE	POJO-AQUE UNIT	TAOS	COUNTY OF LOS ALAMOS	CITY OF ESPANOLA	TWINING SANITATION	VILLAGE OF LOS LUNAS	TOWN OF BERNALILLO	BELEN	RED RIVER	JICARILLA APACHE	SAN JUAN PUEBLO	UNCONTRACTED	TOTAL
MONTH	20,900	5,605	5,000	48,200	1,030	400	1,200	1,000	15	400	400	500	60	6,500	2,000	2,990	96,200
JANUARY	0	0	922	0	0	0	0	0	0	0	0	0	0	0	0	0	922
FEBRUARY	0	0	833	0	0	0	0	0	0	0	0	0	0	0	0	0	833
MARCH	0	0	520	0	0	0	0	0	0	0	0	0	0	0	0	2,371	2,891
APRIL	0	0	0	0	0	0	0	0	0	0	0	105	0	3,541	2,000	619	6,265
MAY	0	0	0	0	0	0	0	0	0	0	0	93	1	2,960	0	0	3,054
JUNE	8,588	389	0	1,372	0	0	0	0	0	39	0	102	59	0	0	0	10,549
JULY	9,127	0	0	22,844	0	0	0	0	0	0	0	0	0	0	0	0	31,971
AUGUST	0	325	0	16,634	0	370	1,178	563	4	264	198	3	0	0	0	0	19,539
SEPTEMBER	2,905	0	0	0	0	0	22	286	0	0	0	0	0	0	0	0	3,213
OCTOBER	280	0	0	3,787	0	0	0	0	0	0	0	0	0	0	0	0	4,067
NOVEMBER	0	2,197	183	3,558	0	0	0	152	11	97	202	73	0	0	0	0	6,473
DECEMBER	0	2,694	85	0	1,492	30	0	0	0	0	0	0	0	0	0	0	4,301
2003 CY Total	20,900	5,605	2,543	48,195	1,492	400	1,200	1,001	15	400	400	376	60	6,501	2,000	2,990	94,078

During 2003, a total of 94,078 af of 2003 and waived 2002 annual allocations were delivered from Heron. The Town of Belen's remaining 2003 allocation of 206 af is being held in Heron according to a waiver that grants an extension of the delivery date from December 31, 2003 to April 30, 2004. An additional 4,732 af allocated for the Cochiti Recreation Pool for 2003 remains in Heron and is being released in a manner to provide secondary benefit to the fishery below Abiquiu Reservoir. Table 3 provides the SJ-C water deliveries from Heron Reservoir to each contractor during 2003, and Table 4 presents actual Heron Reservoir water operations. Column 5 of Table 4 presents the balance between the end-of-month contents using the operational inflow and outflow data. Heron Reservoir end-of-month native Rio Grande, SJ-C, and total storage volumes are tabulated in columns 6, 7, and 8.

Table 4: SJ-C Project - Monthly Water Storage in Heron Reservoir

(UNIT = ACRE-FEET)

Heron Storage MONTH	INFLOW		OUTFLOW		SAN JUAN CHAMA LOSS	END-OF-MONTH CONTENT			ELEVATION (FEET)
	RIO GRANDE	SAN JUAN CHAMA	RIO GRANDE	SAN JUAN CHAMA		RIO GRANDE	SAN JUAN CHAMA	TOTAL	
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	
DEC. 2002						-382	161,141	160,759	7,134.54
JANUARY	92	0	92	922	68	-382	160,151	159,769	7,134.25
FEBRUARY	916	0	83	833	0	451	159,318	159,769	7,134.25
MARCH	3,843	1,170	4,291	2,891	0	3	157,597	157,600	7,133.61
APRIL	1,621	11,343	1,754	6,265	1,307	-130	161,368	161,238	7,134.68
MAY	95	26,560	95	3,054	1,038	-130	183,836	183,706	7,140.94
JUNE	180	18,778	101	10,549	1,329	-51	190,736	190,685	7,142.78
JULY	97	669	97	31,971	2,052	-51	157,382	157,331	7,133.53
AUGUST	85	487	85	19,539	357	-51	137,973	137,922	7,127.49
SEPTEMBER	1,074	3,333	1,500	3,213	0	-477	138,093	137,616	7,127.39
OCTOBER	82	246	82	4,067	625	-477	133,647	133,170	7,125.92
NOVEMBER	664	0	247	6,473	0	-60	127,174	127,114	7,123.86
DECEMBER	1,001	0	586	4,301	0	355	122,873	123,228	7,122.50
SUB-TOTAL	9,750	62,586	9,013	94,078					
ADJUST.						-350	(A)		
ANNUAL		72,336		103,091	6,776	5	123,223	123,228	

Heron Dam Facility Review and Safety of Dams Programs

The last CFR for Heron Dam was completed in 2001. A PFR is scheduled for the spring of 2004. The Heron Dam Standing Operating Procedures (SOP) is scheduled for a complete revision to be complete by early 2004. The following work was completed for Heron Dam during 2003:

- Assisted the Park Service in extending the boat ramp
- The reservoir recorder A- 35 was replaced with a new model A-71

- A Tabletop Exercise was performed for Heron Dam and Reservoir
- Annual Examination and Report was completed
- A draft Security Assessment was completed
- General Maintenance was completed

Pojoaque Tributary Unit - Nambé Falls Dam and Reservoir

Nambé Falls Reservoir began 2003 with the reservoir at an elevation 6,799.21 ft providing a storage volume of 814 af. During the winter, releases averaged around 1 to 2 cfs to maximize conservation storage as agreed to by the Pojoaque Valley Irrigation District (PVID) and Indian water users. The reservoir filled on June 5 and remained full until June 18.

The maximum elevation for the year was 6,826.65 ft (2,038 af) which occurred on June 5. Reservoir storage began to steadily decline beginning June 19 as irrigation releases continued. The reservoir reached the low point of the year on December 31 at an elevation of 6,786.58 ft (487 af).

Cyclical operations of Nambé Falls Reservoir consist of non-irrigation season operations and irrigation season operations. During non-irrigation season (November through April), all inflow in excess of the bypass requirement of 0.5 cfs is stored until an elevation of 6,825.60 ft is reached. Once an elevation of 6,825.60 ft is attained, the outlet gates are regulated weekly to stabilize the reservoir at 6,825.60 ft, or an elevation determined by 100 percent ice cover. An uncontrolled spill begins at elevation 6826.60 ft, which is the top of the spillway crest.

During irrigation season (May through October), water is stored and released on demand to meet downstream requirements. A depletion of 946 af was calculated for Nambé Falls operation for the entire year. In early December, it was determined that the annual depletion caused by Nambé Falls operation was going to be around 1,500 af. In order to insure that the releases from Heron to offset those depletions occurred within the calendar year as well as to integrate with other releases from Heron Reservoir, Nambé replacement water in the amount of 1,492 af was released from December 5 through December 15. Small differences would be accounted for at the end of the year.

On December 9, Reclamation was notified that a release would begin from Nambé Falls in order to drain the reservoir so that debris that washed into the reservoir during an August 11 flash flood could be removed. The reservoir was drained by December 31. All of the water that was released was classified as an operational release as opposed to the more typical irrigation releases. All of the water was then credited toward the annual depletion. This led to an over-release from Heron of 527 af. There was no way that such a large over-release could have been mitigated in the accounting without causing

significant effects at another reservoir. Therefore, the over-delivery was left on the books and could possibly be mitigated by accounting for that water in the 2004 accounting cycle. Table 5 provides a summary of Nambé Falls use above Otowi and the Pojoaque Unit return flow credit used to calculate depletions during 2003. A summary of the reservoir operation is provided in Table 6.

Table 5: SJ-C Project - San Juan-Chama Water at Otowi

(UNIT = ACRE-FEET)

SJ-C @ Otowi	RELEASE FROM HERON	HERON RELEASE STORED IN EL VADO	RELEASE FROM EL VADO	TOTAL BELOW EL VADO	RELEASE FROM-OR STORAGE IN ABIQUIIU	TRANS. LOSSES	NAMBE FALLS USE ABOVE OTOWI	RETURN FLOW CREDIT-POJOAQUE UNIT	SAN JUAN WATER AT OTOWI
MONTH	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
JANUARY	922	0	544	1,466	-106	28	113	21	1,240
FEBRUARY	833	0	0	833	960	25	99	18	1,687
MARCH	2,891	0	0	2,891	230	60	260	16	2,817
APRIL	6,265	0	0	6,265	-2,805	100	210	16	3,166
MAY	3,054	0	1,254	4,308	-2,535	63	698	45	1,057
JUNE	10,549	0	0	10,549	2,515	234	218	25	12,637
JULY	31,971	8,219	0	23,752	-16,099	330	53	52	7,322
AUGUST	19,539	0	8,223	27,762	-9,385	471	143	127	17,890
SEPTEMBER	3,213	2,104	396	1,505	783	37	47	42	2,246
OCTOBER	4,067	4,067	2,974	2,974	-2,252	39	33	44	694
NOVEMBER	6,473	3,558	2,509	5,424	-2,047	90	78	36	3,245
DECEMBER	4,301	4,301	6,317	6,317	-4,170	89	37	601	2,622
ANNUAL	94,078	22,249	22,217	94,046	-34,911	1,566	1,989	1,043	56,623

Table 6: SJ-C Project - Monthly Water Storage in Nambé Falls Reservoir

(UNIT = ACRE-FEET)

NF Monthly	INFLOW	OUTFLOW			RESER. LOSSES	TOTAL OUTFLOW + LOSSES	END OF MONTH	
		BY PASSED	STORAGE RELEASE				CONTENT	ELEVATION
			OPER.	IRRIG.				
MONTH	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DEC. 2002							810	6,799.10
JANUARY	150	37	0	0	1	38	922	6,802.56
FEBRUARY	133	34	0	0	2	36	1,019	6,805.36
MARCH	301	41	0	0	6	47	1,273	6,811.68
APRIL	616	400	0	252	13	665	1,224	6,810.54
MAY	1,527	824	0	106	9	939	1,812	6,822.87
JUNE	1,151	925	0	325	20	1,270	1,693	6,820.63
JULY	289	207	0	895	33	1,135	847	6,800.28
AUGUST	419	276	0	25	-1	300	966	6,803.86
SEPTEMBER	450	400	0	84	3	487	929	6,802.80
OCTOBER	276	241	0	7	4	252	953	6,803.51
NOVEMBER	229	149	0	9	3	161	1,021	6,805.42
DECEMBER	227	190	570	0	1	761	487	6,786.58
ANNUAL	5,768	3,724	570	1,703	94	6,091	487	6,786.58

The RiverWare based Nambé Falls Accounting Model was operated as a separate model independent of the main URGWOM Accounting Model during 2003. Additional information on URGWOM developments during 2003 can be found in a later section.

Molina Complex Fire Impacts to Nambé Falls Reservoir

In June 2003, the Molina Complex forest fire burned over 7,000 acres within the Santa Fe National Forest, Pecos Wilderness, and tribal trust land of Nambé Pueblo. Approximately 28% of the Rio Nambé watershed was burned, and 982 acres within the drainage basin above Nambé Falls Reservoir was severely burned.

The resulting loss of vegetation has significantly increased the chances of flash flooding in the vicinity of the Rio Nambé and the upper end of Nambé Falls Reservoir. The Interagency Burned Area Emergency Response Team (BAER Team) prepared the *Molina Complex Fire Burned Area Emergency Stabilization and Rehabilitation Plan* in September 2003. The following treatments were identified for implementation by the BAER Team:

Emergency Stabilization:

- Structure protection, K-Rails
- Picnic area cleaning
- Removal of floatable debris
- Culvert cleaning
- Flood Hazard Warning System
- Wellhead protection
- Public safety gates
- Re-vegetative monitoring

Rehabilitation:

- Fence reconstruction
- Ditch cleaning
- Removal of floatable debris from the reservoir

Nambé Falls Dam Facility Review and Safety of Dams Programs

The last CFR for Nambé Falls Dam was completed in 2001. The next CFR is scheduled for 2007. A PFR is now scheduled for 2004.

During 2003 the following work took place at Nambé Falls Dam:

- In response to the fire, emergency funds were allocated for design, and installation of an Early Warning System which is scheduled for installation prior to the 2004 spring runoff
- The Annual Examination and Report was completed
- A tabletop exercise was completed in 2003

M&I Water Use - National Environmental Policy Act Compliance

Reclamation is serving as the lead federal agency for the City of Albuquerque's Drinking Water Supply Project EIS which is addressing the City of Albuquerque's plan to divert, treat, and directly use its SJ-C water for municipal and industrial purposes. During 2003, comments on the Draft EIS were incorporated and the final EIS is being prepared. A draft Biological Opinion was received from the United States Fish and Wildlife Service (USFWS) regarding potential impacts to endangered species. The Final EIS is expected to be issued in early 2004.

Reclamation is involved in City and County of Santa Fe water supply projects. The City, County, and a private developer (Las Campanas) are working with the U.S. Forest Service and BLM on an EIS to address effects of the proposed Buckman Water Diversion Project. Reclamation is serving as a cooperating agency on the Buckman EIS. During 2003, work continued on preparation of the draft EIS which is expected to be released for public review in 2004.

During 2003, the environmental assessment process for a proposal to amend six existing water service contracts that would convert them to repayment contracts continued to be on-hold pending because of legal issues related to the Minnow v. Keys litigation. Repayment contracts have no expiration dates. The City and County of Santa Fe, City of Española, Village of Los Lunas, County of Los Alamos, Village of Taos Ski Valley, and Town of Taos requested the proposed change.

In 2003, Reclamation also assisted the City of Española, New Mexico with environmental assessment of construction of a drinking water treatment facilities and diversion of the City's San Juan-Chama Project water. The initial work is authorized by Congress under Public law 102-575.

MIDDLE RIO GRANDE PROJECT, NEW MEXICO

The *Middle Rio Grande Project* (Figure 4) consists of El Vado Dam and Reservoir and irrigation and drainage facilities in the middle Rio Grande valley. The project also entails river channel maintenance from Velarde, New Mexico, southward to Caballo Reservoir, and the Low Flow Conveyance Channel (LFCC) south of San Acacia, New Mexico. Irrigation water is provided to MRGCD which can supply water to approximately 50,000 to 70,000 acres of land.

New Mexico Relinquishment of Rio Grande Compact Credit

Per the Rio Grande Compact Article I definition, the usable water in Project storage (Elephant Butte and Caballo Reservoirs together) was below 400,000 af for all of 2003. Article VII of the Rio Grande Compact stipulates that when usable water in Project storage is below 400,000 af, no “native Rio Grande flows” will be stored in post-1929 reservoirs upstream of Elephant Butte Reservoir in New Mexico and Colorado unless relinquishment of credit waters in Elephant Butte Reservoir occurs. New Mexico offered to relinquish up to 217,500 af of its accrued credit waters to Texas, and Texas accepted the relinquishment on April 23, 2003.

