

2000

2000 Calendar Year Report to the Rio Grande Compact Commission

Hal D. Simpson
Colorado

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New Mexico

Joe G. Hansen
Texas

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Federal Chairman

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Rio Grande Compact Commission

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FEDERAL CHAIRMAN
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UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

Upper Colorado Region

Albuquerque Area Office

March 22, 2001

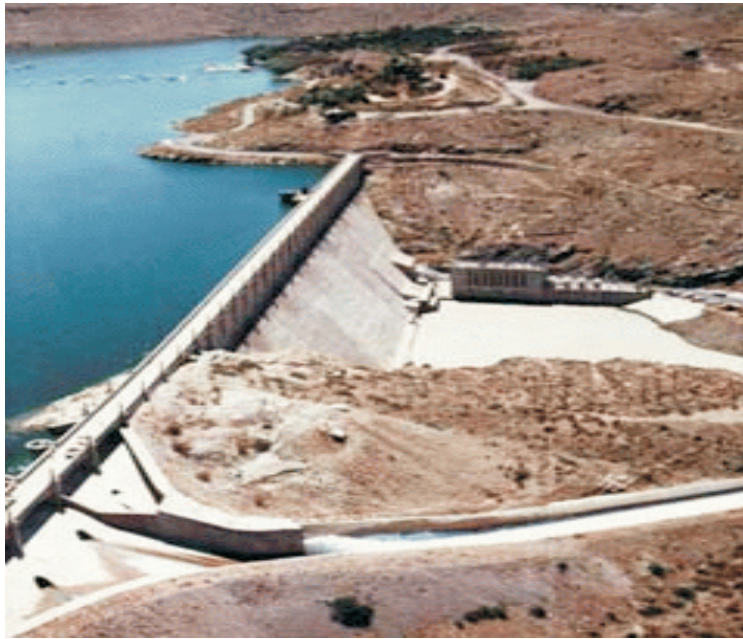
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OF THE**

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*Cover photo - Elephant Butte Powerplant

U.S. Bureau of Reclamation
Upper Colorado Region - Albuquerque Area Office
2000 Calendar Year Report to the Rio Grande Compact Commission

INTRODUCTION

The Albuquerque Area Office of the Bureau of Reclamation (Reclamation) is responsible for operation, maintenance, and oversight of four projects on the mainstem of the Rio Grande and its upper basin tributaries. These projects are: the *San Luis Valley Project*, the *San Juan-Chama Project*, the *Middle Rio Grande Project*, and the *Rio Grande Project* (Figure 1).

The *San Luis Valley Project* consists of the Conejos and Closed Basin Divisions. The Conejos Division with Platoro Dam and Reservoir, provides water for about 86,000 acres within Conejos Water Conservancy District lands. The Closed Basin Division is a ground water salvage project located near Alamosa, Colorado which pumps water from a shallow, unconfined aquifer that would otherwise be lost through evapotranspiration.

The *San Juan-Chama 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 San Juan-Chama 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 Nambe Falls Dam. The Pojoaque Irrigation Unit provides water for about 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 south of San Acacia, New Mexico. Irrigation water is provided to the Middle Rio Grande Conservancy District which supplies water to between approximately 50,000 to 90,000 acres of land in any given year.

The *Rio Grande Project* includes Elephant Butte and Caballo Reservoirs and Percha, Leasburg, Mesilla, and Riverside Diversion Dams in the lower Rio Grande valley of southern New Mexico to just south of El Paso, Texas. The project provides an agricultural water supply for approximately 178,000 acres of land within the Elephant Butte Irrigation District in New Mexico, and the El Paso County Water Improvement District No. 1 in Texas. Water is also provided for diversion to Mexico by the International Boundary and Water Commission-United States Section. Drainage waters from the Rio Grande Project lands provide a supplemental supply for about 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.

