

2004

2004 Calendar Year Report to the Rio Grande Compact Commission

Hal D. Simpson
Colorado

John R. D'Antonio
New Mexico

Joe G. Hanson
Texas

Bill Ruth
Federal Chairman

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RECLAMATION

Managing Water in the West

2004 Calendar Year Report to the Rio Grande Compact Commission

COLORADO
Hal D. Simpson

NEW MEXICO
John R. D'Antonio

TEXAS
Joe G. Hanson

FEDERAL CHAIRMAN
Bill Ruth



Department of the Interior
Bureau of Reclamation
Upper Colorado Region
Albuquerque Area Office
Albuquerque, New Mexico

March 2005

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RECLAMATION

Managing Water in the West

2004 Calendar Year Report to the Rio Grande Compact Commission



Department of the Interior
Bureau of Reclamation
Upper Colorado Region
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March 2005

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Bureau of Reclamation
Upper Colorado Region - Albuquerque Area Office
2004 Calendar Year Report to the Rio Grande Compact Commission

INTRODUCTION

The Albuquerque Area Office of the Bureau of 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 the 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 according to the terms of the 1906 Treaty between the United States and Mexico. 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.

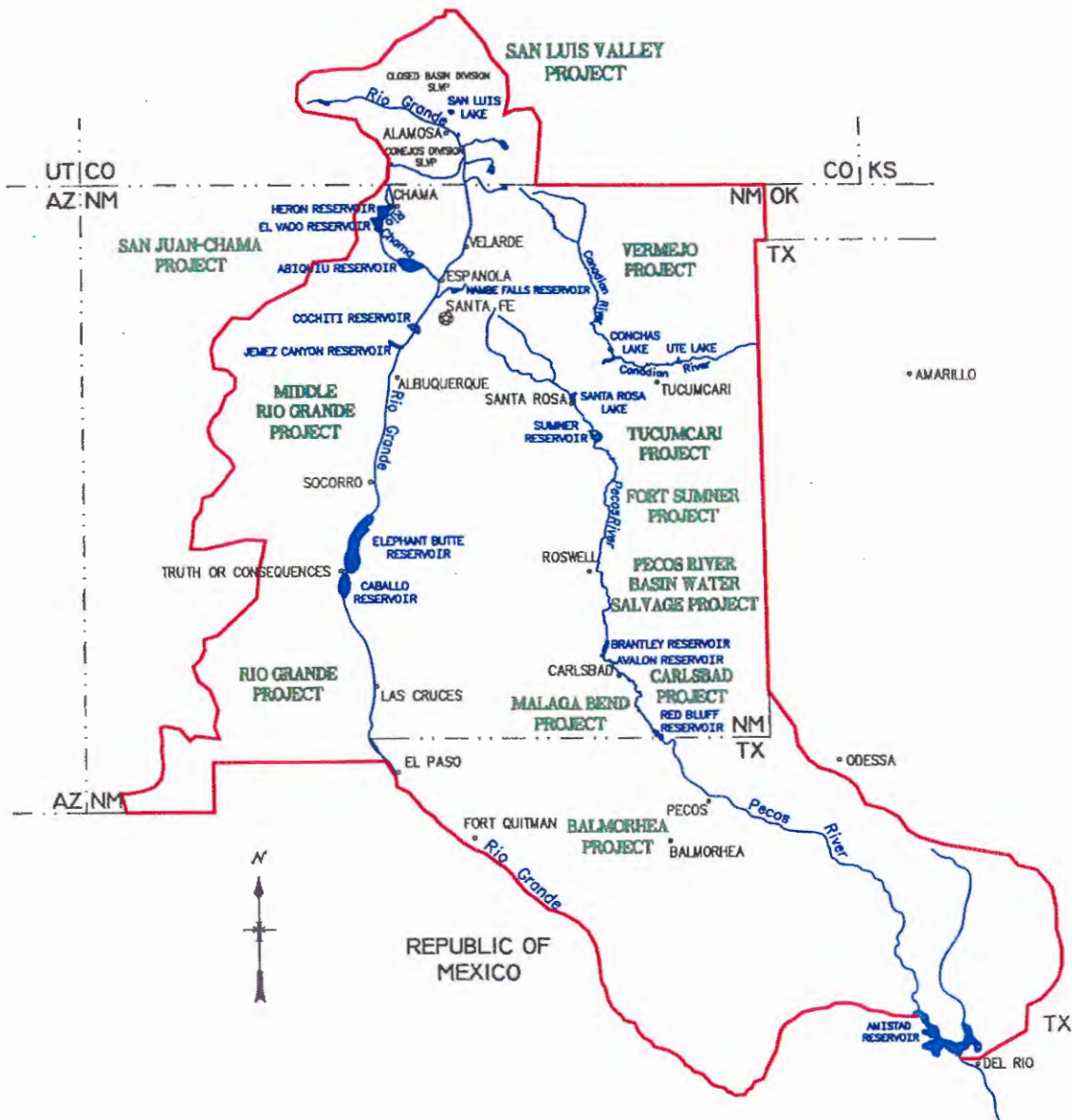


Figure 1: Project Map of Reclamation's Albuquerque Area Office

SAN LUIS VALLEY PROJECT, COLORADO

Conejos Division, Platoro Reservoir

The Conejos Water Conservancy District operates the Conejos portion (Platoro Dam and Reservoir) of the San Luis Valley Project. The Conejos Water Conservancy District office is in Manassa, Colorado.

Platoro Reservoir began the 2004-year with a content of 7,902 acre-feet (af) at elevation of 9957.86. Involuntary storage from shut down in 2003 until re-opening in the spring of 2004 amounted to 1,150af, which was exchanged with credit water in Elephant Butte Reservoir, with Compact Commission approval. There was no supplemental release made in 2004 except direct-flow water or re-regulated direct diversions that amounted to 9,094 af.

Platoro Dam Facility Review and Safety of Dams Programs

In 2004, Platoro Dam had the following activities completed:

- In August 2004, a table top exercise was given with outstanding results. This exercise allowed all participants to better understand roles and responsibilities as separate agencies and how everyone can work together for mitigating and resolving potential emergencies.
- In early September 2004, a Periodic Facility Review was conducted by the Conejos Water District, Albuquerque Area Office and the Regional Office staff.

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. 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.

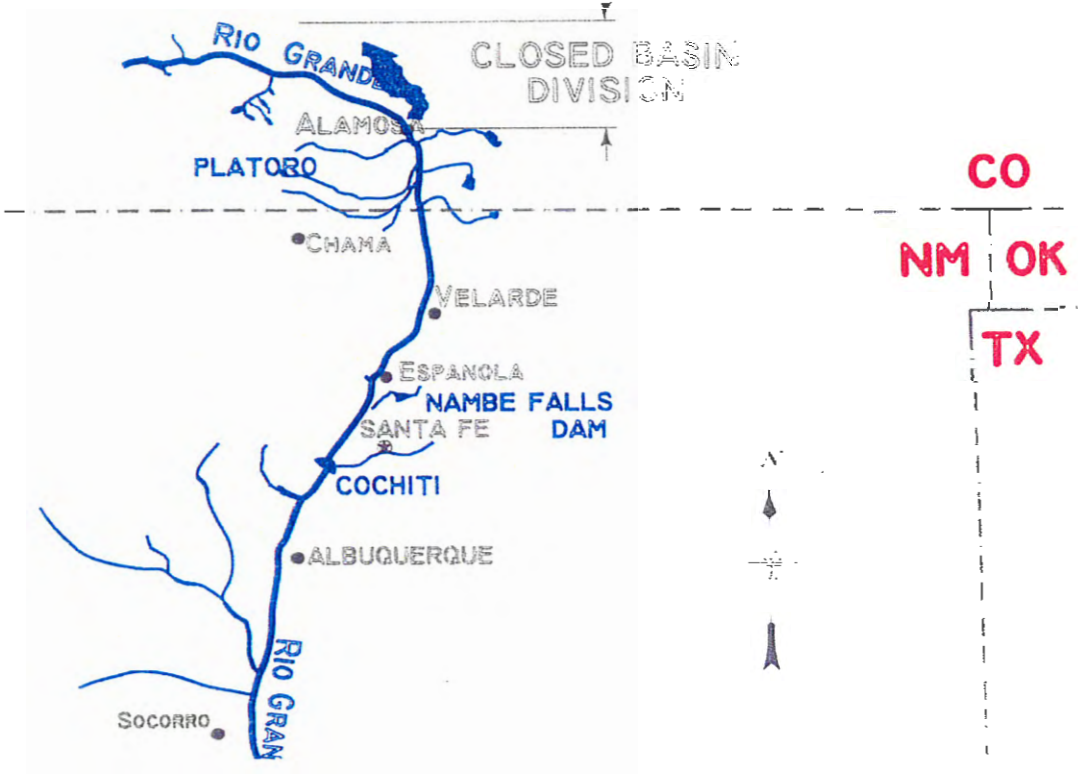


Figure 2: Area Map of San Luis Valley Project

Closed Basin - Operations and Maintenance

Operations

A total of 14,340 af of project water was delivered in Calendar Year (CY) 2004. Total deliveries of Compact water to the Rio Grande for CY2004 equates to 10,845 af.

The Closed Basin water deliveries in CY2004 included deliveries to the Blanca Wildlife Habitat Area, Alamosa National Wildlife Refuge 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 SLL during CY2004 totaled 513 af. No water was pumped from SLL through the SLL Pumping Plant.

Total water deliveries to the Bureau of Land Management Blanca Wildlife Habitat Area for CY2004 equates to 800 af annual mitigation.

Total water deliveries to the Alamosa National Wildlife Refuge for CY2004 equates to 2,695 af annual mitigation.

Closed Basin Division water accounting for the 2004 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. & not used by ANWR	NON-CREDIT-ABLE @ LOBATOS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
JAN	0	0	0	1,386	1,386	0	0	0	0	1,386	1,386	0	1,386
FEB	0	0	0	1,160	1,160	0	0	0	0	1,160	1,160	0	1,160
MAR	54	62	116	935	935	175	71	0	246	689	689	0	1,051
APR	37	31	68	964	964	384	308	0	692	272	272	0	1,032
MAY	0	0	0	1,103	1,103	398	0	0	398	705	705	0	1,103
JUN	0	0	0	1,105	1,105	13	0	0	13	1,092	1,092	0	1,105
JUL	54	170	224	845	845	0	0	0	0	845	845	0	1,069
AUG	83	201	284	515	515	0	8	4	12	503	503	0	799
SEP	41	35	76	1,228	1,228	238	453	78	769	459	459	0	1,304
OCT	0	32	32	1,289	1,289	265	270	30	565	724	724	0	1,321
NOV	0	0	0	1,519	1,519	0	0	0	0	1,519	1,519	0	1,519
DEC	0	0	0	1,491	1,491	0	0	0	0	1,491	1,491	0	1,491
ANNUAL	269	531	800	13,540	13,540	1,473	1,110	112	2,695	10,845	10,845	0	14,340

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% of the wells are at or below 20% of their design capacity. After exhausting chemical treatment with limited success, Reclamation has undertaken a rigorous well re-drill effort.

The Alamosa Field Division has successfully re-drilled 24 salvage wells with the new well design. Production from these wells is ranging from 175 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 (QA/QC) of the observation wells' network data for Reclamation. Reclamation received an excellent rating through the 2004 QA/QC program.

The USGS installed a new monitoring site at the Mosca/Sand dunes drum screen site. The site will monitor water surface and water quality to assist in managing canal flows and quality.

Reclamation began an intensive program in 2002 to identify, resurvey, and verify observation well measuring points throughout the project area. This activity continued through 2004.

The 2003 annual report on vegetation monitoring within the project boundary summarized that an average of 2,421 acres within the project boundary indicated a significant decrease in vegetation from the preproject 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 664 acres within the project boundary indicated significant increase in vegetation from the preproject baseline.

In 2003 the Alamosa Field Division participated in a collaborative effort between the Colorado Division of Wildlife, Colorado Division of Parks and Outdoor Recreation, Reclamation, and the Rio Grande Water Conservation District in the SLL Chemical Reclamation Project. The purpose of this project was to re-establish a sport fishery and improve water quality at SLL.