On April 23, 2003, New Mexico relinquished 122,500 af of its credit water held in storage in Elephant Butte Reservoir, and Texas agreed to accept the water as project water in storage. It was further agreed that Texas will accept the balance of the 217,500 af of relinquishment, up to 95,000 af if available, on March 1, 2004.

The allocation of relinquished credit water is specified by the Emergency Drought Water Agreement (EDWA) that was signed by New Mexico, Reclamation, and the U.S. Army Corps of Engineers (Corps) as an amendment to the Conservation Water Agreement of June 29, 2001. Under the terms of the EDWA, a maximum of 120,000 af of Emergency Drought Water could be captured and stored by the United States during 2003. The City of Santa Fe was provided 2,500 af of Emergency Credit Water to be captured and stored within their post 1929 reservoir storage. The 120,000 af available for capture and storage by the United States was to be allocated as 1/3 to the United States for use on behalf of listed endangered species, and 2/3 to the Middle Rio Grande Conservation District. During 2003, a total of 87,010 af of Emergency Drought Water was captured by Reclamation under the EDWA. The balance of Emergency Drought Water available for capture and storage by Reclamation during 2004 is 32,990 af in addition to any additional New Mexico credit relinquishment that occurs on March 1, 2004.

Reclamation had 18,514 af of Emergency Drought Water stored in El Vado Reservoir for use on behalf of listed endangered species as of December 31, 2003, which is the

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

ALBUQUERQUE AREA OFFICE

MIDDLE RIO GRANDE PROJECT

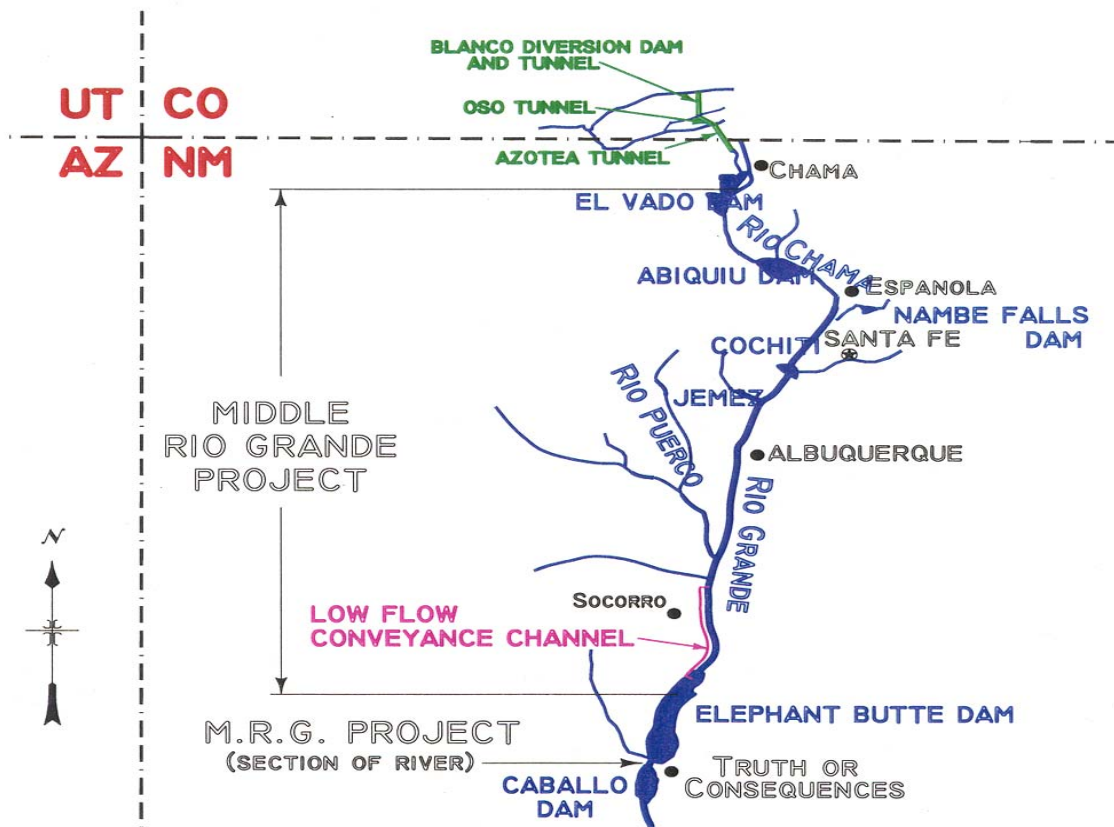


Figure 4: Area Map of the Middle Rio Grande Project

sum of Reclamation's 15,585 af of unused 2003 Emergency Drought Water and 1/3 of the Emergency Drought Water captured after the end of the 2003 irrigation season. MRGCD had 5,858 af of Emergency Drought Water in El Vado Storage on the same date, which is comprised solely of MRGCD's 2/3 portion of Emergency Drought Water captured after the end of the irrigation season.

El Vado Dam and Reservoir Operations

A total of 87,010 af of Emergency Drought Water was captured during the 2003 calendar year. El Vado Reservoir captured 76,667 af of Emergency Drought Water during the spring runoff, and an additional 8,794 af following the end of the irrigation season between October 31 and December 31. Abiquiu Reservoir captured 1,549 af of Emergency Drought Water in the Conservation Pool on September 10.

El Vado's total storage peaked at 106,547 af on June 9, which was comprised of 23,664 af of native Rio Grande water for the senior water rights of the Six Middle Rio Grande Pueblos, 76,667 af of Emergency Drought Water, 2,005 af of MRGCD pre-Article VII native Rio Grande storage, and 4,211 af of stored SJ-C water. MRGCD was allocated 46,667 af of the stored El Vado Emergency Drought water, and Reclamation received 30,000 af to use on behalf of listed endangered species.

MRGCD began the year with a total of 48,673 af of native Rio Grande storage available for meeting their irrigation demand during 2004, which was all released by August 8. MRGCD also used 28,571 af of their 2003 Heron SJ-C allocation, and 15,000 af of SJ-C water borrowed from the City of Albuquerque to extend releases for non-Indian irrigation through most of August. Approximately 2,300 af of MRGCD's 2003 SJ-C allocation is being carried over to 2004 in El Vado.

Releases for the senior water rights of the Six Middle Rio Grande Pueblos started on June 26 and ended on September 7. Indian irrigators continued to receive water into November through direct diversion of natural Rio Grande flows at Cochiti, Angostura, and Isleta Diversion Dams. The 8,744 af of remaining native Rio Grande water stored for the senior water rights of the Six Middle Rio Grande Pueblos was released to Elephant Butte between November 16 and December 21.

Reclamation released a total of 14,863 af of Emergency Drought Water from El Vado and Abiquiu Reservoirs during 2003 on behalf of listed endangered species.

Reclamation had 15,585 af of El Vado Emergency Drought Water remaining in El Vado Reservoir on December 31, which is being carried over for use in 2004.

The total SJ-C water in storage at the end of the year was 5,893 af. Table 7 provides a summary of monthly operations and water accounting for El Vado Reservoir.

Table 7: Reservoir Operation for El Vado Dam

(UNIT = ACRE-FEET)

El Vado Res. Op. MONTH	INFLOW		OUTFLOW		LOSSES		EOM CONTENT		
	RG	SJ-C	RG	SJ-C	RG	SJ-C	RG	SJ-C	TOTAL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
DEC. 2002	1,885	1,689	956	1,689	97	-4	5,124	6,071	11,195
JANUARY	1,970	922	0	1,466	0	-25	7,094	5,552	12,646
FEBRUARY	3,229	833	0	833	195	-17	10,128	5,569	15,697
MARCH	11,975	2,891	5,251	2,891	63	23	16,789	5,546	22,335
APRIL	36,703	6,265	15,654	6,265	130	31	37,708	5,515	43,223
MAY	72,094	3,054	13,225	4,308	336	32	96,241	4,229	100,470
JUNE	13,420	10,549	15,511	10,549	659	38	93,491	4,191	97,682
JULY	3,728	31,971	46,592	23,752	472	63	50,155	12,347	62,502
AUGUST	2,240	19,539	18,026	27,762	117	35	34,252	4,089	38,341
SEPTEMBER	9,601	3,213	10,731	1,505	219	10	32,903	5,787	38,690
OCTOBER	3,322	4,067	7,680	2,974	134	18	28,411	6,862	35,273
NOVEMBER	3,191	6,473	3,775	5,424	180	-3	27,647	7,914	35,561
DECEMBER	2,325	4,301	5,540	6,317	59	5	24,373	5,893	30,266
ANNUAL	163,798	94,078	141,985	94,046	2,564	210			

El Vado Dam Facility Review and Safety of Dams Programs

The last CFR was completed for El Vado Dam in 2001. A PFR is currently scheduled for the spring of 2004. The El Vado Dam Standing Operating Procedures is scheduled for a complete revision in early 2004.

During 2003 the following work was completed for El Vado Dam:

- Observation well OW-2 was repaired to eliminate leakage into the well
- A draft Security Assessment was completed
- Log booms were purchased, and will be installed when the water surface elevation is higher
- The wet spot that was identified a few years ago continues to be monitored on a monthly basis, with no apparent changes
- The Annual Examination and Report was completed
- A Tabletop Exercise was completed for El Vado Reservoir
- The reservoir recorder A-35 was replaced with a new model A-71
- General Maintenance was completed

U.S. Army Corps of Engineers' Related Reservoir Operations

Abiquiu Dam and Reservoir is a facility owned and operated by the U.S. Corps of Engineers (Corps). Public Law 97-140 authorized storage of up to 200,000 af of SJ-C

water in Abiquiu Reservoir. Adjustments for sediment deposited during 2002 reduced the sum of the available SJ-C storage allocations to 183,099 af as of January 1, 2003. The amount of SJ-C water in storage peaked on August 14 at 72,126 af and ended the year at 71,667 af. Table 8 provides a summary of monthly operations and water accounting for Abiquiu Reservoir.

A resolution was passed by the Rio Grande Compact Commission in 2000 that allowed for the temporary storage of native flows in Abiquiu and Jemez Reservoirs for the benefit of the Rio Grande silvery minnow. This water is referred to as the Conservation Water Agreement Pool, or the Conservation Pool. Under the terms of the agreement, up to 100,000 af could be stored over a 3 year period in both Abiquiu and Jemez Reservoirs and releases up to 30,000 af per year are allowed to maintain flows in the Rio Grande in compliance with Biological Opinions issued by the USFWS. Losses on this water would be calculated the same as native storage.

Following storm events within the Rio Chama basin, 1,549 af of storm run-off was captured in the Abiquiu Conservation Pool on September 10 under the terms of the Conservation Water Agreement and the EDWA. This water was released for the benefit of endangered species from September 18 through September 22. There was no additional storage in the Conservation Pool during 2003, and the Conservation Water Agreement expired at the end of the calendar year.

Table 8: Reservoir Operation for Abiquiu Dam

(UNIT = ACRE-FEET)

Abiquiu Res. Op. MONTH	INFLOW		OUTFLOW		LOSSES		EOM CONTENT			
	RG	SJ-C	RG	SJ-C	RG	SJ-C	SEDIMENT	RG	SJ-C	TOTAL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
DEC. 2002	1,926	1,711	1,928	1,009	0	17	784	-1	42,962	43,745
JANUARY	2,443	1,232	1,542	1,126	-1	-24	785	-1	43,092	43,876
FEBRUARY	738	356	742	1,316	-1	-364	785	-8	42,496	43,273
MARCH	6,812	2,377	6,807	2,607	1	-93	786	-2	42,359	43,143
APRIL	20,777	6,217	19,840	3,412	3	726	798	939	44,438	46,175
MAY	18,013	4,365	18,796	1,830	-3	937	806	154	46,036	46,996
JUNE	17,033	9,414	17,178	11,929	-7	1,069	820	1	42,452	43,273
JULY	42,473	23,490	42,471	7,391	-5	1,095	896	-2	57,456	58,350
AUGUST	19,189	27,983	19,183	18,598	-4	1,175	946	-2	65,666	66,610
SEPTEMBER	14,409	1,979	14,410	2,762	1	794	952	-1	64,089	65,040
OCTOBER	8,839	2,598	8,838	346	-2	657	953	-3	65,684	66,634
NOVEMBER	2,875	5,463	2,864	3,416	-1	77	953	6	67,654	68,613
DECEMBER	5,742	5,892	5,742	1,722	1	-147	954	9	71,971	72,934
ANNUAL	159,343	91,366	158,413	56,455	-18	5,902				

Middle Rio Grande Diversion Dam Facility Review and Safety of Dams Programs

No work was completed by the Albuquerque Area Office Water Resources Division's facilities group during 2003.

Cooperative Program with the State of New Mexico

Reclamation cooperates with the New Mexico Interstate Stream Commission (NMISC) on water salvage, drain improvement, and river maintenance activities. During 2003, State funds were used for equipment operation and maintenance, as well as various construction efforts.

In a continuing effort to improve information sharing and coordination, monthly work progress and expenditure reports of on-going projects funded by the State of New Mexico (State) through the Cooperative Program are being provided to NMISC.

Reclamation performed vegetation mowing on the following drains: Drain Unit 7 Extension, approximately 4 miles (west side) and 1.6 miles (east side) south from La Joya railroad crossing, including road on both sides; La Joya Drain, approximately 4.5 miles mowing on the east and west side, including road on west side (and as far as they could go on east side); and Escondida Riverside Drain, approximately 2.2 miles (east side) and 2.5 miles (west side), including road on west side of drain. This work was completed May 24, 2003 under the "Miscellaneous Mowing, Middle Rio Grande Project, NM" (Contract No. 01-CC-40-3140). This contract has now expired.

A new 5-year Performance Based Type contract entitled "Brush Clearing Mowing & Tree Trimming, Middle Rio Grande Project, NM" (Contract No. 03-CC-40-8043) was awarded September 5, 2003 to Stoven Construction, an 8A contractor. No Task Orders for the State drains were issued in 2003 under this contract.

Reclamation, USFWS, and the Socorro Soil and Water Conservation District continue to work together cooperatively in efforts to control Perennial Pepperweed and Russian Knapweed on the project sites and surrounding areas. Plateau herbicide treatment occurred between April and August in areas along the Drain Unit 7 Extension and La Joya Drain.

The State provided significant cost share funds to aid in continuation of construction of the Temporary Channel into Elephant Butte Reservoir for the 7 mile reach upstream of Nogal Canyon. The funds were vital to the operation and maintenance of the amphibious excavators and support equipment. Details regarding the Temporary Channel project are provided in the following section.