Due to drought conditions throughout the area, SLL has remained at an average elevation of 7511.70. No Closed Basin water was diverted to SLL in CY2004.

The project has upgraded the Remote Terminal Units (RTU) in 70 wells. The RTU's are the communication devices that control and monitor the equipment at the wells. This is an ongoing project that will continue until all wells have been upgraded.

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.

A total of 8 replacement wells were drilled in 2004, these replacement salvage wells range from 175 gpm to 450 gpm. With the different well screen design and change in the gravel pack style these wells continue to prove that the redrills have been very successful to the project and commitment to the Rio Grande Compact, the Alamosa National Wildlife Refuge, as well as the Blanca Wildlife Habitat Area. A total of 24 salvage wells have been redrilled to date.

Repair and replacement of pumps and motors in the Salvage Wells vaults continue to be an on going process.

Annual preventive maintenance of the salvage wells is being performed. A total of 40 well sites have been completed in 2004.

In 2004 the maintenance group and Rio Grande Water Conservation District pulled four turbine pumps and one screen pump out of the SLL's pumping plant. The number 1 turbine pump and the number 4 turbine pump were completely rebuilt. The number 2 and 3 turbine pumps were cleaned, a new coating was applied to the pipes and new bearings were installed. The screen pump was rebuilt as well. The pumps will be reinstalled in March 2005.

Equipment that has been updated includes: an air compressor, a dump truck, a trailer to haul our heavy equipment, a motor for the drill rig, and a 6" pump.

600 triploid grass carp were introduced into the canal the summer of 2004. This is part of the aquatic vegetation management program.

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 2004. 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 biofouling 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 Ecological Research and Investigations Division to determine acceptable biofouling 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, Alamosa, Colorado, is active. A student worked with the laboratory during the spring 2004 semester, concentrating primarily on microbiological and biofouling issues.

The laboratory has acquired an Inductively Coupled Plasma-Mass Spectrometer. This instrument has the capability to determine most elements at sub-ug/L levels. The instrument has increased the laboratory's capabilities, efficiency and productivity concerning elemental analysis.

Rio Grande Water Conservation District

The Rio Grande Water Conservation District (RGWCD) continues to perform civil maintenance on the project. Canal berms were maintained. Other work included maintenance of lateral access roads, mowing of canal berms and right of ways, 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 RGWCD continues to assist Reclamation in the redrill 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 redrilling activities that are being planned as a multi-year effort aimed at regaining lost project production. This grant has been extended through June 2006.

SAN JUAN-CHAMA PROJECT, COLORADO-NEW MEXICO

Reclamation's Albuquerque Area Office Water Management Division continued to maintain its Internet Web Page for Middle Rio Grande Water Operations during 2004. 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. The 2004 RO&M exam was completed in November 2004; the final report will be completed by March 2005.

Heron Dam and Reservoir Operations

Diversions into the Azotea Tunnel began on March 9, and ended on December 2. The total amount diverted through the tunnel was 84,884 af. The running 10-year average stayed about the same from last year going from 80,721 af to 80,988 af. Heron Reservoir began the year at an elevation of 7122.50 ft, (123,227 af) and finished the year at an elevation of 7118.0 ft (111,005 af). The February 2005 most probable streamflow forecasts for the Blanco and Navajo River Basins are 125% and 119% respectively of the 30 year average. Projected inflow at the current time should be around 132,000 ac-ft. Based on the current forecast for below average runoff this Spring, it is unlikely that Heron Reservoir will fill for the tenth straight year. Reclamation will maximize diversions as water becomes available in 2005.

The SJ-C contractors 2004 and waived 2003 annual allocations were delivered as shown in Table 4, for a total delivery in 2004 of 88,339 af. The remaining 2004 allocation is being held in Heron according to waivers which grant an extension for the delivery date for several contractors from December 31, 2004 to April 30, 2005.

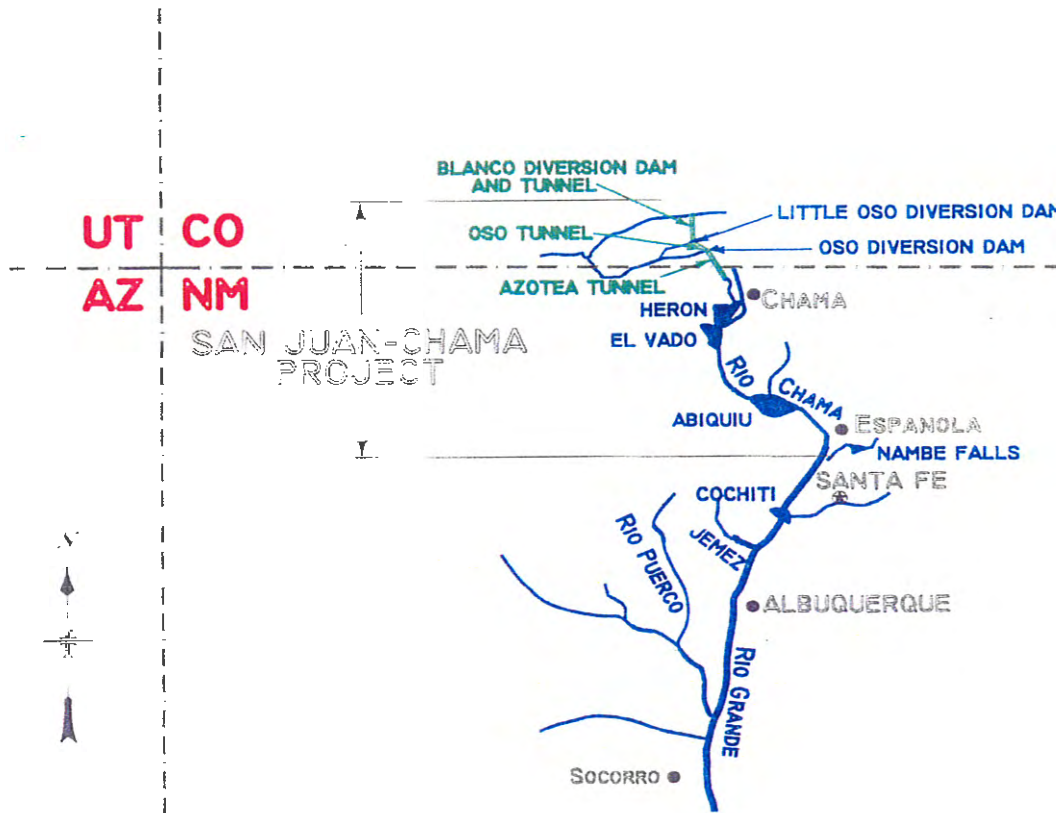


Figure 3: Area Map of the San Juan-Chama Project

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

(UNIT = ACRE-FEET)

Azotea											
MONTH	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	10 YEAR TOTAL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
JANUARY	0	0	349	0	0	0	0	0	0	0	349
FEBRUARY	0	0	76	0	0	0	0	0	0	0	76
MARCH	0	1,400	9,299	2,329	4,152	536	1,512	743	1,170	11,505	32,646
APRIL	10,010	16,370	13,890	11,516	12,516	15,864	19,284	4,499	11,366	15,427	130,742
MAY	36,090	30,760	43,720	41,822	32,806	20,987	51,092	865	26,613	30,164	314,919
JUNE	37,200	5,820	48,442	28,598	39,659	5,019	29,283	204	18,816	20,390	233,431
JULY	1,900	2,620	11,634	8,846	12,734	106	4,643	0	669	2,139	45,291
AUGUST	1,050	70	9,108	1,668	13,019	229	4,455	0	487	237	30,323
SEPTEMBER	0	210	3,406	153	4,015	0	313	0	3,340	1,973	13,410
OCTOBER	0	270	2,350	200	0	0	0	0	246	1,821	4,887
NOVEMBER	0	980	0	1,188	0	0	0	0	0	1,216	3,384
DECEMBER	0	30	0	381	0	0	0	0	0	12	423
ANNUAL	86,250	58,530	142,274	96,701	118,901	42,741	110,582	6,311	62,707	84,884	809,881

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

SJ-C Heron Rel	MARGCD	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
	20,900		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	10,676	0	1,150	0	0	0	0	0	0	0	233	0	0	0	0	0	12,059
FEBRUARY	5,359	0	2,193	6,058	0	0	0	0	0	0	0	0	0	0	0	0	13,610
MARCH	353	0	1,071	12,928	0	0	0	0	0	0	0	0	0	0	0	0	14,352
APRIL	2,838	0	583	20,870	0	0	0	0	0	0	0	206	0	0	0	0	24,497
MAY	1,675	0	0	8,344	0	0	0	0	0	0	0	194	0	0	0	381	10,594
JUNE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
JULY	0	787	0	0	0	0	0	0	0	0	0	0	0	0	0	2,226	3,013
AUGUST	0	506	0	0	0	0	0	0	0	0	50	50	0	535	0	383	1,524
SEPTEMBER	0	0	0	0	0	0	0	0	0	0	0	0	0	4,760	0	0	4,760
OCTOBER	0	0	0	0	0	0	0	0	0	0	0	0	0	1,025	0	0	1,025
NOVEMBER	0	1,264	183	0	0	1	0	0	1	134	117	50	0	0	0	0	1,567
DECEMBER	0	414	85	0	929	0	0	0	0	0	0	0	0	0	0	0	1,343
2003 CY Total	20,900	2,971	4,997	48,200	929	1	0	0	1	134	400	500	0	6,320	0	2,990	88,344

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

Heron Storage MONTH	INFLOW		OUTFLOW		SAN JUAN CHAMA LOSS (5)	END-OF-MONTH CONTENT			ELEVATION (FEET) (9)
	RIO GRANDE	SAN JUAN CHAMA	RIO GRANDE	SAN JUAN CHAMA		RIO GRANDE	SAN JUAN CHAMA	TOTAL	
	(1)	(2)	(3)	(4)		(6)	(7)	(8)	
DEC. 2003						0	122,873	123,227	7,122.50
JANUARY	74	0	73	12,059	-320	1	111,134	111,135	7,118.05
FEBRUARY	446	0	447	13,610	0	0	97,524	97,524	7,112.54
MARCH	3,458	11,482	3,459	14,352	210	-1	94,444	94,443	7,111.20
APRIL	941	15,396	941	24,497	422	-1	84,921	84,920	7,106.79
MAY	59	30,104	59	10,594	1,702	-1	102,729	102,728	7,114.72
JUNE	622	20,349	70	0	1,696	551	121,382	121,933	7,122.04
JULY	834	2,139	1,396	3,013	1,150	-11	119,358	119,347	7,121.11
AUGUST	74	237	74	1,524	1,284	-11	116,787	116,776	7,120.17
SEPTEMBER	70	1,973	70	4,760	1,254	-11	112,746	112,735	7,118.66
OCTOBER	71	1,821	71	1,025	373	-11	113,169	113,158	7,118.82
NOVEMBER	69	1,216	69	1,567	414	-11	112,404	112,393	7,118.53
DECEMBER	71	12	71	1,343	57	-11	111,016	111,005	7,118.00
SUB-TOTAL	6,789	84,729	6,800	88,344					
ADJUST.						-350 (A)			
ANNUAL		91,518		95,144	8,242	-361	111,366	111,005	

Heron Dam Facility Review and Safety of Dams Programs

The 2004 Periodic Facility Review exam and report were completed. The Standing Operating Procedures was revised in early 2004.

The following work was completed for Heron Dam during 2004:

- Classroom Dam Tenders Training
- Facility Reliability Rating was completed in 2004
- Construction Drawings were scanned and incorporated into an electronic database
- Annual Emergency Action Plan Review, Drill, and Communication Directory Update
- Completed the Embankment Measurement Point Survey
- Completed the last Internal Vertical Movement survey, until further notice from Denver
- Completed the 2004 Land Slide Survey
- Completed as-built drawing for the 1999 toe drain fix
- A new Dam Operator was hired in August 2004

Pojoaque Tributary Unit - Nambé Falls Dam and Reservoir

Nambe Falls began 2004 with the reservoir at elevation 6,786.58 ft providing a storage volume of 487 af. During the winter releases, averaged around 1 ft³/s to maximize conservation storage as agreed to by the Pojoaque Valley Irrigation District and Indian

water users. The reservoir did not fill in 2004. The maximum elevation for the year was 6,822.98 ft. (1,818 af) on May 30. The reservoir began falling after that date as irrigation releases were made. The reservoir began the year at the lowest point of the year at an elevation of 6,786.58 ft (487 af). Nambe Falls Reservoir ended 2004 at elevation 6,801.87 ft (876 af). Cyclical operations of Nambe 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 ft³/s 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 6826.6 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 1,346 af was calculated for Nambe Falls operations for the entire year. The depletion amount was released from Heron and Abiquiu reservoirs during December 2004.

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 ABIQUIU	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	12,059	0	1,890	13,949	-12,271	169	74	27	1,462
FEBRUARY	13,610	1,003	0	12,607	-11,183	151	129	25	1,169
MARCH	14,352	353	0	13,999	-12,191	170	269	24	1,393
APRIL	24,497	2,838	0	21,659	-20,294	251	705	22	431
MAY	10,594	1,675	0	8,919	-9,595	92	236	18	-986
JUNE	0	0	1,587	1,587	3,361	62	3	22	4,905
JULY	3,013	0	1,713	4,726	-3,487	63	-1	90	1,267
AUGUST	1,524	0	926	2,450	2,210	39	0	87	4,678
SEPTEMBER	4,760	0	0	4,760	10,585	190	-1	33	15,189
OCTOBER	1,025	0	0	1,025	-370	17	1	29	666
NOVEMBER	1,567	0	0	1,567	280	34	143	28	1,698
DECEMBER	1,343	0	0	1,343	2,288	47	194	23	3,413
ANNUAL	88,344	5,869	6,116	88,591	-50,667	1,315	1,752	428	35,285

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

(UNIT = ACRE-FEET)

NF Monthly MONTH	INFLOW	OUTFLOW		RESER. LOSSES	TOTAL OUTFLOW + LOSSES	END OF MONTH		
		BY PASSED	STORAGE RELEASE			CONTENT	ELEVATION	
			OPER					IRRIG
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
DEC. 2002						487	6,786.58	
JANUARY	142	68	0	0	0	68	6,789.84	
FEBRUARY	195	66	0	0	1	67	6,794.84	
MARCH	341	72	0	0	7	79	6,803.43	
APRIL	771	66	0	0	8	74	6,819.73	
MAY	1,381	1,141	0	51	22	1,214	6,822.93	
JUNE	783	763	0	647	19	1,429	6,809.22	
JULY	289	291	0	576	-1	866	6,791.07	
AUGUST	414	418	0	17	-4	431	6,790.39	
SEPTEMBER	270	273	0	16	-2	287	6,789.73	
OCTOBER	279	279	0	16	-1	294	6,789.05	
NOVEMBER	255	112	0	1	3	116	6,794.59	
DECEMBER	225	31	0	0	0	31	6,801.17	
ANNUAL	5,345	3,580	0	1,324	52	4,956	6,801.17	

Nambé Falls Dam Facility Review and Safety of Dams Programs

During 2004, Nambé Falls Dam had the following activities implemented or completed:

- The stairways located on the north abutment leading to the survey collimation points used for monitoring dam statistics were refurbished. The Pojoaque Valley Irrigation District is hoping to extend the life-usage of stairways for implementing a budget plan and/or other alternatives.
- Instrumentation drawings for the dam are being updated and are scheduled for completion by the end of 2005.
- Scribe Marks for assisting in monitoring dam movement have also been implemented. Scribe Marks should be completed in 2005.
- In May of 2004, a Periodic Facility Review was conducted by the Pojoaque Valley Irrigation District, Albuquerque Area Office and the Regional Office staff.
- Another item implemented, was the testing of the back-up internal generator. It was discovered that the generator had not been working properly for sometime and was in need of repairs. The generator was tuned-up and lines and valves that were leaking have been replaced. It is also recommended that the propane tank be replaced depending on the life expectancy.
- The Molina Fire Burn continues to raise some concern regarding hydrological inflows. During the summer of 2004, Reclamation implemented a sediment survey to determine water storage impact if any. It was discovered the amount of sediment was on target for the life expectancy of the dam.
- The Pojoaque Valley Irrigation District hired a new dam tender who underwent some extensive hands on training provided by the Technical Service Center out of Denver, Colorado. The following training was provided:

- Internal and external instrumentation measuring/location
 - Mechanical (gate operations and maintenance)
 - Flow measurements upstream and downstream and gage interpretation
- The Pojoaque Valley Irrigation District is planning on sending the new dam tender to the dam training workshop in 2005.

M&I Water Use - National Environmental Policy Act Compliance

Reclamation served as the lead federal agency for the City of Albuquerque's Drinking Water Supply Project EIS which addressed 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 was completed March 5, 2004. A draft Biological Opinion was received from the U.S. Fish and Wildlife Service regarding potential impacts to endangered species. The Record of Decision was signed June 1, 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 the Bureau of Land Management on an EIS to address effects of the proposed Buckman Water Diversion Project. Reclamation is serving as a cooperating agency on the Buckman EIS. Currently a Draft EIS was advertised for public comment. The public comment period ended on February 15, 2005. Comments were received and as a result, are being reviewed and responses are being prepared.

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 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. The EA for this project is on hold pending a decision by the City and the Corps of Engineers regarding the point of diversion and subsequent engineering of the structure for the diversion and EA.

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 the Middle Rio Grande Conservancy District (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 and 2004. 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. Texas accepted the additional final relinquishment of 53,000 af on March 1, 2004, for a total relinquishment of 175,500 af.

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, and prorated for the final relinquishment of 175,500 af, a maximum of 169,448 af of Emergency Drought Water could be captured and stored by the United States. The City of Santa Fe was provided 6,052 af of Emergency Credit Water to be captured and stored within their post 1929 reservoir storage. The 169,448 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 Conservancy District.

A total of 87,010 af of Emergency Drought Water was captured by Reclamation under the EDWA for 2003, and a total of 57,873 af was captured for 2004. The balance of Emergency Drought Water available for capture and storage by Reclamation during 2005 is 24,565 af.

Reclamation had 17,048 af of Emergency Drought Water stored in El Vado Reservoir for use on behalf of listed endangered species as of December 31, 2004. MRGCD had 3,170 af of Emergency Drought Water in El Vado Storage on the same date.

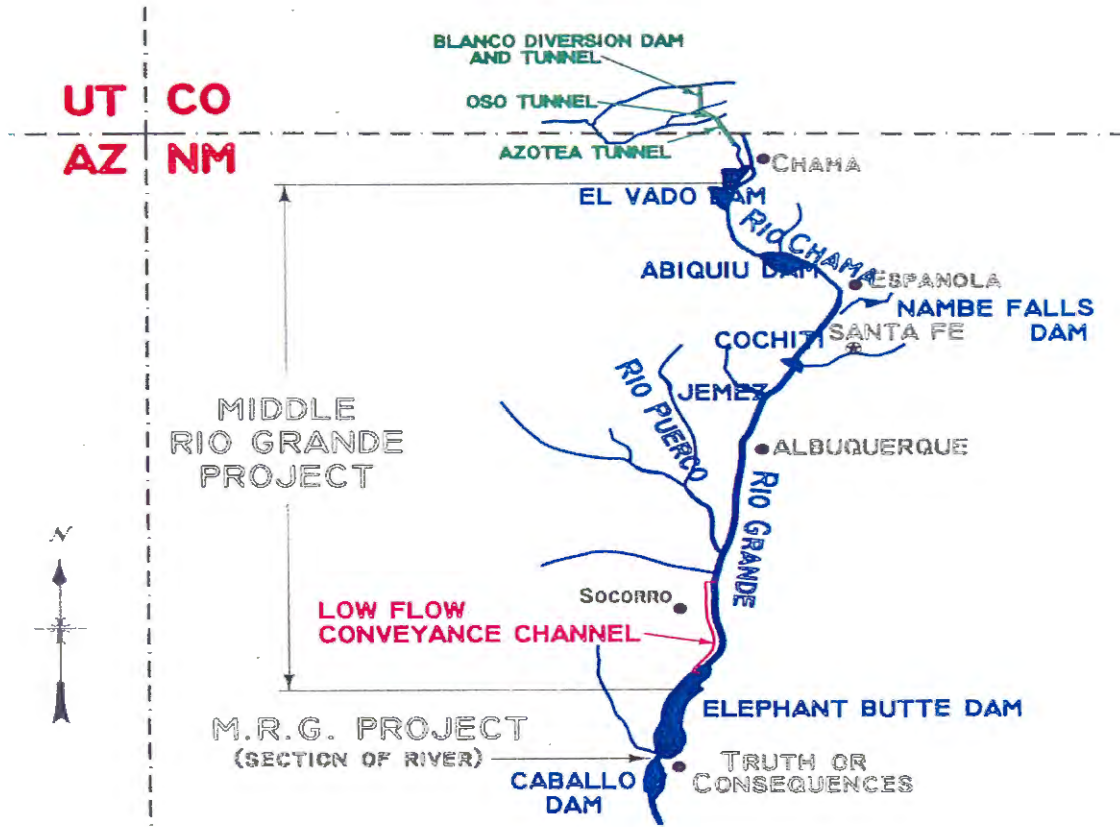


Figure 4: Area Map of the Middle Rio Grande Project

El Vado Dam and Reservoir Operations

A total of 57,873 af of Emergency Drought Water was captured during the 2004 calendar year. El Vado's total storage peaked at 118,786 af on May 11, which was comprised of 20,000 af of native Rio Grande water for the senior water rights of the Six Middle Rio Grande Pueblos, 82,109 af of Emergency Drought Water, and 9,828 af of stored SJ-C water. MRGCD was allocated 46,667 af of the stored El Vado Emergency Drought water, and Reclamation received 20,000 af to use on behalf of listed endangered species.

MRGCD began the year with no native Rio Grande water in storage for meeting their irrigation demand during 2004. MRGCD used 15,000 af of their 2004 Heron SJ-C allocation to repay the City of Albuquerque for water borrowed in 2003. The remaining 5,900 af was moved. Approximately 2,548 af of MRGCD's 2004 SJ-C allocation is being carried over to 2005 in El Vado.

Releases for the senior water rights of the Six Middle Rio Grande Pueblos started on July 5 and ended on September 4. Indian irrigators continued to receive water into November through direct diversion of natural Rio Grande flows at Cochiti, Angostura, and Isleta Diversion Dams, at total of 7,668 af was released. The 9,832 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 26 and December 23.

Reclamation released a total of 16,675 af of Emergency Drought Water from El Vado during 2004 on behalf of listed endangered species. Reclamation had 17,046 af of El Vado Emergency Drought Water remaining in El Vado Reservoir on December 31 which is being carried over for use in 2005.

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. 2003	2,325	4,301	5,540	6,317	59	5	24,373	5,893	30,266
JANUARY	3,020	12,059	0	13,949	61	-5	27,332	4,008	31,340
FEBRUARY	3,869	13,610	0	12,606	0	1	31,201	5,011	36,212
MARCH	26,041	14,352	0	13,998	81	8	57,161	5,357	62,518
APRIL	41,526	24,497	4,707	21,659	344	18	93,636	8,177	101,813
MAY	68,068	10,594	59,426	8,919	790	89	101,488	9,763	111,251
JUNE	469	0	8,663	1,588	669	139	92,625	8,036	100,661
JULY	-23,799	3,013	2,315	4,726	385	773	66,126	5,550	71,676
AUGUST	-21,035	1,524	1,162	2,450	228	502	43,701	4,122	47,823
SEPTEMBER	-9,769	4,760	1,824	4,760	99	-1,233	32,009	5,355	37,364
OCTOBER	5,076	1,025	5,182	1,025	124	7	31,779	5,348	37,127
NOVEMBER	4,055	1,567	4,524	1,567	107	9	31,153	5,339	36,492
DECEMBER	-8,393	1,343	2,095	1,343	86	95	20,579	5,244	25,823
ANNUAL	89,078	88,344	89,898	88,590	2,974	403			

El Vado Dam Facility Review and Safety of Dams Programs

The 2004 Periodic Facility Review exam and report was completed for El Vado Dam. The El Vado Dam Standing Operating Procedures was revised in early 2004.