As an alternative to receiving additional funding from the NMISC to support additional amphibious excavators and operators for the Temporary Channel Project, the NMISC elected to award their own contract to do the work for a 3.5 mile reach from Nogal Canyon south. A brief summary regarding that phase of work are found in the section entitled "Temporary Channel into Elephant Butte 2002".

Temporary Channel into Elephant Butte 2000

The reach of the Rio Grande above Elephant Butte Reservoir continues to undergo long-term aggradation (rise of riverbed due to sediment accumulation) as a result of sediment loads that are higher than can be transported with the mild valley slope. Additionally, the river is restricted to the eastern edge of the valley from San Acacia to Elephant Butte Reservoir. Problems that arise from this situation include loss of water delivery and flow reduction past the San Marcial Railroad Bridge.

A river channel tends to adjust its length entering a reservoir as the pool rises and falls, maintaining a continuous channel into the reservoir pool. In the case of the headwater area above Elephant Butte Reservoir, the clay deposits and mild valley slope prevent the river from maintaining a connection as evidenced in Figure 5. It is therefore necessary to construct a channel to maintain a connection between the reservoir pool and the Rio Grande. As the reservoir pool increases, the channel will be inundated. As the pool drops, additional work will be required to maintain a connection.

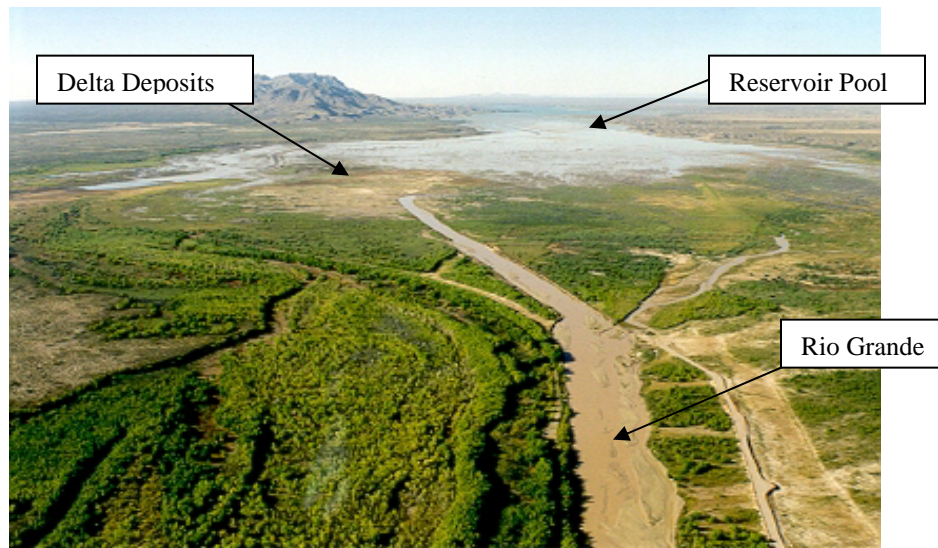


Figure 5: Photograph showing Rio Grande's inability to maintain a channel through the delta (1998)

The Temporary Channel 2000 was designed for a length of approximately 7 miles, ending at Nogal Canyon and having an average width of 250 ft and depth of 2 ft. The excavated material is being placed on either side of the constructed channel to form 3 ft high berms. A continuous channel has been constructed throughout the project area. Approximately 15 percent of the channel is entirely complete; the remainder of the channel is being widened to design dimensions. Figure 6 is a photograph of construction activities within the Temporary Channel.



Figure 6: Downstream view of an Amphibious Excavator working in the Temporary Channel (4/2002)

As a result of LFCC spillage waters, the downstream half of the project site has highly saturated clays and silts, creating difficult construction conditions. A variance was sought and granted from the New Mexico Environmental Department to work in flowing water, to ease the construction difficulties and reduce maintenance on the equipment. Figure 7 shows the confluence of LFCC spillage and the Temporary Channel.

In December 2003, a permit modification was completed to add wingwall berms downstream of the connection with the LFCC spillage waters on the west side of the channel. Without such berms, constructing a bankline berm on the west side is not possible due to the saturation of the material to the west of the channel. Construction will focus on this portion of the channel and the widening to the west, which will also prevent the need to move the extremely large volume of material on the east side to widen the channel to design width.

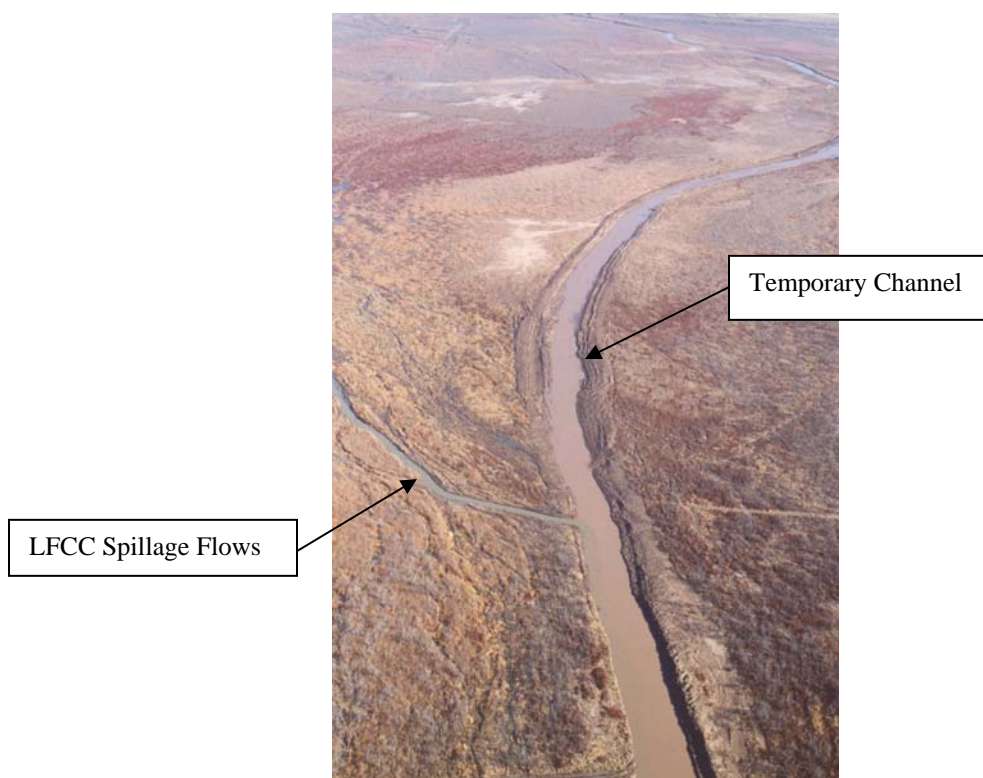


Figure 7: Upstream view of the confluence of LFCC spillage and the Temporary Channel (1/2003)

Some of the environmental features which fulfill mitigation requirements outlined in the Elephant Butte Temporary Channel 2000 Biological Assessment have been constructed. One of the environmental features is located at the 2001 breach site. The old channel was blocked to force all of the water to pass into the new alignment but the channel itself remains intact and therefore permits higher flows to pass along the old channel. Of the six low discharge crossings, five have been incorporated into the channel. These are typically located at arroyo mouths where flows currently enter the Elephant Butte Reservoir area from the west. These areas are also currently being used as equipment access points. The two main channel island features have been located. One is located just upstream of Nogal Canyon where saturated conditions are making construction extremely difficult. In constructing a main channel island feature, the secondary channel that would be created would act in part as a drain and the berm that would prevent flows from flowing parallel to the constructed river channel. The second main channel island is located in an area where there was an old natural channel. Earthwork on the Bosque del Apache Channel Widening environmental feature is finished. The status of the channel widening will be reevaluated after the next high flow spring runoff.

A gross estimate of open water evaporative losses was made for the existing conditions and for the Temporary Channel with environmental features using 1999, 2000, 2001

hydrographs. There is a savings in depletions of about 5,400 af per year with the construction of the Temporary Channel. As part of the dredged channel analysis in the early 1950's, the net depletion savings were estimated to be 40,700 af per year (transpiration and evaporation losses). The expectation is that the actual net depletion savings will range between the 1950's value and the savings from evaporative losses with the Temporary Channel in place.

Reclamation procured three Caterpillar 330 excavators with amphibious-pontoon undercarriages. The excavators each have 60 ft. long reach booms and 1.2 cubic yard bucket capacities. This equipment will replace older equipment and improve Reclamation's productivity on the Temporary Channel work. Federal funding for the new excavators involved approximately \$1.2 million dollars. The excavators should be available in March 2004. Reclamation also procured two airboats to transport fuel and personnel along the channel alignment to improve production.

Temporary Channel into Elephant Butte 2002

This project is an extension of the Temporary Channel 2000 project, which ends at Nogal Canyon. The Temporary Channel 2002 project consists of construction of a channel from Nogal Canyon through the Narrows to convey water through the currently dry portion of Elephant Butte Reservoir. This portion of the channel has been constructed by the contractor hired by NMISC, Wilco Marsh Buggies. A continuous, 150-foot-wide channel has been completed between Nogal Canyon and the downstream end of the Narrows. Sediment deposition during spring runoff 2004 and future years may result in the need for maintenance to achieve adequate channel functionality.

River Maintenance

River Maintenance Priority Sites

The Middle Rio Grande River Maintenance Program currently has efforts to address river problems related to 28 sites where levee failure due to bank erosion or reduced channel capacity could cause shallow overland flooding, reduction of water deliveries, and destruction of canals and drains. Work is being performed at the highest eight priority sites where there is a low level public health and safety risk. Elephant Butte Reservoir is at the lowest level in 20 years, resulting in a need to continue construction of a channel through the delta to effectively deliver water for agricultural use on about 178,000 acres of irrigated land, for municipal use by the City of El Paso, and for generating electric power.

Bernalillo and Sandia Priority Sites

There are two river maintenance priority sites located approximately 0.5 and 1.5 miles downstream of the U.S. Highway 550 Bridge in Bernalillo. A low level threat to public safety and health exists at both of these sites, owing to the proximity of the river channel to the east levee system. The active river channel in this reach is incising, yet is higher than the lands outside of the levee. At both sites, the main channel is actively eroding toward the levee and is currently about 50 to 70 feet away.

At the Bernalillo Priority Site (0.5 miles downstream of U.S. Highway 550), Reclamation has completed providing pre-emergency, short-term bankline erosion protection for a length of approximately 350 feet involving approximately 800 cubic yards (cy) of riprap material.

At the Sandia Priority Site (1.5 miles downstream of U.S. Highway 550), Reclamation, in cooperation with Sandia Pueblo, has provided pre-emergency, short-term bank erosion protection for a length of approximately 1,000 feet of bankline involving approximately 1,200 cy of riprap material.

Actions identified at these sites are short-term, pre-emergency measures to protect public safety and health. Reclamation is also planning a long-term, reach-wide maintenance solution for this location. Currently, geomorphic and sediment studies are being conducted together with data collection activities in preparation for evaluation of different alternatives.

San Acacia to Escondida Priority Site Reach

Reclamation is currently developing plans to address river maintenance needs at three locations in the 11 mile reach between San Acacia Diversion Dam and the Escondida Bridge located north of the community of Socorro, New Mexico. Reclamation is in the process of developing a 90 percent design at these locations to begin environmental compliance of a possible project. At the three locations, channel incision, lateral channel migration, and bank erosion threaten the integrity of the levee system. Erosion of the levee would result in significant loss of water deliveries to Elephant Butte Reservoir. Reclamation is considering the use of gradient restoration facilities, channel re-alignment, and bio-engineering features to protect these sites.

Bosque del Apache and Tiffany Priority Site Levee Raising

Work was performed to raise and widen the levee to safely pass the mean annual flow through the Bosque Del Apache and Tiffany reaches. Approximately 46,000 cubic yards of material was placed.

Red Canyon Mine Riprap Development

A contractor has begun to blast and quarry riprap at the Red Canyon Mine located southwest of Socorro. Riprap from this location will be hauled to various stockpile sites for river maintenance purposes. The material will also be used for work on the San Acacia to Escondida Priority Site Reach Project.

Low Flow Conveyance Channel Experimental Operations

Reclamation conducts experimental operations on the LFCC in a 12 mile reach from San Acacia to Escondida. The operations are part of a study that Reclamation is conducting to evaluate the LFCC for future use. The data gathered from this study will help Reclamation evaluate the LFCC in the San Marcial and Elephant Butte Reaches, which have filled with sediment because of past full reservoir conditions. A suitable outfall into Elephant Butte Reservoir has not existed since 1985. The major objective of the study is to develop prototype channel design for varying energy slopes and channel widths, so that high sediment loads can be transported effectively.

Reclamation's environmental staff completed and submitted a Biological Assessment for continued operational studies on the LFCC through 2006. The USFWS has issued a Biological Opinion to cover experimental operations from 2003 through 2007. Operations during spring 2004 and in future years are dependent on water availability during spring runoff.

Santa Ana

A large scale river maintenance project at Santa Ana Pueblo is nearly complete. The major features, river realignment and construction of a gradient restoration facility, are complete. Remaining activities consist of management of sediment excavated and stockpiled during earlier phases of the project, floodplain grading, and native vegetation planting. The project design requires average or higher spring runoff flows to develop features to their final configurations, so the duration of ongoing activities is dependent on hydrologic conditions.

Truth or Consequences River Maintenance Priority Site

To maintain the authorized 5,000 cfs capacity in the reach of the Rio Grande between Elephant Butte Dam and Caballo Reservoir, Reclamation annually excavates sediment from the river channel. Maintenance activities are conducted after releases are shut off from Elephant Butte Dam each fall. The primary activity consists of sediment removal at arroyo mouths. Secondary activities include sediment removal in other areas throughout the reach and bank stabilization with riprap at selected sites. During periods of non-release, Reclamation installs a dike in the river to raise the stage for the benefit of hot spring bathhouse owners in Truth or Consequences. Because of the interaction between the river and the hot spring aquifer, the increased stage within the river floodway increases the flow of water at hot spring sites.

Activities in late 2003 through early 2004 include the usual sediment excavation at arroyo mouths and temporary dike installation. A bank stabilization project using bendway weirs will be implemented in the Williamsburg Bend area.

Rio Grande River Restoration Projects

Los Lunas Habitat Restoration Project

The Los Lunas Habitat Restoration Project is a joint project between the Corps, Reclamation, and MRGCD funded through the Middle Rio Grande Endangered Species Act Collaborative Program (Collaborative Program). The Los Lunas Habitat Restoration Project began as a result of the need to perform habitat restoration in the Belen reach of the Rio Grande. This directive was outlined in the 2001 Biological Opinion (2001 BiOp) issued by USFWS on June 29, 2001. The project area was burned in a fire during the spring of 2000 and nearly all of the vegetation in the area was destroyed. Due to the uncertainty in the value of the surviving vegetation, the site was selected as a good location for habitat restoration. Habitat restoration at the Los Lunas project site was intended to improve habitat for the Rio Grande silvery minnow and the southwestern willow flycatcher. A wide active river channel with a shallow, low velocity overbank region will benefit the Rio Grande silvery minnow. In addition, overbank flooding will aid in the regeneration of vegetation in the restoration area. Project goals were accomplished by lowering the floodplain such that inundation of the new floodplain occurs at flows greater than 1,000 cfs.