During 2004 the following work was completed for El Vado Dam:

- Classroom Dam Tenders Training
- Facility Reliability Rating was completed in 2004
- Annual Emergency Action Plan Review, Drill, and Communication Directory Update
- Construction Drawings were scanned and incorporated into an electronic database
- The landslide and parapet point surveys were completed in July 2004
- Ultra Sonic Survey of the faceplate and spillway was completed in June
- Training on the Cathodic Protection System
- A new Dam Operator was hired in August 2004
- Work was started on Safety of Dams recommendations
- A dive exam of the steel faceplate was completed
- The 2004 Region landslide survey was completed in July
- 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 U.S. Corps of Engineers facility. Public Law 97-140 authorized storage of up to 200,000 af of SJ-C water in Abiquiu Reservoir. Adjustments for sediment reduced the sum of the available storage allocations to 182,928 af in 2004. The amount of SJ-C water in storage peaked on May 13 at 134,932 af and ended the year at 110,277 af. The year finished with a net gain of native Rio Grande water which was attributed to making a release of SJ-C after-the-fact for Nambe Falls' depletions. Due to this accounting, a like amount of Rio Grande water ended up being stored. This water was released in 2005. Table 8 provides a summary of monthly operations and water accounting for Abiquiu Reservoir.

Table 8: Reservoir Operation for Abiquiu Dam

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. 2003	0	6,206	5,742	1,722	0	-147	954	7	71,976	72,934
JANUARY	2,090	13,436	1,189	1,165	1	166	955	-75	84,078	84,958
FEBRUARY	1,687	12,743	1,619	1,560	0	326	957	-6	94,935	95,886
MARCH	3,635	13,840	3,716	1,649	-1	728	961	-88	106,398	107,271
APRIL	12,571	21,097	12,916	803	5	504	980	-428	126,188	126,740
MAY	61,558	9,595	60,772	0	27	2,291	1,081	384	133,492	134,957
JUNE	17,248	1,570	17,622	4,931	4	2,287	1,087	13	127,844	128,944
JULY	28,741	3,895	28,583	408	1	1,870	1,106	175	129,461	130,742
AUGUST	23,361	3,045	23,521	5,255	-5	1,739	1,118	8	125,512	126,638
SEPTEMBER	12,602	4,708	12,611	15,293	-2	1,254	1,123	-3	113,673	114,793
OCTOBER	4,984	1,171	5,215	801	0	718	1,123	-233	113,325	114,215
NOVEMBER	4,981	1,315	4,751	1,595	0	271	1,123	-3	112,774	113,894
DECEMBER	13,560	1,505	12,727	3,793	0	209	1,126	831	110,277	112,234
ANNUAL	187,018	87,920	185,242	37,253	30	12,363				

RG REFERS TO RIO GRANDE WATER.

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

The Albuquerque Area Office's Facilities and Lands Division has initiated a letter to the District for funding upcoming Review Operations and Maintenance examination scheduled for winter of 2005.

Cooperative Programs with the State of New Mexico

Water Salvage work for the Middle Rio Grande Project

Reclamation cooperates with the New Mexico Interstate Stream Commission (NMISC) on water salvage, drain improvement, and river maintenance activities. During 2004,

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 were provided to NMISC. An annual report was provided as well.

Given the low reservoir levels in Elephant Butte Reservoir and relatively low river flows for the year, it was important to focus attention on the temporary channel work. As a result, no water salvage drain maintenance work was performed in 2004.

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".

Elephant Butte and Caballo Reservoir Vegetation Management Cooperative Agreement

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 2004, 5,110 acres of woody phreatophytes were mowed at both reservoirs. The herbicide Arsenal was applied to 918 acres of saltcedar (318 acres at Elephant Butte via helicopter and 600 acres at Caballo via ground rig). In addition Reclamation has obtained funding under DOI Science and Technology Invasive Species Initiative to integrate studies of saltcedar control methods, pesticide monitoring and Evapotranspiration measurements.

Temporary Channel into Elephant Butte 2000

River disconnection has been an issue at the headwaters of Elephant Butte since the early 1950's. The contributing factors for the occurrence of disconnection are many: the valley slope is very slight, the incoming sediment load is high, the clay deposits are highly cohesive, and vegetation growth is extremely aggressive. During dry climactic periods when the reservoir pool decreases rapidly, all of these factors make it difficult for the river channel to cut its own channel thereby maintaining a connection with the reservoir pool.

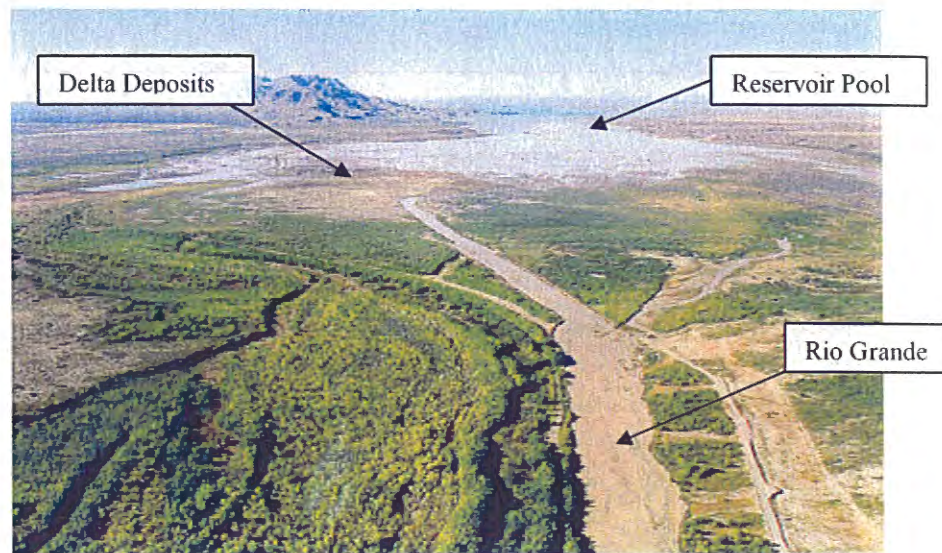


Photo 1: Photograph showing the Rio Grande's inability to maintain a channel through data (1998)

The Temporary Channel 2000 is approximately 7 miles in length, ending at Nogal Canyon and having an average width of 250 feet and depth of 2 feet. The excavated material is being placed on either side of the constructed channel to form 3 ft high berms. In the fall of 2003, a 404 permit modification allowed Reclamation 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. The modification also included the substitution of the sediment detention pond, north of Black Mesa, with several peninsulas for instream habitat. By August, the entire channel had been constructed to the design width. All of the environmental features with the exception of the groundwater pond had been constructed. Since August, maintenance work has been done on the Temporary Channel 2000 project, as the river continues to deposit sediments in the channel.

During 2004, a headcut developed upstream of the Temporary Channel. The headcut originated in the vicinity of EB 31 and progressed upstream. The headcut varied in height during the course of monitoring and at times reached heights of 3 to 4 feet. As of late October, the headcut had disappeared. The following photograph shows the headcut in early September.

Reclamation began utilizing three new Caterpillar 330 excavators with amphibious-pontoon undercarriages in the spring of 2004. The excavators each have 60 ft long reach booms and 1.2 cubic yard bucket capacities. Reclamation also began the use of a new low ground pressure dozer for use in the drier reaches. This new equipment as well as the use of two airboats has immensely improved Reclamation's productivity on the Temporary Channel maintenance. Continued maintenance for 2005 will be largely dependent upon funding received via the Cooperative Program with the State of New Mexico. Increased channel maintenance needs for this reach are anticipated after spring runoff 2005.



Photo 2: Temporary Channel 2000 headcutting (2004)

Elephant Butte Temporary Channel 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 and maintenance of an 11-mile channel from Nogal Canyon through the Narrows. This project provides effective conveyance of water and sediment 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 was completed between Nogal Canyon and the downstream end of the Narrows in late 2003. Work in 2004 consisted primarily of increasing conveyance capacity, improving the stability of berms in the area upstream of the Narrows, and removing sediment that had accumulated in the channel during spring runoff. Figure 1 shows channel excavation. Sediment deposition during spring runoff 2005 and future years will likely result in the need for maintenance to achieve adequate channel functionality.



Photo 3: Temporary Channel 2002 excavation.

Elephant Butte Temporary Channel 2004

The Temporary Channel 2004 extends from the downstream end of the Temporary Channel 2002 (at the downstream end of the Narrows) to Elephant Butte Dam. The project provides effective conveyance to the reservoir pool. Until recently, this area has been underwater, so the river channel in the newly exposed area is in its formative stages. Consequently, the channel alignment is not known with certainty in some areas and may be subject to significant variability, owing to natural movement. Construction activities will begin in 2005 and consist of channel maintenance activities to accomplish the following:

- *Removal of Flow Obstructions:* Impediments to flow will be removed from the channel. Work will consist primarily of straightening sharp curves and excavating debris, which could include cottonwood or saltcedar snags. Some narrow sections of the channel may be widened.
- *Pilot Channel Excavation:* In areas where a continuous channel has not formed naturally, a pilot channel will be constructed.
- *Pond Reconnection:* Small channels will be constructed to reconnect isolated side pools or secondary side channels to the main channel.

The level of work performed for these activities will also be largely dependent upon funding received via the Cooperative Program with the State of New Mexico.

River Maintenance

River Maintenance Priority Sites

The Middle Rio Grande Project's river maintenance program currently has efforts to aggressively address river problems related to 27 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. These efforts include contract administration, data collection, geomorphic and sediment investigations, design studies, alternative evaluation, design and development of construction drawings, material supply and development, lands and environmental compliance, project and construction management, and construction maintenance. 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, for delivery to the Republic of Mexico and for generating electric power.

La Canova

The La Canova Acequia is in close proximity, roughly 30 ft, to the river's edge at the La Canova site. The outside of the bend at the site is along the same river bank as the acequia. The photograph below illustrates the conditions at the La Canova site.



Photo 4: Looking upstream at the La Canova site, the acequia is at the far left and middle of the photograph. (2004)

Engineering analysis was conducted and completed during the summer of 2004. Alternatives evaluated included riprap or gabion baskets for toe protection and geocell lift system, fabric encapsulated soil lift system, hard retaining wall structure, soil stabilizers, or BioD blocks for the upper bank where there are soil stability issues. The final project alternative involves 1000 cubic yards of riprap toe protection with the use of approximately 2500 linear feet of BioD blocks in a series of lifts. Native vegetation will also be planted along the area to be constructed. Construction maintenance began in January 2005 and should be completed in March.

Salazar Pit

Reclamation mined rock in the Salazar Pit from the mid-1980s to the mid-1990s utilizing the material for riprap in river maintenance projects. While the arroyo that passes through the Salazar Pit has always deposited material at the base of the pit, the quantity and median size seems to have increased since Reclamation's mining operations. The deposition is problematic as the deposition zone includes a county road leading to a number area residences and the driveway of the landowner.

Significant changes in the arroyo have been observed since regular monitoring of the site began in 1998. In recent years the arroyo had deepened and widened as is evident in the photograph below.



Photo 5: Upstream end of the Salazar Pit looking in the downstream direction along the arroyo. (1999)

Alternatives evaluated include re-vegetation, installation of a culvert under the county road, riprap lining the channel, sediment detention ponds, and installation of weirs as check structures. The preferred alternative has been identified and involves installation of four gabion basket weirs, three areas of channel widening, and a small sediment detention pond on the east side of the county road. This project involves placement of approximately 6600 cubic yards of riprap material as well as about 10,000 cubic yards of excavation earthwork. The 404 permit was recently granted under a Nationwide permit and the necessary NPDES documents are currently being prepared. Construction will start in March 2005 with completion in the early summer.

Santa Fe River Confluence

Design and construction of a river maintenance project to address a priority site on the Pueblo of Cochiti were completed in 2004. The project site is located on the east side of the Rio Grande at the confluence with the Santa Fe River. A short portion of the levee was moved away from the river and armored with riprap to reduce the possibility of levee erosion during high flow conditions. The project required movement of approximately 7,000 cubic yards of earth material and placement of approximately 800 cubic yards of riprap. Additionally, the area between the levee and the river was planted with native vegetation to stabilize the soil and increase erosion resistance.



Photo 6: Construction at the Santa Fe River confluence.

Bernalillo Area Priority Sites

The Bernalillo Area priority sites consist of two river maintenance sites: the Bernalillo and Sandia priority sites, located approximately 0.5 and 1.5 miles, respectively, downstream of the U.S. Highway 550 Bridge (see figure below). 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. Reclamation provided short-term bankline erosion protection at both sites in 2003.

Reclamation plans to implement maintenance activities to address long term needs at the Bernalillo Area priority sites. Cross-section surveys of the Rio Grande in this reach were completed in 2004. Alternative analysis for both priority sites is nearing completion. Preferred alternatives for both sites will be selected in early 2005, and designs will subsequently be developed.

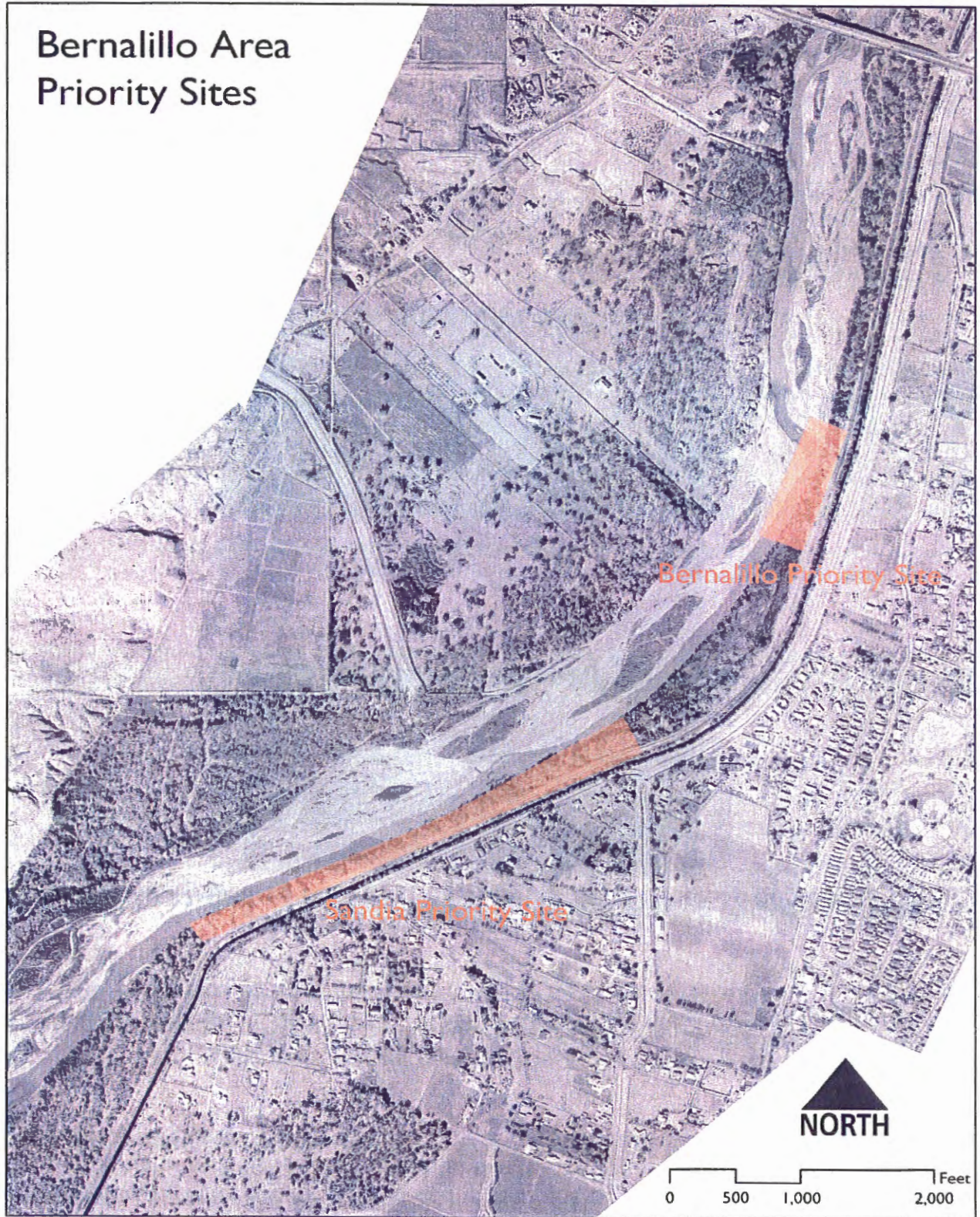


Figure 5: Bernalillo and Sandia priority sites

San Acacia to Escondida Reach Priority Sites

Reclamation is currently pursuing 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 Socorro, New Mexico. At the three locations, channel incision, lateral channel migration, and bank erosion threaten the integrity of the levee system. Reclamation will start maintenance construction at two locations, River Mile 114 and 113, pending environmental approvals. The preferred alternative for the project involves moving the levee and LFCC to the west away from the river. Work is expected to continue through the end of 2005. The figure below shows the reach of the Rio Grande at River Mile 114 and 113.



Photo 7: Looking downstream at RM 114 and 113 Levee Setback Project. Levee and LFCC will be moved to the west (right).

At the third priority site, River Mile 111, Reclamation is currently completing its alternative analysis and value engineering study for the project. Completion of design and environmental compliance work is planned for the fall of 2005.

Arroyo de la Parida

The arroyo has created and continues to create a fan into the Rio Grande. The direction of flow from the arroyo into the Rio Grande is perpendicular causing flows to move directly into the right bankline. The potential impacts at the Arroyo de la Parida site are the loss of an outfall structure. However, during the engineering analysis, it was determined that the structure no longer served a purpose. Therefore, the determination was made to remove the structure. The decision to not relocate the structure was made after careful consideration of elevations, the history of the structure, and the potential for future use.

The 404 permit was applied for under a nation-wide permit and a short biological assessment was completed referencing the Programmatic Biological Opinion. Work to remove the structure is anticipated to begin in February 2005, upon receipt of the necessary permits.

Bosque del Apache (BDA), Tiffany and San Marcial Levee Raising (2004)

This system of levees has been historically losing flood capacity due to an aggradational trend in the riverbed. Continual maintenance through levee raising is often required to maintain adequate conveyance capacity. The capacity analysis done in 2004 focused only on the BDA and Tiffany levees with the San Marcial levee set at a lower priority due to a future possibility of a levee realignment in this area. The model results yielded minimal change in channel capacity due to factors such as the drought, a very low reservoir pool elevation, and the downstream temporary channel. The capacity under the San Marcial Railroad Bridge was also checked and found to be approximately 3700 cfs. This same analysis is scheduled for 2005 with new cross sectional and profile survey data.

Red Canyon Mine Riprap Development

Rock which was previously processed (16-inch nominal) was hauled to a stockpile site at U.S. Highway 380. Rock pad material was also hauled to stockpile sites at San Acacia, Polvadera, and U.S. Highway 380 to increase the stockpile areas. Nominal 6-inch rock is currently being processed at the Red Canyon Mine.

Low Flow Conveyance Channel (LFCC) 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 U.S. Fish and Wildlife Service (USFWS) has issued a Biological Opinion to cover experimental operations from 2003 through 2007. Reclamation collected one data set during spring 2004; plans for additional data collection were cancelled because of concerns raised by the USFWS about silvery minnow egg entrainment. Operations during spring 2005 and beyond are dependent on water availability during spring runoff, and upcoming modifications to the LFCC as part of the River Mile 114 and 113 project.

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. Additional floodplain grading and native vegetation planting was completed

during 2004. Remaining activities consist primarily of management of sediment that was stockpiled during earlier phases of the project. The project design requires average or higher spring runoff flows to develop features to their final configurations. Therefore, the duration of ongoing activities is dependent on hydrologic conditions.

Truth or Consequences

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. Owing to the interaction between the river and the hot spring aquifer, the increased stage within the river floodway increases water temperatures and the flow of water at hot spring sites.

Sediment excavation at arroyo mouths and temporary dike installation occurred during late 2004; approximately 12,000 cubic yards of sediment were removed. A bank stabilization project using bendway weirs was constructed in the Williamsburg Bend area in January 2004 (Photo 8); about 660 cubic yards of riprap were used to construct the weirs.



Photo 8: Bendway weirs installed near Williamsburg Bend.

River Maintenance Priority Site Evaluation and Risk Analysis

Reclamation is currently pursuing procedural evaluations for continued assessment of Middle Rio Grande Levee Priority Sites. These assessments ensure that the maximum benefit is achieved by the overall Middle Rio Grande river maintenance program. They also provide various management options to perform a systematic evaluation for prioritizing priority sites.

Reclamation's River Analysis staff developed a Priority Site evaluation report to support identification, prioritization of maintenance work, and continued monitoring of the river channel and priority sites. This report and assessment methodology assists Reclamation in establishing priorities for the current 27 priority sites and any future sites that may develop.

Also considered was a risk analysis (RA) method that used event trees to model probabilities of failure for river maintenance sites. Quantitative failure probability estimates multiplied by estimated potential damages resulted in annualized risk estimates for each site. The statistical methodology in the RA method incorporates a Monte Carlo simulation that accommodates ranges of uncertainty in failure probability and damage estimates.

Reclamation is in the process of combining both methods into a procedural review process for identifying, prioritizing, and providing a more formal structure for making river maintenance work priority decisions.

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 need to perform habitat restoration in the Belen Reach of the Rio Grande was outlined in the 2001 Biological Opinion (2001 BiOp) issued by USFWS on June 29, 2001. Habitat restoration at the Los Lunas project site was intended to improve habitat for the Rio Grande silvery minnow and the southwestern willow flycatcher.

Major construction was completed by December 2002 and other minor construction, re-vegetation, monitoring, and other activities were carried out in 2003. Additional monitoring and re-vegetation continued in 2004.

Egg collection and electrofishing were conducted in 2004 by Reclamation scientists and their contractors. No Rio Grande silvery minnows were collected during electrofishing in February. Artificial minnow egg experiments were conducted in May to continue research in characterizing suitable minnow habitat. The report on this research contains recommendations for future habitat improvements. Seining was done in June and no silvery minnow eggs were collected but more than 250 post-hatch larvae were collected (Magaña, personal communication, 2004).

Cross-section surveys were conducted on 14 rangelines in January to monitor the river channel through the reach upstream and downstream of the project. Funding was awarded for cross-section surveys of eight rangelines and a topographic survey to be completed in late 2004 and this will likely occur in February 2005.

Previously installed groundwater monitoring wells were monitored in 2004 and surveys of breeding bird protocol (Bbird) transects and bird point count surveys were done.

Approximately 1,400 woody vegetation poles and tall pots including New Mexico olive, sumac, and wolfberry were planted in the fall of 2004. Planting is ongoing and includes approximately 1,000 black willows and additional cottonwood plants. The constructed berm was seeded with dry season grasses in the summer of 2004.

References:

Porter, M.D. and T.M. Massong 2004. Progress Report on Rio Grande Silvery Minnow Egg Habitat Study - FY 2004. U.S. Bureau of Reclamation Science and Technology Program Progress report. 18 pp.

Porter, M.D., G. Dean, and T.M. Massong 2004. ANNUAL REPORT-2004, RIO GRANDE FISH COMMUNITY SURVEYS, October 2004. 12 pp.

Rio Grande and Low Flow Conveyance Channel (LFCC) 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.