River restoration activities that occurred in the late spring of 2002 involved jetty jack removal and initial vegetation clearing. Other restoration activities in 2002 included floodplain lowering, reinforcing the levee with material from the excavated floodplain, constructing an earthen berm with root wads, and constructing two high flow side

channels. In addition, a number of variable width microhabitat inlets designed to create low velocity areas in order to retard downstream transport of Rio Grande silvery minnow eggs and larval fish during runoff flows were constructed. Dead cottonwood trees damaged by the fire were also mulched and the wood chips were piled along the newly reinforced levee.

The majority of construction activities at the Los Lunas Habitat Restoration Project were completed by December 2002. Minor construction, minor re-vegetation, monitoring, and other activities were carried out during 2003.

The excavated floodplain was intended to be partially inundated at flows higher than 1,000 cfs and be entirely inundated at flows higher than 2,500 cfs. Upon completion of floodplain excavation, it was discovered that certain features in the restored area experienced inundation at flows of approximately 500 cfs. The New Mexico Interstate Stream Commission (NMISC) was concerned with higher depletions due to diversions at lower flows than originally anticipated. Extensive review of the original cross-sectional data and the hydraulic design model was done along with additional hydraulic modeling. Sensitivity analysis of the additional modeling results was done to determine the reasons for the low-water flooding and several meetings were held. Based on the results of additional hydraulic modeling, it was determined that the difference in the 1,000 cfs water surface elevation and the 500 cfs water surface elevation was approximately six inches. To mitigate the situation, it was determined that the upstream ends of the two side channels would be plugged, however in such a manner that water could still get into the side channels through the microhabitat inlets. These construction modifications were done in early April of 2003 and the NMISC inspected the work on April 10, 2003 and found it to be satisfactory.

Approximately 1,000 coyote willow poles were planted in the excavated floodplain in spring 2003; however because of Collaborative Program funding delays, the planting activities took place later than originally anticipated. The timing of the pole planting along with the drought conditions and drying of the river channel (as related to the local groundwater levels in the floodplain) resulted in a 100% mortality of the willow plantings.

During the summer of 2003, the wood chips that were previously stockpiled along the levee were hauled away from the site under a contract through a local landscaping contractor. Approximately 18,000 cubic yards of material was hauled from the site over a period of several weeks.

Once the wood chips were removed, the levee reinforcement was modified. The slopes of the newly reinforced levee were made steeper and a small ditch was constructed between the old levee and the levee reinforcement in order to discourage vehicle access to the site. Certain areas of the project area were scarified in order to promote future re-vegetation activities.

Egg collection experiments were conducted in a number of the constructed microhabitat inlets by Reclamation scientists. One Rio Grande silvery minnow egg was collected during the monitoring efforts. Artificial minnow eggs that have properties similar to those of actual Rio Grande silvery minnow eggs were also released and collected in the inlets. Locations of artificial minnow eggs, various species of fish, and the Rio Grande silvery minnow eggs were noted and mapped. Based on the results of the experiments, a number of recommendations were suggested to improve the microhabitat inlets. Additional information and results were presented in a research progress report distributed in October 2003.

A detailed topographic survey of the restored area was completed during May 2003. Data collected from this survey was used to accurately map the constructed features and to determine the wetted acreage at various model discharges. The topographic survey was also done to produce an as-built survey of the features. Regular cross-section surveys would not have accurately represented the constructed features. Surveys of the pre-construction river cross-sections are planned to be completed by March 2004.

Other monitoring activities included installing a number of groundwater monitoring wells, surveying a number of breeding bird protocol (Bbird) transects, and bird point count surveys. More monitoring was originally planned for 2003, but could not be done due to the long delays in funding.

If funding is available and in-channel flow is expected in 2004, additional re-vegetation efforts are expected. Bird monitoring and groundwater monitoring are also expected.

Rio Grande and Low Flow Conveyance Channel Modifications and EIS

In September 2000, Reclamation released a Draft EIS on proposed realignment of the Rio Grande and the LFCC below San Marcial. The proposed project would alleviate some of the more critical channel maintenance problems in the San Marcial area. The Draft EIS evaluates alternatives for reconfiguring the channel system below San Marcial for continuing water conservation benefits, maintaining system elements for effective valley drainage, and minimizing costs while considering environmental needs and the protection of endangered species and their habitats. The Draft EIS did not address operation of the LFCC. Release of a Final EIS is pending the outcome of consultation with the USFWS pursuant to Section 7 of the Endangered Species Act. One particular concern with the realignment project relates to the numerous southwestern willow flycatcher territories at the upper end of the reservoir which are dependent on the outflow from the LFCC.

In May 2001, Reclamation submitted a Biological Assessment to USFWS requesting

formal Section 7 consultation on the proposed project. As reported in Reclamation's June 8, 2001 letter to the Engineer Advisers, Reclamation elected to consult on the "bottom up" realignment alternative described in the Draft EIS. This is the more flexible of the two proposed realignment alternatives and could better encompass the range of possible outcomes from the Upper Rio Grande Basin Water Operations Review, Section 7 consultations, Collaborative Program decisions, and ongoing court proceedings. The bottom up alternative would allow construction of new segments of the LFCC below San Marcial to be phased by first building channel segments to carry drainage flows of up to 500 cfs with provision to enable later enlargement of the channel, if necessary, to accommodate water diverted to the LFCC at San Acacia.

At a meeting on June 30, 2003, the USFWS informed Reclamation and NMISC that they could not complete consultation on the channel realignment unless operation of the LFCC were addressed. To support an analysis of LFCC operations, the NMISC is now conducting a study using a new linked groundwater/surface water model to evaluate the potential water salvage that could be gained by resuming LFCC operations.

Preliminary design and data collection work is continuing on the realignment project. A proposed new alignment for the LFCC on the west side of the floodplain below San Marcial has been mapped. A task order has been issued for a contractor to clear brush for a detailed ground survey of this alignment, pending environmental approval. The Collaborative Program has provided \$300,000 to help support this effort.

Reclamation and the Corps have had discussions relating to coordination of the realignment project and the proposed replacement of the San Marcial railway bridge. Increased flexibility for routing future river alignments would result from locating the bridge to cross a new river channel more centrally in the floodplain, rather than cross the existing channel on the extreme eastern edge as currently proposed. A new bridge could be built in the dry at reduced cost then have the river diverted to a new channel under it once complete. However, lack of funding and scheduling issues may not allow this approach to work.

Endangered Species

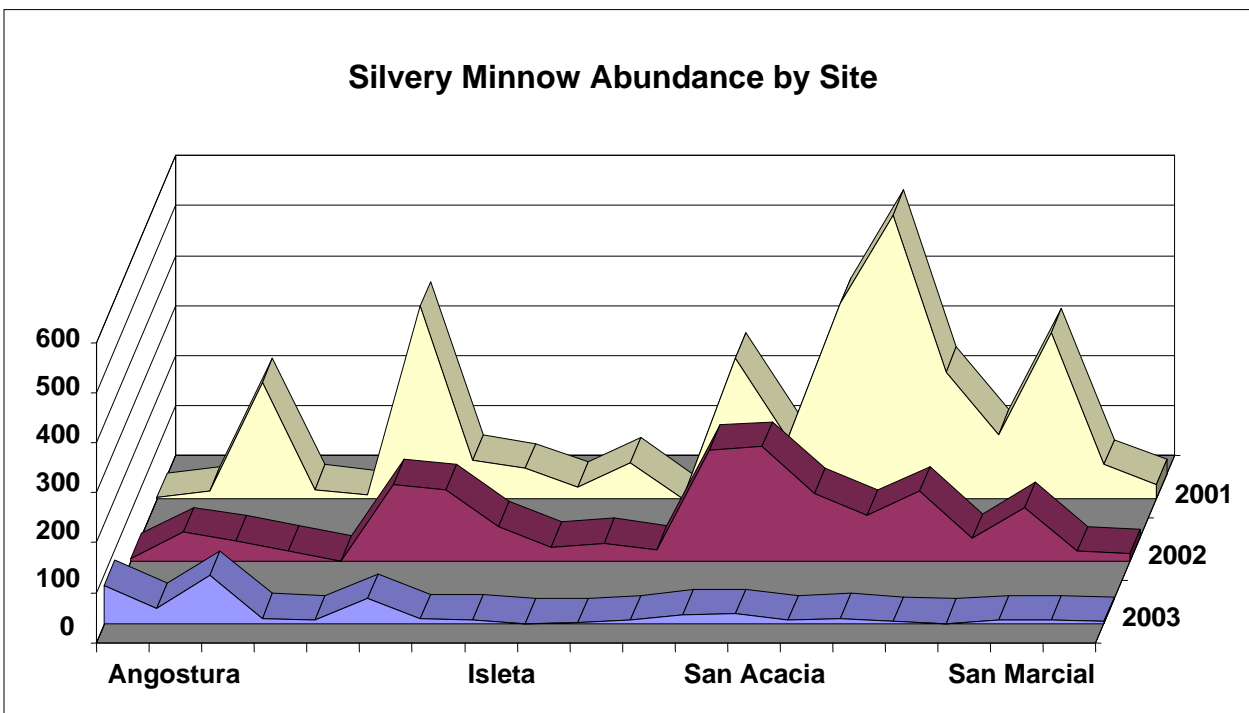
Rio Grande Silvery Minnow

The USFWS listed the Rio Grande silvery minnow (silvery minnow) as endangered in 1994 under the Endangered Species Act (ESA). The silvery minnow was formerly one of the most widespread and abundant species in the Rio Grande basin of New Mexico, Texas, and Mexico. Currently, the silvery minnow occupies less than 10 percent of its historic range and is restricted to the reach of the Rio Grande in central New Mexico from Bernalillo to the headwaters of Elephant Butte Reservoir.

During 2003, extreme drought conditions prevailed in the Rio Grande Basin of New Mexico, resulting in the worst spring runoff on record. To continue to meet the flow requirements of the 2003 Biological Opinion (2003 BiOp), Reclamation leased approximately 19,200 af of supplemental water from willing SJ-C contractors and managed over 78,000 af of water stored by the State of New Mexico under the Emergency Drought Water Agreement and Conservation Water Agreement.

During the irrigation season, Reclamation used supplemental water to maintain flow in the Albuquerque reach from Cochiti to Isleta Diversion Dam. The Rio Grande was allowed to dry from Isleta Diversion Dam downstream to Bernardo, and from San Acacia Diversion Dam downstream to the south boundary of Bosque del Apache National Wildlife Refuge (refuge). Water pumped from the Low Flow Conveyance Channel maintained flow in the river channel south of the refuge. Below average precipitation limited irrigation. Reclamation remains in compliance with the 2003 BiOp. Native flow reconnected the river on about Nov 5, 2003, following the end of irrigation season, and all Low Flow Conveyance Channel pumping ceased for the winter.

Figure 8: Rio Grande Silvery Minnow Abundance



Silvery minnow populations continue to decline in 2003 as indicated by catch per unit effort (CPUE) in monthly monitoring. The minimal flow during spawning the past two

years may be too low to produce suitable nursery habitat for recruitment. Figure 8 displays silvery minnow abundance within various reaches of the Rio Grande based on surveys conducted from 2001 through 2003. The 2001 surveys were conducted bimonthly. Intermittency has continuing adverse effects on downstream silvery minnow populations. Additional silvery minnow monitoring information is available on the Reclamation web page: <http://www.usbr.gov/uc/albuq/envprog/rg/index.html>.

The USFWS re-convened the Rio Grande Silvery Minnow Recovery Team in December 2002 to update the recovery plan, and released the revised critical habitat designation in February 2003. Captive silvery minnow populations include Albuquerque Biopark, Dexter National Fish Hatchery, and New Mexico State University.

Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered by USFWS effective March 29, 1995. Critical habitat was designated effective August 21, 1997 in some areas of New Mexico and other states throughout the species range. The Rio Grande was not designated as critical habitat for the southwestern willow flycatcher. However, Section 7 of the ESA requires all Federal agencies to consult with USFWS on any action that "may affect" a listed species regardless of whether critical habitat has been designated or not. Reclamation has been in consultation with the USFWS pursuant to Section 7 over numerous actions, mainly operations and maintenance activities along the Rio Grande, since 1995.

Six breeding sites for southwestern willow flycatchers have been documented during various survey efforts in the Middle Rio Grande between 1993 and 2003 and include the following: San Juan Pueblo, Isleta Pueblo, Sevilleta National Wildlife Refuge (NWR) and La Joya State Wildlife Management Area (WMA), the San Marcial area, and the Elephant Butte Reservoir delta. Table 9 presents the results of surveys for southwestern willow flycatchers at these sites from 2000 through 2003.

Reclamation continues to conduct southwestern willow flycatcher surveys and nest monitoring along portions of the middle Rio Grande. Between 2000 and 2003, the number of southwestern willow flycatcher territories in the San Marcial reach has expanded from 23 to 86. A majority of these territories are located within the newly developed riparian vegetation within the conservation pool of Elephant Butte Reservoir. This area is the largest breeding population of southwestern willow flycatchers on the middle Rio Grande to date. Flycatcher surveys and nest monitoring in selected areas of the Middle Rio Grande will continue in 2004.

Table 9: Estimate of Southwestern Willow Flycatcher Territories

Middle Rio Grande Project, 2000 - 2003 Breeding Seasons

River Reach	Number of Territories 2000	Number of Territories 2001	Number of Territories 2002	Number of Territories 2003*
Velarde (Ahlers et al 2000-2002)	2	1	0	not surveyed
San Juan Pueblo (Williams 2000)	16	not surveyed	not surveyed	unknown
Isleta Pueblo (Johnson and Smith, 2000)	14	not surveyed	not surveyed	unknown
Sevilleta NWR/ La Joya State WMA (Ahlers et al 2001,2002)	8	11	13	17
Bosque del Apache NWR (Taylor 2000-2002)	1	2	4	3
San Marcial area	4	3	12	34
Elephant Butte Reservoir Delta	19	22	51	52
Total	63	39	80	106

* USBR unpublished data

Middle Rio Grande Endangered Species Act Collaborative Program

The Middle Rio Grande Endangered Species Act Collaborative Program (Collaborative Program) is a collaborative effort by Reclamation and other Federal and non-Federal partners to preserve, protect, and improve the status of endangered species while also protecting existing water uses and ensuring compliance with all applicable laws. In April of 2002, an interim Memorandum of Understanding was signed, committing the signatories to continue to develop the Program and formally established a governance structure for the Program. The Interim Steering Committee was formed to achieve the required work to establish the long-term Program including: a long-term Cooperative Agreement, Program document, cost sharing agreement, draft authorizing legislation, compliance with environmental regulations, identification of a long-term water supply, and fulfillment of federal trust responsibilities. There are 21 signatories to the April 2002 Memorandum of Understanding including Reclamation, USFWS, the Corps, U.S. Forest

Service, Bureau of Indian Affairs, multiple agency representatives of the State of New Mexico, MRGCD, Alliance for Rio Grande Heritage, Rio Grande Restoration, City of Albuquerque, National Association of Industrial and Office Properties, University of New Mexico, New Mexico State University, Pueblo of Isleta, and two additional agriculture and irrigation interests..