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 operations 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. In 2004, the joint lead agencies decided that the operation of the LFCC would be addressed as part of the Upper Rio Grande Basin Water Operations Review (URGWOPS) and Environmental Impact Statement (EIS). Pending completion of the UGWOPS EIS, Section 7 consultation and completion of the Draft EIS on the LFCC and Rio Grande Realignment would resume.

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. Brushing/clearing has been performed on approximately 80% of the alignment which is not under water. A task order to ground survey the cleared alignment to obtain topography in the area will be issued in the near future.

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.

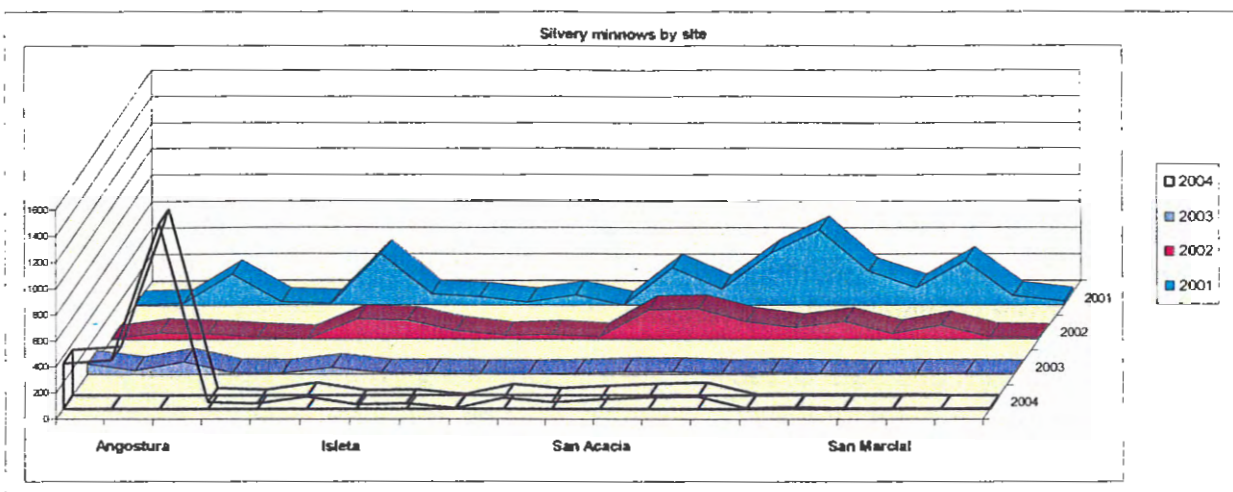
Endangered Species

Rio Grande Silvery Minnow

The silvery minnow was formerly one of the most widespread and abundant species in the Rio Grande basin of New Mexico, Texas, and Mexico, but is now endangered (Fish and Wildlife Service, 1994). 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 Cochiti Dam to the headwaters of Elephant Butte Reservoir.

Reclamation remains in compliance with the 2003 BiOp. During the 2004 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 LFCC maintained flow in the river channel south of the refuge. Below average precipitation shortened the irrigation season. Native flow reconnected the river following the end of irrigation season, and all LFCC pumping ceased on November 2, 2004, for the year.

Figure 6: Rio Grande Silvery Minnow Abundance



Silvery minnow populations rebounded in 2004 in the Albuquerque reach as indicated by catch per unit effort (CPUE) in monthly monitoring. The increase is likely related to a near-normal hydrograph during the spawn as well as augmentation in this reach. The flow during spawning in 2004 increased useable nursery habitat which improved recruitment. Also, the highest numbers of silvery minnows were collected at or upstream of where augmentation has occurred. Reclamation is continuing studies on how egg retention in nursery habitat contributes to localized recruitment. Figure 6 displays silvery minnow abundance within various reaches of the Rio Grande based on surveys conducted from 2001 through 2004. The 2001 surveys were conducted bimonthly, with monthly surveys in 2002-2004. Intermittency appears to have continuing adverse effects on downstream silvery minnow populations, based on low sample numbers in the intermittent areas. Table 9 provides a summary of the number of minnows collected by year. Continuation of increased recruitment appears dependent on sufficient flows during spawning, and augmentation throughout reaches with stable summer flows.

Table 9: Comparison of Total Rio Grande Silvery Minnows by Year

Year	Total collected
2001	3080
2002	1598
2003	384
2004	2823

The USFWS reconvened 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 endangered by the USFWS effective March 29, 1995. Critical habitat was designated, effective August 21, 1997 in some areas of New Mexico and other states throughout the specie's range. The Rio Grande was not designated as critical habitat for the Southwestern Willow Flycatcher at that time and the 1997 critical habitat proposal was later retracted. On October 13, 2004, under court order, the USFWS reissued a proposed designation for critical habitat for the Southwestern Willow Flycatcher that now includes portions of the Rio Grande in New Mexico and Colorado. This final rule, designating critical habitat, is expected to be issued in late 2005. Though critical habitat is not proposed for every location where Southwestern Willow Flycatchers exist on the Rio Grande, Section 7 of the ESA requires all Federal agencies to consult with the 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 primary breeding sites for Southwestern Willow Flycatchers have been documented during various survey efforts in the Middle Rio Grande between 1993 and 2004 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 10 presents the results of surveys for Southwestern Willow Flycatchers at these and other sites from 2000 through 2004.

Reclamation continues to conduct Southwestern Willow Flycatcher surveys and nest monitoring along portions of the Middle Rio Grande. Between 2000 and 2004, the number of Southwestern Willow Flycatcher territories in the San Marcial reach has expanded from 23 to 113. A majority of these territories are located in the newly developed riparian vegetation within the conservation pool of Elephant Butte Reservoir. This area holds 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 2005.

Table 10: Estimate of Southwestern Willow Flycatcher Territories

Middle Rio Grande Project, 2000 - 2004 Breeding Seasons

River Reach	Number of Territories 2000	Number of Territories 2001	Number of Territories 2002	Number of Territories 2003	Number of Territories 2004*
Velarde (Ahlers et al. 2000-2002)	2	1	0	not surveyed	1
San Juan Pueblo (Williams 2000)	16	not surveyed	not surveyed	unknown	unknown**
Isleta Pueblo (Johnson and Smith, 2000)	14	not surveyed	not surveyed	unknown	unknown
Belen reach	not surveyed	not surveyed	not surveyed	not surveyed	0
Sevilleta NWR/ La Joya State WMA (Ahlers et al. 2001,2002)	8	11	13	17	19
Bosque del Apache NWR (Taylor 2000-2002)	1	2	4	3	1
San Marcial/Tiffany areas	4	3	12	34	16
Elephant Butte Reservoir Delta	19	22	51	52	113
Total	63	39	80	106	149

* USBR unpublished data

** Surveyed by New Mexico Dept. of Game & Fish; results currently not available.

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 Collaborative Program and formally established a governance structure for the Collaborative 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, 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, Pueblo of Sandia, and two additional agriculture and irrigation interests.

Congress provided the Collaborative Program, through Reclamation, approximately \$7 million in FY 2004 and \$6.15 million in FY 2005. The Collaborative 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. Activities selected to receive funding in FY 2004 are ongoing. Proposals submitted under the FY 2005 Request for Proposals process are pending completion of the review process. Program accomplishments in 2004 include continuation of work on the programmatic NEPA, draft Program Document, and draft authorizing legislation. **A major accomplishment for 2004 is the completion of a draft Long-Term Plan that includes activities supportive of the USFWS's March 2003 BiOp and listed species recovery plans; including water acquisition and management,** listed species population management, 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 reinstate ESA consultation for 2003 water operations. This consultation was initiated by Reclamation in October 2002. On March 17, 2003, USFWS issued the 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 (ESA) and National Environmental Policy Act (NEPA) violations. The Middle Rio Grande Conservancy District (MRGCD), 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 January 2004, the Tenth Circuit Court of Appeals (Circuit Court) ruled that the appeals in the *Minnow v. Keys* lawsuit are moot, and vacated the June 2003 Circuit Court panel decision affirming the District Court of New Mexico's 2002 finding that Reclamation has discretion to reduce deliveries of water under its contracts to comply with the ESA.

In MRGCD's cross-claim against the United States in the *Minnow v. Keys* lawsuit, MRGCD seeks to quiet title to certain Middle Rio Grande Project properties. The United States' position in this cross-claim is that MRGCD conveyed these Middle Rio Grande Project properties to the United States and that these 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.

A non-jury trial was held on October 19, 2004, on the Middle Rio Grande Conservancy District's second amended cross-claims against the United States. Judge Parker did not indicate when he may be issuing a ruling in the case.

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 Reclamation ET Toolbox web site within the MRGCD / Rio Grande Silvery Minnow Operations

schematic pages. The URL of the referenced site is:

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 2004 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 permit from 2003 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 2004. Additional information on the Temporary Pumping Program can be found in the Reclamation report entitled "*2004 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 7). 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 2004 as measured at the Rio Grande Floodway (FW) plus the LFCC at San Marcial (FW+LFCC) was 413,948 af which is 48.1% of the 93-year average annual flow at the San Marcial stations (FW+LFCC). The 93-year average annual flow at San Marcial (FW+LFCC) is 861,317 af. The actual 2004 March through July runoff, measured at San Marcial (FW+LFCC), was 240,678 af, which was 42.0% of the 30-year average of 573,000 af. Of the period 1996-2004, the spring runoffs (March-July) at the San Marcial gauging stations have consistently been below average, with the exception of 1997, which was 120% 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 2004, 423,960 af of water was released from Elephant Butte Reservoir. There was a release of 399,519 af to meet the irrigation requirements of Project water users from Caballo Reservoir.

The January through June Natural Resources Conservation Service and National Weather Service (NRCS & NWS) coordinated forecasts received for the 2004 March through July runoff season are presented in Table 11.

Combined total storage for Elephant Butte and Caballo Reservoirs was 216,627 af on December 31, 2004. This combined storage was 9.2% of the total capacity of both reservoirs, and 9.7% 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 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).

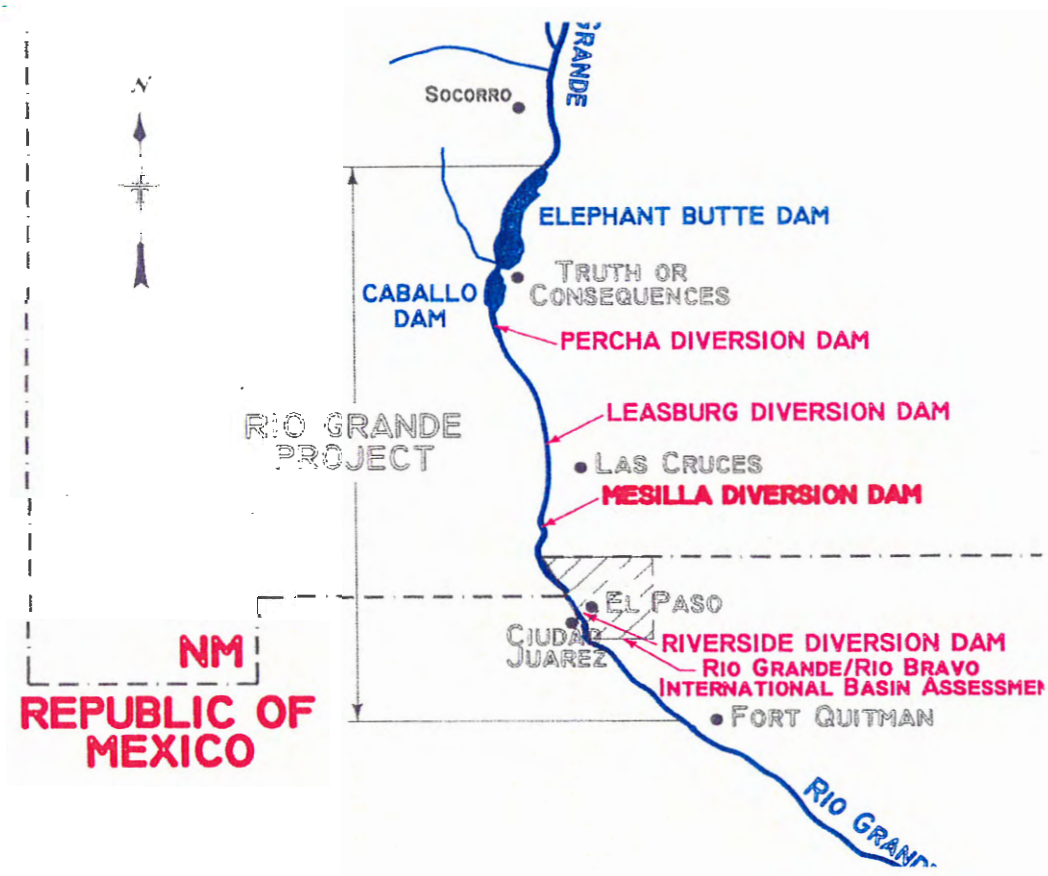


Figure 7: Area Map of the Rio Grande Project

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 2004. 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 March 1, 2004, New Mexico relinquished 53,000 af of its credit waters to Texas, and Texas accepted the relinquishment. On March 31, 2004, Colorado relinquished 1,150 af of its credit waters to Texas, and Texas accepted the relinquishment. The combined 54,150 af of relinquished credit waters was then allocated to the Rio Grande Project water users for the 2004 irrigation season.

Table 11: Summary of 2004 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	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
Mar 15	560,000	74	395,000	69
Apr 1	550,000	73	385,000	67
Apr 15	550,000	73	385,000	67
May 1	560,000	74	400,000	70
May 15	535,000	71	400,000	70
June 1	460,000	61	340,000	59
Actual Runoff	415,737	55	240,678	42

A final allotment to the Rio Grande Project water users of only 37.98% of a full supply was declared by Reclamation on August 18, 2004 for the 2004 irrigation season. The initial allotment to the Rio Grande Project water users (declared on December 15, 2003) started at only 4.69% of a full supply. 2004 was the second year in a row that the Rio Grande Project's irrigation water supply was less than a full supply; 2003 was only 34.07% of 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 2005 irrigation season, a less than full allotment (only 14.87% of a full supply) was declared on December 17, 2004. This initial allotment was revised on January 20, 2005, but it is still less than a full allotment (only 19.72% of a full supply) based on inflow to the Rio Grande Project reservoirs and existing storage during December 2004 and January 2005. Based on the February 1 NRCS/NWS spring runoff forecast at the San Marcial gauging stations and present hydrologic conditions, Reclamation might be able to allocate a full supply for irrigation during 2005 for the Rio Grande Project.

The 2005 coordinated forecasts from the NRCS & NWS for the 2005 March through July runoff season is presented in Table 12.

Table 12: 2005 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	650,000	86	400,000	70
Feb 1	960,000	127	675,000	118
Mar 1	1,060,000	140	760,000	133

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 2004, 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 2004. 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 2004. The International Boundary and Water Commission (IBWC) continued to own, operate, and maintain the American Diversion Dam and the American Canal during 2004 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 headgates 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 41,962 af during 2004. Under the Warren Act contracts, HCCRD was charged for drainage water from the Project between March 1 and September 30 which amounted to 35,207 af.

Water flows measured by IBWC on the Rio Grande at Fort Quitman Station, downstream of the Project and HCCRD boundaries, amounted to 62,961 af during 2004.

Elephant Butte Reservoir and Powerplant

Elephant Butte Reservoir reached a maximum storage of 322,872 af (elevation 4,324.34 ft) on May 31, 2004. A minimum storage of 94,615 af (elevation 4,294.04 ft) was reached on September 24, 2004. The last time Elephant Butte Reservoir was at this low of a storage level was November 1978. Storage levels in Elephant Butte Reservoir did not enter into the 50,000 af prudent flood control space in 2004.

Net power generation for 2004 was 27,625,640 kilowatt-hours which was 36.9 percent of the 65-year average (1940 through 2004) of 74,808,637 kilowatt-hours.

The power plant releases were utilized to meet downstream irrigation demand and manage Caballo Reservoir storage levels. The balance valves were utilized to help meet peak releases during 2004 (June 14-18, July 1-23, and August 13-16). 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) was completely replaced by early 2005. All three turbines will be ready for releases and power generation by the beginning of the 2005 irrigation season (tentatively March 1). However, due to ongoing repair work on the power plant's No. 1 penstock guard gate, the power plant will have only two turbines available for operation in 2005.

In July, 2004, Reclamation moved 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 July 26. Reclamation then bypassed inflows to Elephant Butte Reservoir for approximately three weeks holding the reservoir level near 4303.00 feet. This allowed Reclamation to perform needed repairs and maintenance to the E gallery on the upstream side of Elephant Butte Dam. Normal releases from the dam resumed August 13 to help meet irrigation demand on the Rio Grande Project.

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 Elephant Butte Comprehensive Facility Review is scheduled to occur in 2005. During 2004 the following additional work was completed for Elephant Butte Dam:

- Work on the sluice gates was implemented and scheduled for completion in February of 2005
- Contract for the Electronic Governors should be ready for awarding
- An Remote Operation Vehicle examination was tried without success; may need to reschedule with a dive exam
- The Annual Examination and Report was completed

Caballo Dam and Reservoir

Caballo Reservoir reached a maximum storage of 75,513 af (4,151.66 ft) on July 23, 2004. A minimum storage of 11,250 af (4,131.56 ft) was reached on January 1, 2004.

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, 2004 was to maintain storage levels such that they would not exceed 50,000 af in February, not exceed 75,000 af in July, and not be less than 10,000 af by the end of September. Having somewhat higher storage levels earlier in the irrigation season allowed Reclamation to:

- Reduce evaporative losses between Elephant Butte and Caballo Reservoirs
- Provide sufficient operational hydraulic head at Caballo Reservoir for irrigation demand releases
- Serve as a reserve pool in case releases were interrupted from Elephant Butte Dam and minimize changes to release rates from Elephant Butte Dam
- 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, 2004 through September 30, 2005 has not been finalized yet. Due to current drought conditions and uncertainty of the 2005 spring runoff volume into Elephant Butte Reservoir, Reclamation will finalize its operating plan in the spring of 2005. The plan will reflect accommodations for the minimization of evaporation differences between Elephant Butte and Caballo Reservoirs, and maintenance of some reserve water in Caballo Reservoir for emergency purposes.

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 replaced the exposed pipeline with new pipe and couplings and grouted the voids adjacent to the steel liner upstream during the fall of 2003. During the 2004 irrigation season, the Bonita Lateral pipeline was used for normal operations and delivery of water to the Bonita Community Lateral. Additional repairs to the upstream steel liner and concrete will be performed as Reclamation's maintenance schedule permits.

Caballo Dam Facility Review and Safety of Dams Programs

The next Caballo Dam CFR is scheduled to occur in 2005. The Annual Examination and Report for Caballo Dam was completed in September 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 2004. 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>

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, was completed in 2003 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. 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 issue of lease lot ownership has been implemented with the privatization of the lease lots and sale of 403 lease lots to the Elephant Butte Leaseholder's Association for a total of \$916,000. The sale was finalized with the transfer of deeds in late 2004 following the completion of a land survey and appraisal.

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 2005. 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 were due on January 30, 2004, responses to the briefs were due on February 27, 2004, and a status conference hearing was in March 2004.

The Texas Commission on Environmental Quality (TCEQ) 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. Draft certificates of adjudication and findings of fact for each of the parties have been negotiated and approved among the parties and will be sent to the TCEQ for review.

Elephant Butte and Caballo Reservoir Vegetation Management Cooperative Agreement

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 2004, 5,110 acres of woody phreatophytes were mowed at both reservoirs. The herbicide Arsenal was applied to 918 acres of saltcedar (318 acres at Elephant Butte via helicopter and 600 acres at Caballo via ground rig). In addition Reclamation has obtained funding under DOI Science and Technology Invasive Species Initiative to integrate studies of saltcedar control methods, pesticide monitoring and Evapotranspiration (ET) measurements.

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 8). 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 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.

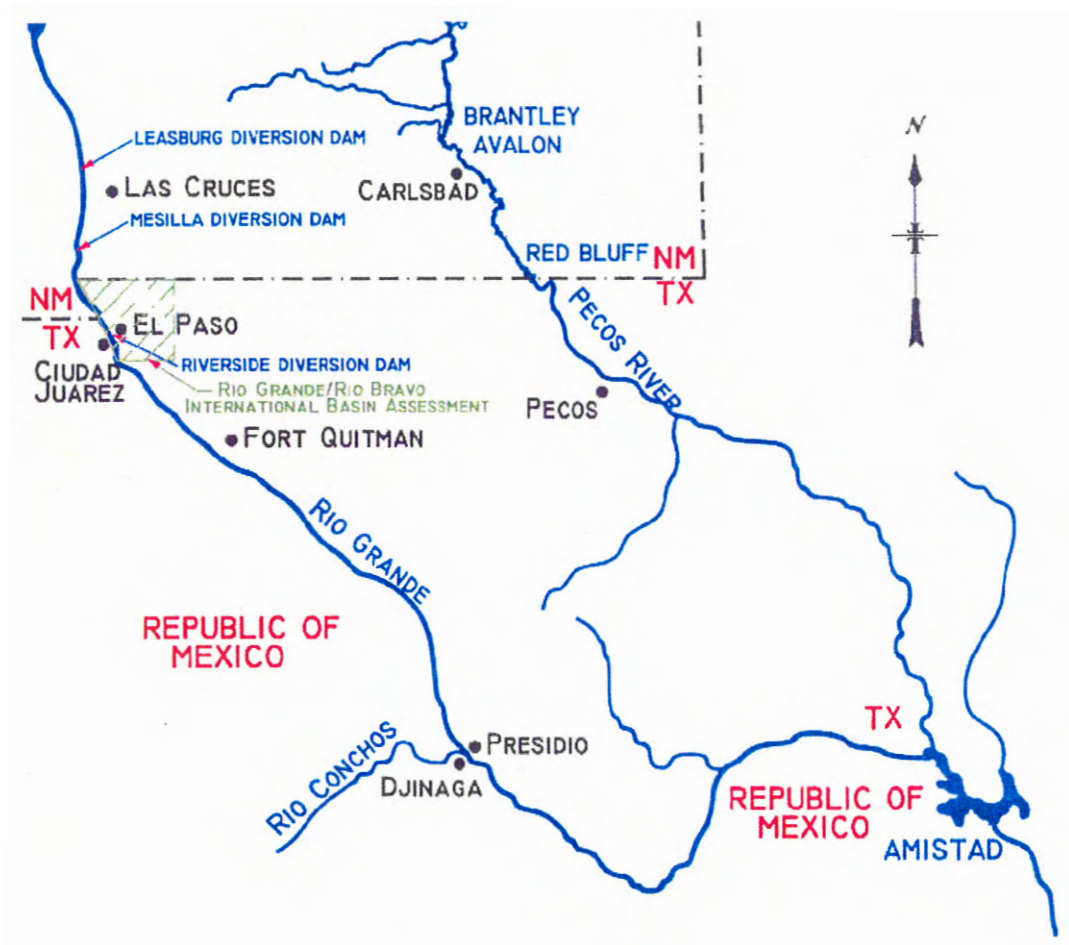


Figure 8: Area Map of the Rio Grande/Rio Bravo International Basin Assessment

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. Reclamation has assisted the efforts of the IBWC by hosting a regional water work group to investigate joint IBWC, Reclamation and USDA – Agricultural Research Stations to investigate two binational pilot projects for a controlled release of biological control agents.