Congress provided the Collaborative Program, through Reclamation, approximately \$10 million in FY 2003 and \$7 million in FY 2004. Program activities consist of short and long term efforts to benefit the listed species including habitat restoration, Rio Grande silvery minnow monitoring, propagation and rescue, water acquisition and management, and water quality studies; supportive of ESA Section 7 consultation requirements and recovery plans of the listed species. Proposals submitted under the FY 2004 Request for Proposals process are pending completion of the review process. Additional Program accomplishments in 2003 include completion of a draft Program Document for NEPA scoping, submittal of draft authorizing legislation to Congress by non-federal signatories, and the ongoing development of draft long-term plans for water acquisition and management, science, research and monitoring, and habitat restoration.

Programmatic Water Operations and River Maintenance ESA, Section 7, Consultation

During the Minnow v. Keys litigation, the District Court ordered Reclamation to re-initiate ESA consultation for 2003 water operations. This consultation was initiated by Reclamation in October 2002. On March 17, 2003, USFWS issued a Biological Opinion (2003 BiOp) on the effects of actions associated with the "Programmatic Biological Assessment of Bureau of Reclamation's Water and River Maintenance Operations, Army Corps of Engineers' Flood Control Operation, and Related Non-Federal Actions on the Middle Rio Grande, New Mexico." In the 2003 BiOp, USFWS analyzed the full spectrum of water management options described in the February 19, 2003, final biological assessment for March 10, 2003, through February 28, 2013, water operations and river maintenance proposed by Reclamation and the Corps.

The USFWS issued the 2003 BiOp with a Reasonable and Prudent Alternative (RPA) designed to alleviate jeopardy to the Rio Grande silvery minnow, adverse modification to Rio Grande silvery minnow critical habitat, and jeopardy to the southwestern willow flycatcher based on the biological needs of the species. The RPA elements address some of the long-term recovery needs of the Rio Grande silvery minnow by incorporating four essential factors during the 10-year scope of the project: (1) water operations; (2) habitat improvement; (3) population management; and, (4) water quality. The water operations elements establish minimum water flows under different hydrologic scenarios that are needed to alleviate jeopardy to both species.

Rio Grande Silvery Minnow v. Keys Litigation

In November 1999, environmental groups collectively filed suit against Reclamation and the Corps for alleged Endangered Species Act and National Environmental Policy Act violations. The Middle Rio Grande Conservancy District, State of New Mexico, City of Albuquerque, and Rio Chama Acequia Association subsequently intervened. The plaintiffs identified the central issue to be the scope of discretionary authority that Reclamation and the Corps have over the Middle Rio Grande and San Juan-Chama Projects' water deliveries and river operations.

In June 2003, the Tenth Circuit Court of Appeals affirmed the District Court of New Mexico's earlier finding that Reclamation has discretion to reduce deliveries of water under its contracts to comply with the ESA. In August 2003, the Department of Justice and Interveners filed petitions requesting rehearing en banc with the Tenth Circuit Court of Appeals. Subsequently, the Tenth Circuit Court of Appeals ruled that the appeals are moot, and it vacated the June 2003 panel decision.

In MRGCD's cross claim against the United States in the Minnow v. Keys lawsuit, MRGCD seeks to quiet title all Middle Rio Grande Project properties. The United States' position in this cross claim is that MRGCD conveyed all Middle Rio Grande Project properties to the United States and that those properties remain in the name of the United States until, among other things, Congress authorizes title transfer. The repayment contract also stays in effect until such time. The District Court vacated a trial scheduled for July 2003. The United States' Motion for Summary Judgment (in response to the MRGCD's motion) will be submitted in January 2004.

Temporary Pumping Program – San Acacia to Fort Craig Reach

During the irrigation season, flows in the Rio Grande between San Acacia Diversion Dam and the headwaters of Elephant Butte Reservoir can drop to a level that may potentially result in adverse impacts to the Rio Grande silvery minnow and southwestern willow flycatcher. Reasonable and Prudent Alternatives D, G, K, and O of the 2003 BiOp require the use of pumps to manage river recession, maintain river connectivity, and insure an adequate water supply for nesting southwestern willow flycatchers. The Temporary Pumping Program also helps Reclamation comply with the continuous river requirements stipulated by Reasonable and Prudent Alternatives E, H, and L.

In an effort to help maintain a minimum flow within this reach of the Rio Grande and comply with the Reasonable and Prudent Alternatives of the 2003 BiOp as well as prior biological opinions, Reclamation has installed portable pumps with flow measurement devices at strategic locations to move water from the LFCC into the Rio Grande

floodway. Discharge data for the pumping sites is now posted on the USBR ET Toolbox web site within the MRGCD / Rio Grande Silvery Minnow Operations schematic pages. The URL of the referenced site is provided below:

www.usbr.gov/pmts/rivers/awards/Nm/rg/RioG/gage/schematic/SCHEMATICsouth.html

The portable pumps were effectively used to augment river flows during the 2003 irrigation season, allowing Reclamation to maximize the effectiveness of supplemental water releases made for ESA purposes during the spring runoff period through June 15. After June 15, the pumping operations were gradually scaled back to support instream flows from the south boundary of Bosque del Apache National Wildlife Refuge to the headwaters of Elephant Butte Reservoir.

The total available pumping capacity for all pump locations is now approximately 200 cfs, although the maximum total combined rate is limited to 150 cfs by the Emergency Authorization granted by the New Mexico State Engineer. A total of approximately 21,000 af was transferred from the LFCC to the Rio Grande floodway through the Temporary Pumping Program during 2003. Additional information on the Temporary Pumping Program can be found in the Reclamation report entitled "*2003 Supplemental Water Program Report*".

RIO GRANDE PROJECT (NEW MEXICO - TEXAS)

Reclamation's El Paso and Elephant Butte Field Divisions are jointly responsible for the operations of the Rio Grande Project (Figure 9). Elephant Butte Field Division operates and maintains Elephant Butte and Caballo Dams. El Paso Field Division is responsible for scheduling releases from Elephant Butte and Caballo Reservoirs to meet irrigation demand and the delivery of Rio Grande Project water to the canal headings of Elephant Butte Irrigation District (EBID), El Paso County Water Improvement District No. 1 (EPCWID), and Mexico (under the 1906 International Treaty). EBID and EPCWID operate and maintain Reclamation's diversion dams on the Rio Grande, including Percha Diversion Dam, Leasburg Diversion Dam, and Mesilla Diversion Dam in New Mexico, and the Riverside Diversion Cofferdam in Texas. EBID operates and maintains the three diversion dams in New Mexico under a contract with Reclamation. In September, 2003, Reclamation completed work to remove Riverside Diversion Dam and the adjacent Cofferdam. Riverside Diversion Dam had been inoperable since 1987, when flooding on the Rio Grande caused the structure to fail.

Water Supply Conditions

Inflow into Elephant Butte Reservoir during 2003 as measured at the Rio Grande Floodway (FW) plus the LFCC at San Marcial (FW+LFCC) was 207,069 af, the fifth lowest on record (109 years of record dating back to 1895). The 92-year average annual inflow, measured at San Marcial (FW+LFCC) is 866,180 af. The actual 2003 March through July runoff, measured at San Marcial (FW+LFCC), was 62,029 af, which was 10.8 percent of the 30-year average of 573,000 af. Of the period 1996-2003, the spring runoffs (March-July) at the San Marcial gauging station have consistently been below average, with the exception of 1997, which was 120 percent of average. The 1996, 2000, 2002, and 2003 spring runoffs have been near-record low volumes, with the 2003 spring runoff volume being the ninth lowest on record at the San Marcial gauging stations. During 2003, 366,750 af of water was released from Elephant Butte Reservoir. There was a release of 364,528 af to meet the irrigation requirements of Project water users from Caballo Reservoir.

The January through June National Weather Service and Natural Resources Conservation Service coordinated forecasts received for the 2003 March through July runoff season are presented in Table 10.

Combined total storage for Elephant Butte and Caballo Reservoirs was 221,662 af on December 31, 2003. This combined storage was 9.4 percent of the total capacity of both reservoirs, and 10.0 percent of the available storage. The available storage for both reservoirs during the winter months (October 1 to March 31) is equal to the capacity of Elephant Butte Reservoir, 2,023,358 af minus 25,000 af that Reclamation reserves for winter operational flood control space (50,000 af during the summer), plus

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

ALBUQUERQUE AREA OFFICE

RIO GRANDE PROJECT

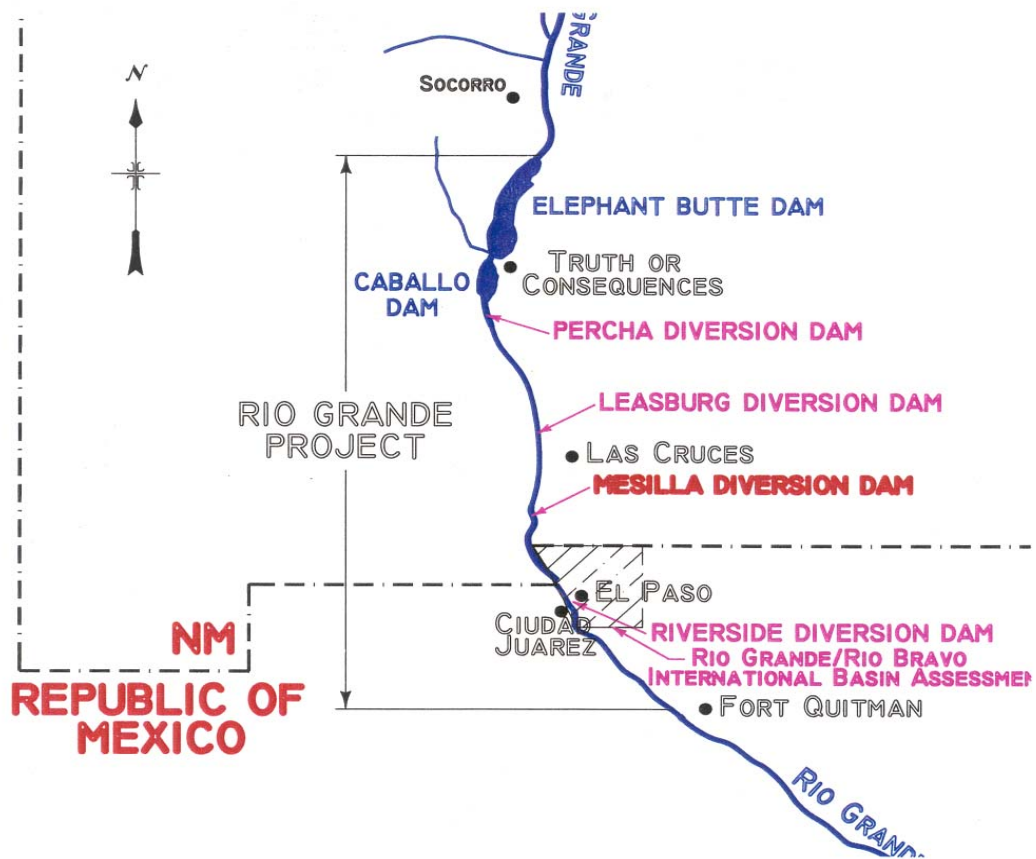


Figure 9: Area Map of the Rio Grande Project

the capacity of Caballo Reservoir, 326,672 af minus 100,000 af for flood control space, or 2,225,030 af during the winter (2,200,030 af during the summer).

Per the Rio Grande Compact Article I definition, the usable water in Project storage (Elephant Butte and Caballo Reservoirs together) was below 400,000 af for all of 2003. Article VII of the Rio Grande Compact stipulates that when usable water in Project storage is below 400,000 af that no “native Rio Grande flows” will be stored in post-1929 reservoirs upstream of Elephant Butte Reservoir in New Mexico and Colorado, unless relinquishment of credit waters in Elephant Butte Reservoir occurs. On April 23, 2003, New Mexico relinquished 122,500 af of its credit waters to Texas, and Texas accepted the relinquishment. The 122,500 af of relinquished credit waters was then available for allocation to the Rio Grande Project water users.

Table 10: Summary of 2003 Rio Grande Coordinated Spring Runoff Forecasts

Month	Forecasted Otowi Runoff (af)	Percent of 30-Year Average	Forecasted San Marcial Runoff (af)	Percent of 30-Year Average
Jan 1	533,000	70	370,000	65
Feb 1	415,000	55	260,000	45
Feb 15	385,000	51	230,000	40
Mar 1	465,000	61	305,000	53
Mar 15	485,000	64	325,000	57
Apr 1	465,000	61	305,000	53
Apr 15	440,000	58	285,000	50
May 1	400,000	53	245,000	43
May 15	365,000	48	215,000	38
June 1	430,000	57	275,000	48
Actual Runoff	283,041	37	62,029	11

A final allotment of only 34.07 percent of a full supply was declared by Reclamation on August 21, 2003 for the 2003 irrigation season. The initial allotment to the Rio Grande Project water users (declared on December 10, 2002) started at only 8.03 percent of a full supply. The year 2003 was the first year since 1978 that the Rio Grande Project’s irrigation water supply was less than a full supply. The Rio Grande Project had enjoyed a full supply for irrigation each year from 1979 to 2002 (24 continuous years).

For the 2004 irrigation season, a less than full allotment (only 4.69 percent of a full supply) was declared on December 15, 2003. This initial allotment was revised on January 21, 2004 and again on February 11, 2004, but it is still less than a full allotment (only 10.81 percent of a full supply) based on inflow to the Rio Grande Project reservoirs during December 2003 and January 2004. Due to the large amount of Rio

Grande Compact credit waters that existed in Elephant Butte Reservoir, a majority of the water in Project storage (Elephant Butte and Caballo Reservoirs together) was not available for allocation at the beginning of 2004. Per New Mexico's relinquishment of credit waters on April 23, 2003, it was further agreed that New Mexico will relinquish their remaining credit waters to Texas on March 1, 2004. However, based on the January 1 NRCS/NWS spring runoff forecast at the San Marcial gauging stations, Reclamation anticipates that the Rio Grande Project will not have a full supply for irrigation during 2004.

The 2004 coordinated forecasts from the National Weather Service and the Natural Resource Conservation Service for the 2004 March through July runoff season is presented in Table 11.

Table 11: 2004 Rio Grande Coordinated Spring Runoff Forecasts

Month	Otowi Runoff (af) (Mar-Jul)	Percent of 30-Year Average	San Marcial Runoff (af) (Mar-Jul)	Percent of 30-Year Average
Jan 1	620,000	82	455,000	79
Feb 1	635,000	84	470,000	82
Feb 15	570,000	75	405,000	71
Mar 1	620,000	82	420,000	73

Project Irrigation and Drainage Systems and Title Transfer

In 1992, Congress authorized the transfer of title to certain irrigation facilities to the Districts. The official transfer of the irrigation and drainage rights-of-way and facilities to the Districts was completed on January 22, 1996. In 2003, the irrigation and drainage system continued to be owned, operated, and maintained by Elephant Butte Irrigation District in the New Mexico portion of the Rio Grande Project and by El Paso County Water Improvement District No. 1 in the Texas portion of the Project. Reclamation continues to own and administer the lands and rights-of-way activities of the reservoirs and diversion dam areas.

Reclamation retains title and operation and maintenance responsibilities for Elephant Butte and Caballo Dams and Reservoirs. Operation and maintenance of the diversion dams are performed by the Districts under contracts with Reclamation. Reclamation retains the rights-of-way and title of the diversion dams and their associated reserved works. The Districts performed flow measurements at canal headings, river stations, and lateral headings during 2003. Reclamation coordinated and maintained central

control of releases, river operations, and water accounting. To accomplish the water allotment accounting, the Districts collected field flow measurements and coordinated data from all water user entities. Utilizing the summarized flow data submitted by the Districts for their areas of responsibility, Reclamation calculated and summarized the monthly and end-of-year Project water supply use and accounting for 2003. The International Boundary and Water Commission (IBWC) continued to own, operate, and maintain the American Diversion Dam and the American Canal during 2003 in accordance with the International Treaties with Mexico (1906 and 1933). In addition, the IBWC operated the International Diversion Dam which diverts irrigation waters into the Acequia Madre head gates operated by Mexico.

Drainage waters from the Rio Grande Project lands provide a supplemental irrigation water supply for approximately 18,342 acres of the Hudspeth County Conservation and Reclamation District No. 1 (HCCRD). Total flows out of the Project to HCCRD, through the Hudspeth Feeder Canal, Tornillo Canal at Alamo Alto, and Tornillo Drain were 53,509 af during 2003. Under the Warren Act contracts, HCCRD was charged for drainage water from the Project between March 1 and September 30 which amounted to 35,925 af.

Water flows measured by IBWC on the Rio Grande at Fort Quitman Station, downstream of the Project and HCCRD boundaries, amounted to 30,560 af during 2003.

Elephant Butte Reservoir and Powerplant

Elephant Butte Reservoir reached a maximum storage of 405,306 af (elevation 4,331.92 ft) on February 26-27, 2003. A minimum storage of 147,946 af (elevation 4,303.27 ft) was reached on September 14, 2003. The last time Elephant Butte Reservoir was at this low storage level was December 1978. Storage levels in Elephant Butte Reservoir did not enter into the 50,000 af prudent flood control space in 2003.

Net power generation for 2003 was 29,552,650 kilowatt-hours which was 39.1 percent of the 64-year average (1940 through 2003) of 75,546,453 kilowatt-hours.

The balance valves were not utilized for releases during 2003. Only the power plant releases were utilized to meet downstream irrigation demand and manage Caballo Reservoir storage levels. In 1998, Reclamation determined that the hydraulic turbines of the power plant needed to be replaced because of severe stress fracturing. A new hydraulic turbine was installed in the power plant in the winter of 2001 to replace the No. 2 turbine. Another new hydraulic turbine was installed to replace the No. 3 turbine in June 2003. The last remaining turbine (No. 1 turbine) will be completely replaced by early 2005. The power plant will have only two turbines available for operation in 2004.

Beginning with the start of the irrigation season in 2005, Reclamation anticipates having all three turbines available for generation and releases.

In July, 2004, Reclamation plans to move an additional 34,000 af of water to Caballo Reservoir to help meet irrigation demand on the Rio Grande Project and also lower Elephant Butte Reservoir's level to 4303.00 feet by the third week of July. Reclamation will then bypass inflows to Elephant Butte Reservoir for approximately three weeks holding the reservoir level near 4303.00 feet. This will allow Reclamation to perform needed repairs and maintenance to the E gallery on the upstream side of Elephant Butte Dam. Normal releases from the dam will resume by the middle of August to help meet irrigation demand on the Rio Grande Project.

Elephant Butte Dam Facility Review and Safety of Dams Programs

The last PFR for Elephant Butte Dam was completed in 2002. The next Elephant Butte CFR is scheduled to occur in 2005. During 2003 the following additional work was completed for Elephant Butte Dam:

- The drum gate modifications were completed in 2003
- Work on the penstock gates was started
- An Inspection on the upstream side of the penstock gates was completed in September. It was done in accordance with O&M recommendations
- Due to the expectation of continued use of the balance valves, the control system was over-hauled and upgraded
- An automatic call out system was installed
- The Annual Examination and Report was completed

Caballo Dam and Reservoir

Caballo Reservoir reached a maximum storage of 67,657 af (4,150.10 ft) on May 14, 2003. A minimum storage of 4,428 af (4,126.76 ft) was reached on September 20, 2003.

According to Court Order No. CIV-90-95 HB/WWD of October 17, 1996, which resulted from a negotiated settlement with the Districts, the Caballo Reservoir storage level is targeted not to exceed 50,000 af (4,146.11 ft) from October 1 to January 31 of each year, unless flood control operations, storage of water for conservation purposes, re-regulation of releases from Elephant Butte Dam, safety of dams purposes, emergency operations, or any other purpose authorized by Federal law, except non-emergency power generation, dictate otherwise. Significant variation above 50,000 af during the winter months of October through January requires collaboration and consultation between the Districts and Reclamation.

Reclamation's plan for operation of Caballo Reservoir during February 1 through September 30, 2003 was to maintain storage levels such that they would not exceed 50,000 af in February, not exceed 67,000 af in May, and not be less than 6,000 af by the end of September. Having somewhat higher storage levels earlier in the irrigation season allowed Reclamation to:

1. Reduce evaporative losses between Elephant Butte and Caballo Reservoirs
2. Provide sufficient operational hydraulic head at Caballo Reservoir for irrigation demand releases
3. Serve as a reserve pool in case releases were interrupted from Elephant Butte Dam and minimize changes to release rates from Elephant Butte Dam; and,
4. Compensate for loss in discharge capacity from Elephant Butte Dam power plant due to the turbine runner replacement program.

Caballo Reservoir's operating plan for October 1, 2003 through September 30, 2004 has not been finalized yet. Due to current drought conditions and uncertainty of the 2004 spring runoff volume into Elephant Butte Reservoir, Reclamation will finalize its operating plan in the spring of 2004. The plan will reflect accommodations for the Elephant Butte turbine runner replacement program, minimization of evaporation differences between Elephant Butte and Caballo Reservoirs, maintenance of some reserve water in Caballo Reservoir for emergency purposes, and accommodation of additional water from Elephant Butte Reservoir in July, 2004 so that Reclamation can perform needed repairs and maintenance to the upstream side of Elephant Butte Dam. See explanation of repairs under the section entitled "Elephant Butte Reservoir and Power Plant" above.

On August 5, 2003, a rupture was discovered in the Bonita Lateral pipeline in the gate chamber of Caballo Dam's outlet works. Reclamation temporarily repaired the pipe to allow the delivery of irrigation water to continue. After September 19, 2003, when the gates were closed at Caballo Dam to end the irrigation season, Reclamation conducted inspections of the exposed pipeline and the embedded steel liner upstream of the gate chamber. It was determined that the exposed pipe had completely rusted due to corrosion. It was also determined that corrosion of the steel liner occurred upstream of the gate chamber where voids in the concrete had been discovered. Reclamation has now replaced the exposed pipeline with new pipe and couplings and grouted the voids adjacent to the steel liner upstream. In February, 2004, the Bonita Lateral pipeline was made ready for normal operations and delivery of water to the Bonita Community Lateral. Additional repairs to the upstream steel liner and concrete will be performed after the end of the irrigation season in 2004.

Caballo Dam Facility Review and Safety of Dams Programs

The last PFR for Caballo Dam was completed in 2002. The next Caballo Dam CFR is scheduled to occur in 2005. During 2003 the following additional work was completed for Caballo Dam:

- The Annual Examination and Report was completed
- A video inspection was done in accordance with recommendation (1999-SOD-B) of the embankment toe drain was completed in June
- The update for the Standard Operating Procedures (SOP) and the Emergency Management Plan (EAP) is in progress and is scheduled for completion by January 2004

Data Automation and Instrumentation and Flow Monitoring System

Reclamation's El Paso Field Division continued to maintain its Internet Web Page for the Rio Grande Project during 2003. The current year's daily, weekly, and monthly data on the operations of Elephant Butte & Caballo Reservoirs, and the delivery of water to the two United States Rio Grande Project water users (Elephant Butte Irrigation District and El Paso County Water Improvement District No. 1), are available via the Internet. To reach the Web page, type the following URL into a web browser:

<http://www.usbr.gov/uc/elpaso/index.html>

In 2004, Reclamation plans to begin developing a database to be used to store and access all of the Rio Grande Project's historical water data, including Elephant Butte & Caballo Reservoirs historical daily elevations and storage contents. Eventually, Reclamation anticipates linking this database to the El Paso Field Division's Web Page for everyone to access, peruse, and download water data.

Elephant Butte and Caballo Reservoirs Resource Management Plan

The Resource Management Plan (RMP) for Elephant Butte and Caballo Reservoirs, initiated in late 1995, has been completed and distributed to interested parties. The RMP provides a guide for Reclamation and other relevant agencies for use in the management of Elephant Butte and Caballo Reservoirs land and associated resources. The Final EIS and Record of Decision (ROD), signed by the Regional Director on February 24, 2003, outlined the environmental impact of implementing the Multi-Purpose Emphasis Alternative which was selected as the preferred management alternative. Among the primary issues discussed and evaluated in the resource planning

process were grazing management practices, lease lot ownership and management, threatened and endangered species, water quality, and recreation development. The public and related agencies were kept informed throughout the planning process by way of newsletters, planning workgroup meetings, periodic public workshops, and informational open houses.

Diversion Dam Facility Review and Safety of Dams Programs

Reclamation conducted a field examination of the Rio Grande Project reserved works structures - Percha, Leasburg, Mesilla, and Riverside Diversion Dams, on January 23-24, 2003. The final examination report will be issued in 2004. The next scheduled operation and maintenance field examination of the diversion dams is tentatively set for the fall of 2008, following the end of the irrigation season.

Rio Grande Project Adjudications

The United States filed the case United States of America v. Elephant Butte Irrigation District, et al Civ. No. 97-0803 JP/RLP/WWD (Quiet Title to the Waters for the Rio Grande Project) on June 12, 1997, requesting the Court to quiet legal title to the waters of the Rio Grande Project in its name. The United States District Court (USDC) for the District of New Mexico dismissed the case in August 2000. On May 7, 2002, the United States Court of Appeals (10th Circuit) vacated the USDC's August 2000 decision and remanded the case back to District Court for further proceedings. Chief Judge James A. Parker issued an order to stay the case and close for administrative purposes on August 15, 2002 but further ordered that should it become necessary or desirable during the pendency of the water adjudications in New Mexico and Texas, any party may initiate proceedings as though the case had not been closed for administrative purposes.

Lower Rio Grande Basin Adjudication (New Mexico), State of New Mexico, ex rel, Office of the State Engineer v. EBID, et al, CV-96-888: This "stream adjudication" was originally filed by Elephant Butte Irrigation District (EBID) against the State Engineer in 1986. Judge Valentine set briefing deadlines regarding notice and procedure of global issues at the most recent status conference in the fall of 2003. Briefs associated with these items are due on January 30, 2004, responses to the briefs are due on February 27, 2004, and a status conference hearing is tentatively set for mid to late March 2004.

The Texas Commission on Environmental Quality posted public notice of adjudication of all claims of water rights in the Upper Rio Grande (above Ft. Quitman) segment of the Rio Grande Basin and the requirement to file sworn claims pursuant to section 11.307 of the Texas Water Code on or before April 22, 1996. The Investigation Report was completed under Phase 1. Phase 2 calls for evidentiary hearings in which claimants

present evidence to support the validity of their claims. Threshold issues were briefed, and on July 31, 2003, the Administrative Law Judge ruled as follows: (1) the TCEQ has jurisdiction over the proceeding, (2) the river segment subject to the adjudication does not need to be revised or expanded, and (3) the proceeding qualifies as an adjudication of water rights under the McCarran Amendment. An evidentiary hearing was held on December 11, 2003, and Reclamation presented expert testimony about the Rio Grande Project.

Elephant Butte and Caballo Reservoir Vegetation Management Cooperative Agreement and Status of Environmental Compliance

Under a Cooperative Agreement with the State of New Mexico, Reclamation has continued maintenance on lands within the Caballo Reservoir and Elephant Butte Reservoir projects. During 2003, Reclamation completed a Final Programmatic Environmental Assessment/Biological Assessment, for "Phreatophyte Management at Caballo and Elephant Butte Reservoirs," with a Finding of No Significant Impact for this action. During September 2003, approximately 1,248 acres of monotypic saltcedar were treated at Elephant Butte Reservoir with the herbicide Arsenal (imazapyr) applied via helicopter. An additional 240 acres of saltcedar was treated by ground rig at Caballo Reservoir with Arsenal tank mixed with the herbicide Glyphomax (glyphosate), and 96 acres of the phreatophyte screwbean mesquite were treated using Reclaim/Remedy (chlopyralid/trichlopyr) tank mix. Maintenance of non sprayed areas has continued at Caballo Reservoir through mowing. The west bank of the Rio Grande river in Williamsburg Bend received mechanical treatments to mulch large trees and the stumps were treated with the herbicide Garlon (trichlopyr) to control resprouting. Additional treatments are scheduled for late summer 2004.

EL PASO FIELD DIVISION PLANNING STUDIES AND INTERACTION WITH THE NEW MEXICO - TEXAS WATER COMMISSION

The New Mexico-Texas Water Commission (Commission) was created as a result of the voluntary court settlement in the El Paso vs. Reynolds (563 F. Supp. 379 D.N.M. 1983) ground water appropriation case. The Commission seeks to implement the best management practices for the water resources of the west Texas and southern New Mexico area (Figure 10). The following sections summarize studies that are being performed through the cooperation of Reclamation and the Commission.