Environmental Health in the US-Mexico Border Region

Rapid population growth, economic development, and land-use changes are pushing the limits of environmental sustainability and quality in the US-Mexico border region. To allow for continued economic growth while protecting the area's natural resources and fostering a high quality of life, the United States and Mexico need an improved understanding of the threats posed by these anthropogenic changes. The USGS has initiated a project to provide an earth and biological resources database within a geographic framework using an Internet map service (IMS) to further our understanding of the condition of the physical environment in the border region. Although the project is planned to ultimately encompass the entire US-Mexico border, initial efforts have focused on the lower Rio Grande basin from Falcon Reservoir to the Gulf of Mexico. An IMS for that study area is now available via the Internet at borderhealth.cr.usgs.gov. Stakeholder meetings were held in the study area during early FY04 to gain support for the project; a Fact Sheet describing the project has been developed and meetings with partners to demonstrate the utility of the IMS have been held. New efforts in FY05 will include additional data incorporation, development of real-world applications with local partners, and selection of subsequent study areas.

International Boundary & Water Commission planning for Rio Grande Summit per Minute 308

An International Boundary and Water Commission (IBWC) sponsored Binational Rio Grande Basin Summit is tentatively scheduled for June 9-10, 2005, to be held in McAllen, Texas, and Reynosa in the State of Tamaulipas, Mexico. An agenda is under development, and to date, invitations to the Summit have not been disseminated.

As a result of discussions held between President George W. Bush and Mexican President Vicente Fox Quezada held on February 16, 2001, the IBWC, through Minute 307, on March 16, 2001, recommended a commitment by the United States and Mexican Governments to work jointly to identify measures of cooperation for sustainable management of the Rio Grande Basin. Minutes are decisions of the International Boundary and Water Commission recorded to settle differences that may arise between the two governments with respect to the interpretation or application of the Treaty of 1944, and are subject to approval by the two governments.

To fulfill the commitment in Minute 307, on June 28, 2002, Minute 308 was signed by the IBWC recommending: 1) the approval of a bi-national summit to convene high-level dignitaries having the authority to identify and prioritize opportunities for, and obstacles to, optimal development of the Rio Grande Basin; 2) that recommendations made at the summit be considered by the two Governments in the development of a bi-national sustainable management plan for the basin; and 3) the establishment of an International Advisory Council that would exchange information and advice from government and non-government organizations with the IBWC in order to strengthen the role of the IBWC in the sustainable management of the basin and drought management planning.

In March 2004, the IBWC began planning and organizing the recommended summit by inviting federal, state, and non-government entities to participate on a Steering Committee. The committee is in the process of developing an agenda, and a proposed list presenters and attendees of the summit.

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 the New Mexico State University's Department of Fishery and Wildlife Sciences and the USGS Biological Resources Division, has established the only mercury deposition network 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 \$1.3 million of 50% cost share funding in FY 2004 to implement efficiency measures within the district. A Request for Proposals (RFP) was issued to western irrigation and water districts by Reclamation for a \$4 million west wide challenge grants program for FY 2004. The FY 2005 budget calls for \$20 million to continue the objectives of the Water 2025 Initiative. The application deadline for FY2005 RFP's was January 21, 2005.

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 outreach efforts and research projects, and through providing technical assistance to the water users of New Mexico. Some of the projects supported during 2004 are summarized in the following paragraphs.

Reclamation continued to support conservation outreach and public and industrial awareness of water issues during 2004. Institutional and industrial water management workshops were cosponsored 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 2004. 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 continuing to work 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.

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, Española, and Albuquerque in New Mexico, and El Paso, Texas.

The City of Santa Fe has completed work under Title XVI and produced a Feasibility Study Report that summarizes their Title XVI related plans. Santa Fe does not intend to pursue a Title XVI project in the near term, but intends to move forward on their Buckman Direct Diversion project to address their current short term water supply shortages. Santa Fe has received additional funding in 2005 to continue work on their long range water supply planning study.

The City of Española completed an appraisal study in 2000. In late 2001, Espanola 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 of Espanola'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 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 Corps of Engineers and Reclamation's Albuquerque Area Office. 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. Espanola has extended its agreement with Reclamation that was due to expire December 31, 2004, to allow for the completion of its Feasibility Study report, due to continuing NEPA investigation and negotiations for a point of diversion.

In 1999 Reclamation entered into agreements with the City of Albuquerque that provide the framework for participation and cost sharing in their 45 million dollar arsenic demonstration project and non-potable water reclamation and reuse program. Reclamation cost sharing was approved for construction of the industrial recycling and non-potable water reuse portion of the 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. Construction of the subsurface collectors to divert a small portion of the City of Albuquerque's SJ-C project water began in January of 2003 and was completed in 2004. The north Albuquerque area water reclamation project 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. With the completion of customer hook-ups, 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 2005. 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.

The City of El Paso has been using recycled water since 1963. Reclamation through Title XVI has contributed to El Paso's efforts since 1996. Today El Paso recycles 700 million gallons of water through 40 miles of pipe. The recycle program has cost the City \$36 million dollars with Reclamation's contribution of \$8 million. Even though this is a success story, the story does not end there. The recycled water has been applied to some sites not suited for the water causing damage to vegetation. The City of El Paso is being proactive by setting up a best management program to help water users to better prepare their sites and select vegetation better suited for recycled water. Reclamation has contributed more than \$50,000 to aid El Paso's best management practices program.

Upper Rio Grande Water Operations Model

The Upper Rio Grande Water Operations Model (URGWOM) was **utilized to develop the Middle Rio Grande Annual Operating Plan co-released by Reclamation, the Corps, and MRGCD in April of 2004**. Prior to April, URGWOM was used to generate model runs of projected 2004 operations for presentation and discussion during a series of Rio Grande Hydrology and Water Operations meetings that were hosted by Reclamation during the months of January, February, and March.

The URGWOM accounting module has now completed its fourth year as the **primary tool used by Reclamation for SJ-C and Rio Grande Compact accounting**. The Nambé Falls Accounting Model continues to be operated as a separate model independent of the main URGWOM Accounting Model during 2004.

URGWOM development during 2004 primarily concentrated on **incorporating new El Vado storage accounts for native Rio Grande water stored under the Emergency Drought Water Agreement and for the senior water rights of the Six Middle Rio Grande Pueblos**. El Vado now has four native Rio Grande accounts named: *IndianStorage*, *MRGCDDrought*, *SupplementalESA*, and *RioGrande*. The creation of these **storage accounts greatly simplified native Rio Grande accounting**, and eliminated the need for maintaining a separate spreadsheet for native Rio Grande outside of the model. In

addition to creation of these new accounts, significant work was completed associated with developing new methods for modeling target flows in the middle valley, and a new method was incorporated for modeling the interaction between the LFCC and Rio Grande floodway between San Acacia and Elephant Butte.

Planned work for 2005 includes continued work toward improving URGWOM's ability to meet target flows within the middle valley, and completion of updated rules documentation. The URGWOM Team has also submitted a proposal to the Middle Rio Grande Endangered Species Act Collaborative Program for development of an improved simulation of the middle valley that better models the interactions with shallow groundwater and the relationship between MRGCD diversions and surface water returns.

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

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

Hydrologic DataBase (HDB)

The Hydrologic Database (HDB) is a generalized relational database management system for storing and using hydrologic data used by Reclamation in management of river and reservoir systems. It is built on Oracle[®] and includes connections to data sources such as Reclamation's Hydromet, and models such as RiverWare. HDB is developed and maintained at the University of Colorado Center for Advanced Decision Support for Water and Environmental Systems (CU-CADSWES), and also by independent Reclamation consultants. HDB is currently used by Reclamation's Upper and Lower Colorado Regional Offices for joint management of the Colorado River. Several other Reclamation offices, including the Albuquerque Area Office, host HDB installations for the purposes of evaluation and applications development.

Development of water accounting and reporting functionalities for the Albuquerque Area Office's test HDB installation continued during 2004. Water accounting data is now ported from URGWOM to HDB using an automated data loader. The HDB Meta Data Application that was installed in late 2003 was used by the Albuquerque Area Office during 2004 to maintain water accounting annotation similar to the hand written "Green Book" that is currently used to document the intricacies of SJ-C water accounting such as contractor leases, transfers, loans, and deliveries. The hand written "Green Book" and HDB meta data will be maintained in parallel while development and evaluation of the HDB water accounting functionalities continue. Other HDB developments completed during 2004 include selection of Crystal Reports[®] as the water accounting reports generation tool, and completion of two prototype reports that duplicate reports contained within the Annual Water Accounting Report.

Planned work for 2005 consists of continued development of reports to duplicate and ultimately replace all tables within the Annual Water Accounting Report that are currently generated using a Lotus[®] spreadsheet. Reclamation's contractors will provide

detailed documentation of all calculations as well as the mapping of URGWOM and Nambé Falls Accounting Model data slots to the annual report tables. During 2005, all water accounting will continue to be maintained using the current Lotus[®] spreadsheet in parallel to generation of water accounting reports using HDB.

Additional general information about Reclamation's HDB development efforts can be found at this CU-CADSWES HDB web site:

<http://cadswes.colorado.edu/hydrodb.com/>

Evapotranspiration (ET) Toolbox 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 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 Toolbox coverage has now been extended to Elephant Butte Reservoir. ET currently accounts for an estimated 67 percent of the water depletions over this reach of the Rio Grande, including riparian vegetation, irrigated crops, and open water evaporation.

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:

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

The daily cumulative river reach ET estimates are incorporated into the URGWOM RiverWare models. RiverWare currently contains water accounting and ownership tools (objects) and peripheral water budget and flood routing tools (methods) that are 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 the daily water operations URGWOM model goes online.

The New Mexico 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 land cover dataset in the Toolbox (from 1993 to 2000/2001) to improve the accuracy of ET estimates, improve the accuracy of Toolbox predictions, and document the process and code behind the website. These funds also supported the movement of the Elephant Butte ET data collection tower to a new inundated location for data collection. Improvements to the ET Toolbox in FY 2004 were limited to complete implementation of the new coverages mentioned above, a new ET estimate model for the Bosque del Apache site, and minor additions like a Nambe Reservoir component.

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) is limited to existing facilities and authorities. Because of ongoing litigation, water supply operations at El Vado, Elephant Butte and Caballo Reservoirs are not included in the Review and EIS. 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 a programmatic 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 was used together with modeling of overbank flooding (FLO-2D), an aquatic habitat model, and a groundwater – surface water hydrologic model (MODBRANCH), to evaluate alternative water operations and the interrelated effects of the various facilities. A range of hydrologic conditions from surplus to drought was considered using a synthetic

combination of actual measured flows from 1975 to 2000 to create a 40-year planning hydrograph. The hydrologic variability of this 40-year sequence mimics the last 300 years of climatic variability documented in tree ring data.

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 2004, a suite of tools, including the URGWOM Planning Model, were used to assist in the preliminary screening of twenty-two alternatives and detailed analysis of impacts from six alternatives over the 40-year synthetic period of record. Evaluation of alternative impacts was 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 twenty-two alternatives were narrowed down to six alternatives which were subsequently studied in detail to evaluate impacts and compare performance against the no action alternative. Interdisciplinary NEPA technical teams evaluated impacts using resource-specific performance criteria. Alternative performance was further evaluated using decision criteria, weighted in importance by the joint lead agencies and steering committee, leading to the selection of the alternative that best meets often-competing objectives. 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 2005. Following the 2005 release of the Draft EIS, another series of public meetings will be held to present the results of impact analyses and solicit public input.

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 2005 calendar year.

Native American Affairs Programs

Reclamation has numerous projects underway with pueblos and tribes. These projects fall under several categories, including the Native American Affairs Program, the Drought Relief Program, the Planning Program, and special projects funded through Congressional write-ins.

As part of Reclamation's Native American and other programs, assistance was given to various Pueblos to help with improving irrigation system efficiency. Some of the items funded or purchased included concrete lining of farm ditches, laser leveling, check structures, pipes, and gates.

Windmills were repaired at some Pueblos through the Native American Program. Wells for irrigation and drought mitigation were repaired at some Pueblos.

Work proceeded on technical studies in support of a negotiated settlement of the Abouseman adjudication on the Rio Jemez involving Jemez, Zia, and Santa Ana Pueblos.

The subsurface drainage project scheduled for the Isleta Pueblo for the winter of 2001-2002 finally began in late 2004.

A new agreement was reached between the Department of the Interior (represented by the Bureau of Indian Affairs) 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.