Elephant Butte and Caballo Reservoir Water Quality Assessments

Reclamation and the USGS are partners in the reservoir water quality assessments of Elephant Butte and Caballo Reservoirs. These assessments consist of monitoring temperature, dissolved oxygen, and pH profiles throughout the year, in addition to investigations into the generation and potential mitigation of hydrogen sulfide gas (H₂S) releases at the Elephant Butte power production facility. The release of H₂S poses a potential health risk to the employees in the power plant and falls under the purview of Occupational Safety and Health Act (OSHA) regulations. Dissolved H₂S below Elephant Butte is also detrimental to the cold water trout population present in the tailwaters. This effort is being managed by Reclamation's Upper Colorado Regional Office. The actual measurements are being conducted by personnel from New Mexico State University.

Rio Grande/Rio Bravo International Basin Assessment / Border Regional Environmental Workgroup

In July 2000, the Department of the Interior (DOI) and Mexico's Secretariat of Environment and Natural Resources (SeMARNAT) agreed to conduct a binational water and natural resources assessment of a portion of the International reach of the Rio Grande / Rio Bravo. A Memorandum of Understanding was signed whereby an information exchange program was initiated. Data on cultural and natural resources was inventoried and exchanged with SeMARNat under the leadership of the International Boundary & Water Commission. The focus is on data and reports for the Lower Rio Grande/Rio Bravo Basin.

Various groups have designated the subsections of the river differently. For the purposes of this assessment, the Lower Rio Grande / Rio Bravo is the Reach between El Paso, Texas and Amistad Reservoir. Major U.S. cities located along the Lower Rio Grande include El Paso, Laredo, Brownsville, and McAllen, Texas. Major Mexican cities along the Rio Grande are Juarez, Chihuahua, and Nuevo Laredo and Matamoros, Tamaulipas.

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RIO GRANDE / RIO BRAVO INTERNATIONAL BASIN ASSESSMENT

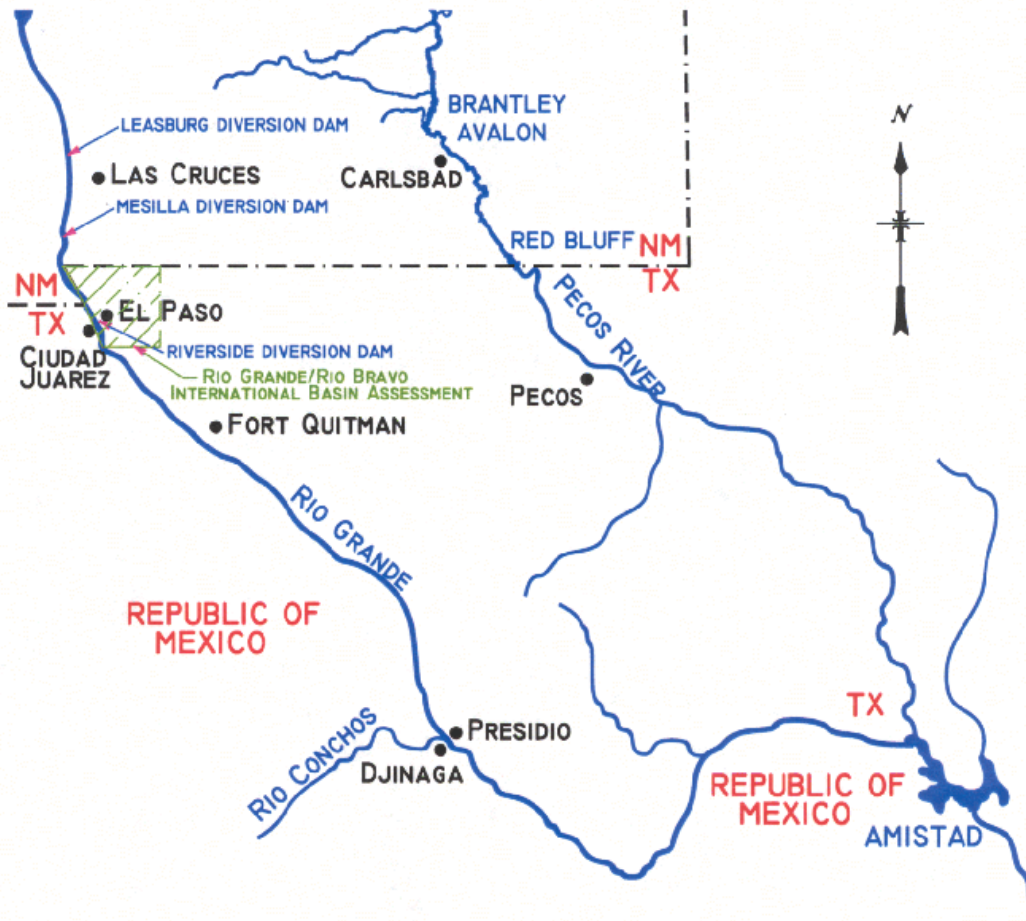


Figure 10: Area Map of the Rio Grande/Rio Bravo International Basin Assessment

The Joint Resolution signed at the Binational Rio Grande / Rio Bravo Symposium on June 14, 2000 listed eight objectives to be accomplished to protect the ecological integrity of the Rio Grande / Rio Bravo in the reach between Fort Quitman and Amistad Dam. Subsequently, meetings have been held between federal and state agency representatives (the organizing committee) to develop a strategy to move forward initiatives to satisfy the intent of the Joint Declaration. Under a phased completion, phase 1 will seek implementation of four of the eight objectives listed in the Joint Declaration, (#1. Form a binational task force; #6. Undertake research on biologic and hydrologic conditions of the region; #7. Develop and exchange of compatible information systems; #8. Facilitate public participation in developing strategies for environmental sustainability.)

Current Activities

Due to declining budgets for natural resource investigations in SeMARNat and the Mexican section of IBWC (CILA), there are limited resources allocated to continue binational studies in this reach of the Rio Grande. Under the leadership of the International Boundary & Water Commission partnerships for funding are being formulated. Currently the United States section of IBWC has had discussions with members of the U S / Mexico Border Coalition of Resource Conservation & Development districts regarding possible support.

Reports

A population study and observation of peregrine falcon nests in Big Bend National Park indicated that nest productivity rates were alarmingly low. This project evaluates the impacts of environmental contaminants on the Big Bend peregrine falcon during the 1997-breeding season by analyzing contaminants in potential avian and bat prey items. Preliminary research indicates that mercury; selenium and DDE may be contributing to low reproductive rates. The published report is available through the USGS.

Survey of In-Stream and Riparian Zone Natural Resources and Ambient Water-Quality Conditions of the Rio Grande/Rio Bravo from Big Bend Ranch State Park near Redford, Texas, to the End of the Wild and Scenic River Segment at Foster's Ranch, Texas.

Databases

The report and database entitled *Standardized Watersheds Database for the Lower Rio Grande/Rio Bravo, Texas USGS Open-File Report 00-065* describes the creation of a large-scale watershed database for the lower Rio Grande/Rio Bravo Basin in Texas. The watershed database includes watersheds delineated to all 1:24,000-scale mapped

stream confluences and other hydrologically significant points, selected watershed characteristics, and hydrologic derivative data sets.

In May of 2002, Reclamation and USGS collaborated in providing a literature search and building a database of water quantity and quality, habitat, flora & fauna studies for the reach between Fort Quitman and Amistad Dam.

USGS and Mexico's National Ecological Institute (INE) conducted studies of contaminants in Biota, and Invertebrates in the Big Bend / Maderas del Carmen region.

Reclamation - El Paso Field Division, compiled base line hydrologic information for the Ft. Quitman to Presidio reach, including Rio Conchos tributary flows.

DOI agencies provided and distributed Digital Orthophoto Quads for this reach of the Rio Grande / Rio Bravo.

Caballo Mercury Study

Reclamation, in conjunction with New Mexico State University's Department of Fishery and Wildlife Sciences and the USGS Biological Resources Division, has established the only mercury deposition network (MDN) site in the southwestern United States. Unique to this site is the measurement of both dry and wet deposition of atmospheric mercury.

Mercury is deposited on both a regional and global scale, and the inorganic mercury which lands in the watershed of the Rio Grande eventually washes into the river and reservoir areas. Under anaerobic conditions, bacteria may transform inorganic mercury into the toxic organic form, methylmercury (MMHg). Methylmercury has profound ecological effects because it is one of the few metals that is known to bioconcentrate, bioaccumulate, and biomagnify in aquatic food chains. The biomagnification is predominantly responsible for the elevated levels of mercury present in the fish populations at Elephant Butte and Caballo Reservoirs. The primary route of MMHg accumulation in wildlife and humans is through the ingestion of fish. Currently, the State of New Mexico has issued an advisory concerning the consumption of fish from these reservoirs. The long-term prognosis of mercury accumulation in our reservoirs is unknown, and is the primary reason for undertaking this project.

The goals of this study are to identify the transport, fate, and effects of mercury in an arid environment. Ultimately, the results of this investigation may lead to a better understanding of the potential for mercury contamination in lakes and reservoirs in both arid and wetter climates across the globe. The direct results of this research may expand this investigation to cover other Reclamation reservoirs throughout the Southwest, including Lake Powell, Lake Mead, Lake Havasu, and Roosevelt Lake.

Snow-Melt Runoff Modeling

Monitoring snow-melt runoff within the Rio Grande Basin is critical to the management and operation of the Rio Grande Project. The Rio Grande Project system (dams and reservoirs) is designed for flood control and for the storage and delivery of irrigation and municipal waters. The crucial factors for determining Rio Grande Project storages, diversions, and releases are the flows within the river, and expected flows from runoff predictions. Currently, this runoff assessment is made from specific NRCS Snowpack Telemetry (SNOTEL) sites coupled with information from the National Weather Service. A Snow-Melt Runoff (SMR) model, utilizing satellite imagery and data from SNOTEL points, could greatly enhance predictive capabilities for runoff forecasts. Implementation of this SMR model is an important step towards more effectively predicting the amount of runoff expected to drain into the Rio Grande Basin. Reclamation is working with the Center for Applied Remote Sensing in Agriculture, Meteorology, and Environment, a cooperative effort of the New Mexico State University, College of Agriculture and Home Economics and the U. S. Army Research Laboratory at White Sands Missile Range.

OTHER RECLAMATION PROGRAMS

Department of the Interior's Water 2025 Initiative

The Department of the Interior's Water 2025 Initiative offers a realistic and practical plan for working with communities and irrigation districts in the western United States, including the Rio Grande Basin, to help resolve water supply crises. The proposal addresses the realities of the arid west which includes increases in population and greater demands on finite supplies of water. The initiative includes tools and innovative approaches that can make a difference such as water conservation, implementation of new technologies and other water management measures which will provide for more efficient use of current water supplies. Reclamation is working with the Middle Rio Grande Conservancy District which was designated to receive approximately \$1.5 million of fifty percent cost share funding in Fiscal Year 2004 to implement efficiency measures within the district. A Request for Proposals was issued to western irrigation and water districts by Reclamation for a \$ 4 million west wide challenge grants program for Fiscal Year 2004. The Fiscal Year 2005 budget calls for \$21 million to continue the objectives of the Water 2025 Initiative.

Reclamation's Water Conservation Field Service Program

Reclamation continues to provide cost share funding and technical assistance to several water management entities through the Water Conservation Field Services Program to promote water use efficiencies throughout the State of New Mexico. The Water Conservation Field Service Program seeks to promote water use efficiency through support of educational efforts and research projects, and through providing technical assistance to the water users of New Mexico. Some of the projects supported during 2003 are summarized in the following paragraphs.

Reclamation continued to support conservation education and public and industrial awareness of water issues during 2003. Institutional and industrial water management workshops were co-sponsored by Reclamation, the Office of the New Mexico State Engineer, and the New Mexico Water Conservation Alliance. Funding was provided to the New Mexico Association of Conservation Districts to support the Rolling Rivers Educational Trailers throughout New Mexico. Demonstrations are generally held at the State and County Fairs, public and private schools, teacher workshops, water conferences, and other educational activities.

Reclamation provided technical support to several water conservation districts that operate within the Rio Grande Basin during 2003. Continued support was provided to the MRGCD water measurement program to obtain the operational data required to improve water transport and distribution efficiencies. A working agreement was

developed with El Paso County Water Improvement District No. 1 to expand irrigation system water measurement and telemetry to provide data for increased operation efficiencies. Reclamation is working with staff of the Elephant Butte Irrigation District and New Mexico State University to develop and implement well and ground water monitoring systems for the Mesilla Bolson.

Reclamation continued to participate in the drip irrigation research and demonstration project in cooperation with the Socorro Soil and Water Conservation District and the Natural Resources Conservation Service. The project will carry over into the 2003 calendar year. Agreements were executed with New Mexico State University and the Texas Water Resource Institute to perform canal seepage and aquifer interaction studies.

Reclamation's Water Conservation Field Service Program will provide support for the recently established Water 2025 program which will advance water efficiency improvements in critical areas in the Western United States.

Title XVI Water Reclamation and Reuse Projects

Under the authority of Public Laws 102-575 and 104-266, Reclamation is participating in water reclamation and reuse projects with the cities of Santa Fe, Albuquerque, and Española in New Mexico, and El Paso, Texas.

The Santa Fe Program consists of three parts. The first part is Santa Fe's Treated Effluent Management Program which may reclaim a portion of Santa Fe's secondary effluent for irrigation and Santa Fe River surface flows. A "Treated Effluent Management Plan" was completed in 1998. The second part is the Santa Fe River Augmentation Project which may deliver water upstream on the Santa Fe River to augment the city's supply wells through indirect recharge of the aquifer and enhance the recreational use of the Santa Fe River corridor in the downtown area. A "Water Management and River Restoration Strategy" was also completed in 1998. The third part is the Rio Grande Diversion Demonstration Pilot Project which diverted a small amount (300 af/yr) of ground water from Rio Grande alluvium through a subterranean horizontal radial collector for pilot testing to determine future treatment needs for a full-scale surface water diversion on the Rio Grande, with the discharge returned to the Rio Grande. In 2001, an Environmental Assessment was completed for the Rio Grande Infiltration Collector Well Demonstration Project and a contract was signed to define water management alternatives for the NEPA process. The subsurface horizontal collector well was constructed in 2001 and the final report of engineering and water quality data was issued as a draft in August 2002. The City has received additional funding in 2004 to complete work on the reuse strategy and finalize the Feasibility Study Report.

The City of Española completed an appraisal study in 2000. In late 2001, the City

initiated work on a feasibility study under Public Law 102-575, Section 1604. The feasibility study will cover NEPA requirements and was originally going to investigate a subsurface horizontal radial collector well diversion and treatment for the City of Española's SJ-C water rights. The project then shifted to a surface water diversion and treatment study. The proposed project would mix treated surface water with existing City of Española well water to dilute the groundwater's naturally high fluoride levels and comply with drinking water standards. Work is now proceeding independently on the construction of the necessary diversion with the Albuquerque Corp of Engineers and the Albuquerque Area Office of the Bureau of Reclamation. The City of Española has recently re-evaluated this project and is now pursuing the NEPA investigation of both a surface water diversion and a horizontal collector well.

In 1999 Reclamation entered in to agreements with the City of Albuquerque which provides the framework for the participation and cost sharing in their 25 million dollar arsenic demonstration project and non-potable water reclamation and reuse program. Reclamation cost sharing was approved for construction of the industrial recycling portion of the City's reclamation and reuse program and construction began on that project. In 2001, an Environmental Assessment was completed for two of the reclamation and reuse projects. The non-potable water projects are developing surface water diversion and non-potable water distribution systems for the irrigation of turf grass in public areas. The industrial recycling project was completed in 2001 and construction of the subsurface collectors to divert a small portion of the City of Albuquerque's San Juan-Chama project water began in January of 2003 and is expected to be completed in 2004. The north Albuquerque area water source is using impaired Rio Grande surface water diverted using infiltration galleries together with treated industrial effluent. In July 2003, the north I-25 non-potable water project began partial distribution of non-potable water for turf irrigation at a rate of 450 gpm. Additional capacity for the north side project will be realized following completion of the surface water diversion, conveyance pipelines, and pump stations and reservoirs. The full north side project is expected to be on line in 2005. The south side water reclamation project is using secondary treated sewage effluent and adding a filtration process to treat the water so that it is suitable for non-potable turf irrigation. The south side project is in the preliminary design phases, with a filtration alternatives study and preliminary Design Analysis Report already submitted. Construction is expected to begin in late 2004. The arsenic technology demonstration program will test various arsenic removal technologies and, following evaluation, select the preferred technology and apply it to a production well currently out of service due to high arsenic levels. A design firm has been selected for the arsenic demonstration project and contract negotiations are underway.

Upper Rio Grande Water Operations Model

Annual Operating Plans were generated during the spring of 2003 using the Upper Rio

Grande Water Operations Model (URGWOM) with good results. El Vado storage projections and projected MRGCD storage run-out dates were nearly dead-on. The May 1 model run predicted a MRGCD storage depletion date that was within a day or two of the actual run-out that occurred on August 8. Application of the Water Operations Model during 2003 was somewhat hindered by extensive updates to the Prior and Paramount water accounting methodology, and the creation of Emergency Drought Water pools for MRGCD and Reclamation in El Vado Reservoir. Development on the Water Operations Model during 2003 was focused on incorporating new accounts and rules for handling Rio Grande Compact credit relinquishment, storage, and accounting. The El Vado Prior and Paramount storage methodology used in the Water Operations Model was revised to incorporate the latest Prior and Paramount technical updates developed by Reclamation.

Although the URGWOM Accounting Model for Heron, El Vado, Abiquiu, Cochiti, Jemez Canyon, and Elephant Butte, has been in use for several years, Nambé Falls accounting has continued separately in the old "daily programs" on Reclamation's SUN computer. The Nambé Falls Accounting Model was developed, tested, and debugged during 2002. The Nambé Falls Accounting Model was operated as a separate model independent of the main URGWOM Accounting Model during 2003.

Significant time and effort was dedicated to development and implementation of the Planning Model during 2003. The Planning Model, which is a derivative of the Water Operations Model, is a key component in the development of the URGWOPS-EIS. The Planning Model incorporates a SJ-C and water accounting ruleset that is less complex than the ruleset used by the Water Operations Model. Implementation of the debugged Planning Model occurred during the 3rd and 4th quarters of the year, using a synthetic 40-year hydrology sequence generated using actual hydrologic data from 1971 to 1999.

URGWOM continued to collaborate with the team contracted by Reclamation to build the next-generation database system "Hydrologic DataBase", or "HDB". This system underwent development in earnest during 2002. A test HDB installation was performed in the Albuquerque Area Office of the Bureau of Reclamation during 2003, and accounting data is now also being stored in the Oracle[®] relational database HDB database application. Additional efforts to make the database fully operational for the automatic generation of reports and possible internet accessible applications will continue in 2004.

Additional information about URGWOM and RiverWare modeling software can be found at the Corp's web site:

<http://www.spa.usace.army.mil/urgwom/>

Evapotranspiration Toolbox (ET) Decision Support System

Reclamation and others have determined a need for rapid improvement in measuring and predicting both daily open water evaporation, and daily riparian and crop water use in the Rio Grande Basin. Reclamation has developed an Evapotranspiration Toolbox (ET Toolbox) for estimating these daily water use requirements at a resolution useful for implementation in URGWOM.

The goal of the ET Toolbox project is to supply water managers within and outside of Reclamation with accurate, real-time ET data via a dedicated website, while making the real-time ET dataset (daily riparian and crop water use estimates, open water evaporation estimates, and rainfall estimates) available to URGWOM for daily Water Operations Model runs. The ET Toolbox is an extension of Reclamation's Agricultural Water Resources Decision Support (AWARDS) system that provides Internet access to high-resolution rainfall and daily crop water use estimates for improving the efficiency of water management and irrigation scheduling. The initial development work focused on the Middle Rio Grande area from Cochiti Dam to San Marcial, which is just south of the Bosque del Apache National Wildlife Refuge in New Mexico. ET currently accounts for an estimated 60 percent of the water depletions over this reach of the Rio Grande, including riparian vegetation, irrigated crops, and open water evaporation. Efforts are underway to extend the coverage to Elephant Butte Reservoir.

The primary purpose of the ET Toolbox is to accurately determine, and predict, daily rainfall and water depletions along the Rio Grande. These daily ET estimates and summary year-to-date cumulative ET estimates are already available to users and water managers via the Internet at the URL:

<http://www.usbr.gov/pmts/rivers/awards/Nm/riogrande.html>

The daily cumulative river reach ET estimates are being automatically input into RiverWare, the modeling software basis of URGWOM. RiverWare currently contains water accounting and ownership tools and peripheral water budget and flood routing tools that are being configured for URGWOM. The ET Toolbox data, now directly retrievable into URGWOM, allows the model to more accurately reflect the physical conditions in the basin, and will allow daily water operation managers to make better water release decisions from upstream control structures when URGWOM goes online.

The Interstate Stream Commission provided \$233,750 in funding for ET research and development in their fiscal year 2002. These funds were utilized to update the base GIS dataset in the Toolbox to improve the accuracy of ET estimates, improve the accuracy of Toolbox predictions, and document the process and code behind the website. Additional funding for improvements in fiscal year 2003 did not materialize and little funding is available in 2004, leaving the future viability of the ET Toolbox in question. Without the Toolbox, URGWOM will have difficulty achieving sufficient accuracy to be

useful for planning studies and daily water operations.

Upper Rio Grande Basin Water Operations Review

Reclamation, the Corps, and the New Mexico Interstate Stream Commission entered in to a Memorandum of Agreement in January of 2000, to cooperate as joint lead agencies in a review of their water operations activities in the Rio Grande basin above Fort Quitman, TX. The scope of the Upper Rio Grande Basin Water Operations Review and Environmental Impact Statement (Review and EIS) will be limited to existing facilities and authorities. Because of ongoing litigation, water supply operations at Elephant Butte and Caballo Reservoirs will not be included in the Review and EIS, at least for the present time. However, flood control operations and their impacts down to Fort Quitman will be considered.

The purpose of the Review and EIS is to develop a better understanding of how Corps and Reclamation facilities could be operated more efficiently and effectively as an integrated system and to formulate a plan for conducting future water operations. The review will support continued compliance with state, federal, and other applicable laws and regulations, including the Endangered Species Act. The Review may also result in improved processes for making decisions about water operations through better interagency communications and public input.

The review will take place through the preparation of an EIS that describes and evaluates a range of alternative water operations plans. Each of the lead agencies will publish a separate Record of Decision on its future water operations following the completion of a Final EIS. The process was officially started in March of 2000 with the notice of intent to prepare an EIS.

Extensive involvement of stakeholders and interested parties, including the Rio Grande Compact Commission, International Boundary Water Commission, Indian tribes, Congressional staff, and the general public, has been part of the Review and EIS, with five official cooperating agencies that include two state government agencies, two federal agencies and one Indian tribe. The URGWOM Planning Model will be used in cooperation with FLO2D modeling of overbank flooding, an aquatic habitat model, and a groundwater – surface water hydrologic model, to evaluate alternative water operations and the interrelated effects of the various facilities. A range of hydrologic conditions from surplus to drought will be considered using actual measured flows from 1975 to 2000, which were then synthetically combined to create a 40-year cycle of these conditions. The variability mimics the last 300 years of climate variability (measured from tree ring data). The project is projected to continue through 2005, and is on schedule for completion of a Draft EIS in mid 2004.

Public scoping meetings began in June of 2000 and continued through October.

Scoping meetings took place in nine locations from Alamosa, CO to El Paso, TX. Comments were received from various individuals and entities, and a scoping summary was prepared. One comment that was made frequently during the scoping process was that the public desired more input into the generation of alternatives. Therefore, another round of public meetings was held from January to May, 2002, in 10 locations in the project area. Modifications to the alternatives, as well as additions to the explanations of existing authorities, were made as a result of these meetings. In addition, outreach continues regarding the 23 Indian tribes, pueblos and nations whose lands are affected by alternative development.

Combined alternatives identified for this review include the following highlights:

- No changes to facilities in Colorado
- Administrative changes to two Reclamation facilities – Heron Reservoir's waiver policy, and the Low Flow Conveyance Channel's diversion policy
- Storage options at Abiquiu reservoir operated by the Corps
- Changes to channel capacity below the Corps' reservoirs of Abiquiu and Cochiti Lake
- Improvements in communications at all facilities, including flood management protocol below Elephant Butte and Caballo, two Reclamation facilities.

In 2003, the URGWOM Planning Model was used to assist in the analysis of impacts from 15 possible alternatives over a 40-year synthetic period of record. Evaluation of alternative impacts is guided by a two-tiered decision process. The first tier of analysis included a water operations review of alternative performance against an established set of weighted decision criteria. The initial fifteen alternatives were narrowed down to six alternatives which are subsequently studied in detail to evaluate impacts and compare performance against the baseline or no action alternative. Interdisciplinary NEPA technical teams are evaluating impacts using resource-specific performance criteria. Alternative performance will be further evaluated using decision criteria, weighted in importance by the joint lead agencies and steering committee, leading to the selection of the best-compromise alternative. GIS and database tools will be used to assess data quality and uncertainty further assisting the decision-making process. Finally, a model developed by Sandia National Laboratories will be refined to provide stakeholders access to a quick simulation tool that helps stakeholders understand the tradeoffs made between different types of alternatives and their resulting resource impacts using documented data and evaluation information from the URGWOM Planning Model and the Review and EIS. The Draft EIS and technical resource reports are in progress, with the Draft EIS expected to be published in mid 2004.

Rio Grande Compact Accounting Documentation Project

Reclamation and the signatory states to the Rio Grande Compact entered into a

memorandum of understanding (MOU) in 2002 to formally address the duties, roles, and responsibilities of each agency with regards to the calculation, reporting, and documentation of native Rio Grande and SJ-C water accounting above Fort Quitman, Texas in accordance with the Rio Grande Compact.

The project is intended to concurrently review and document the basis for both native Rio Grande and SJ-C Project water accounting, calculated values and constant values, and approved methods that are involved in the water accounting. Final products of the MOU will include a bibliography of Rio Grande Compact water accounting reference materials, and a report on the documentation of the history and methodology of Rio Grande Compact Accounting.

During 2002, the signatories to the MOU worked on compiling a draft annotated bibliography of available water accounting data and documentation in the possession of each of signatories. The signatories to the MOU also began work on the initial drafts of the documentation report during 2002. A draft report titled *Documentation of the History and Methodology of Rio Grande Compact Accounting* was produced by the signatories to the MOU in October 2003.

The bibliography and documentation will essentially remain as “living documents” that will continue to be updated as the water accounting process evolves in response to changing conditions within the Rio Grande Basin. Work on this project is continuing into the 2004 calendar year.

Native American Affairs Programs

Reclamation has numerous projects underway with pueblos and tribes within the Rio Grande Basin. These projects fall under several categories, including the Middle Rio Grande Project, the Native American Affairs Program, the Drought Relief Program, the Planning Program, and special projects funded through Congressional write-in.

The three Pueblos involved in the Abouseiman adjudication, Jemez, Zia, and Santa Ana, are moving forward with studies to help in a negotiated settlement of the Abouseiman adjudication.

A feasibility study on the direct use of the City and County of Santa Fe's San Juan-Chama Project allocation is underway. This study has implications for the Aamodt adjudication for the Pueblos of Tesuque, Nambé, San Ildefonso, and Pojoaque.

The subsurface drainage project originally scheduled for Isleta Pueblo during the winter of 2001-2002 is now slated for construction in the winter of 2003-2004.

Isleta Pueblo also received write-in funding to help begin studies in preparation for the

anticipated adjudication of the middle Rio Grande. The agreement to forward funding to Isleta Pueblo should be put in place during the spring or summer of 2004.

Under the Drought Relief Program, Jemez Pueblo completed a new agricultural well.

Technical studies continue on a possible negotiated settlement in the Abeyta adjudication, which includes Taos Pueblo.

Negotiations are still underway between the Department of the Interior (represented by the Bureau of Indian Affairs and Reclamation as primary and secondary leads, respectively) and the Middle Rio Grande Conservancy District for a new Operation and Maintenance Agreement for District facilities on lands of the six Middle Rio Grande Pueblos.

The six Middle Rio Grande Pueblos and the Department of the Interior are considering renegotiating and updating the 1981 El Vado Storage Agreement between these Pueblos, the BIA, and Reclamation for storage of Prior and Paramount waters in El Vado Reservoir.

Native Rio Grande was released from El Vado Reservoir to benefit the six Middle Rio Grande Pueblos of Cochiti, Santo Domingo, San Felipe, Santa Ana, Sandia, and Isleta during 2003. Releases were required during 2003 because of drought conditions. The total amount stored was 23,664 ac-ft, and the total amount released to the Pueblos was 14,272 ac-ft. The remainder after evaporation losses, 8,740 ac-ft, was released for delivery to Elephant Butte Reservoir between November 16 and December 22.

A needs assessment to help Taos Pueblo investigate its surface water, groundwater, wastewater, and water quality needs is underway. Funding is being provided through the Native American Program. Taos Pueblo will be able to use some of the funding for water infrastructure improvement and to help with emergency measures related to the forest fire in the summer of 2003 that burned part of their watershed.

Improvements to Pueblo irrigation infrastructure have been funded through the Native American Program. These improvements will help the Pueblos become more efficient in their water usage. Pueblos receiving help include Cochiti, San Felipe, and Sandia.