ALBUQUERQUE AREA OFFICE
BUREAU OF RECLAMATION

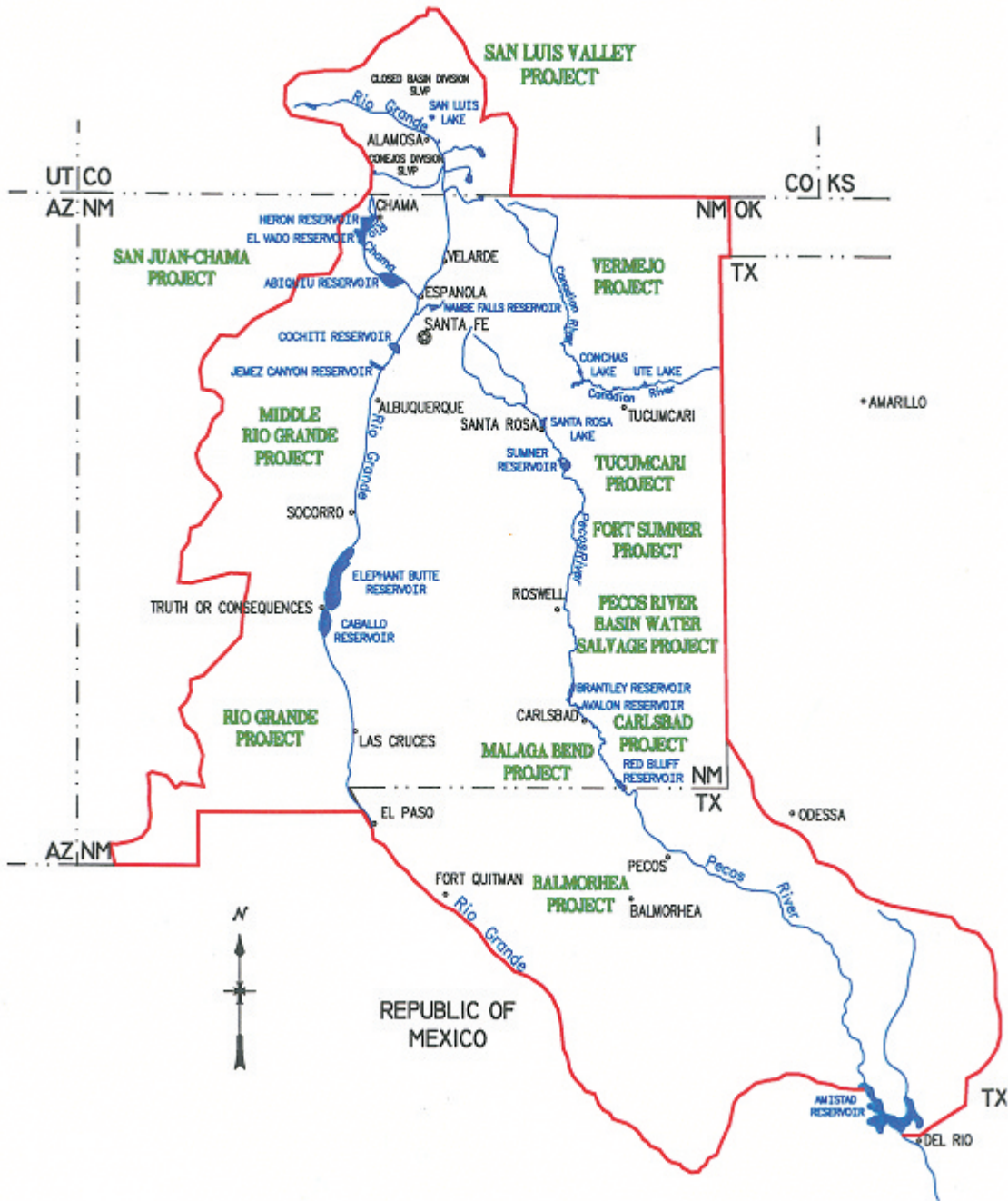


Figure 1. Project map of Reclamation's Albuquerque Area Office.

SAN LUIS VALLEY PROJECT, COLORADO

Conejos Division, Platoro Reservoir

Platoro Dam and Reservoir (Figure 2), the Conejos Division portion of the San Luis Valley Project, is operated and maintained by the Conejos Water Conservancy District (CWCD), with its office in Manassa, Colorado. Platoro Reservoir started the year with a storage content of 29,300 acre-feet (af). Supplemental releases to meet the demand were made through the summer and fall. Total supplemental water released was 16,650 af. There were no flood control operations in 2000. A storm in October helped to increase a very low inflow that lasted until the end of the year. The final water storage content was 16,365 af on October 31, 2000.

Platoro Dam Review of Operations and Maintenance Program

An annual inspection was conducted in 2000 by Reclamation and CWCD personnel. During the inspection some cavitation was discovered at the discharge pipe near the butterfly valves. This condition needs to be monitored and repaired. A dive team inspected the trash rack which was found to be in good condition.

Closed Basin Division

The Alamosa Field Division of the Albuquerque Area Office operates and oversees the maintenance of the water salvage project constructed in the Closed Basin area of the San Luis Valley, Colorado. It is a ground water salvage project which pumps water from a shallow unconfined aquifer that would otherwise be lost through evapotranspiration. The project consists of a field of 170 wells distributed throughout an area of approximately 130,000 acres, 115 miles of pipeline laterals, 42 miles of conveyance canal, 82 boundary observation well sites and a complex remote control and monitoring system. There are 169 miles of electrical distribution system lines including 96 miles of overhead primary electric lines, 31 miles of underground primary lines, and 42 miles of underground secondary lines.

Reclamation continues to work under the guidance of the Closed Basin Division Operating Committee in management of Closed Basin operations and water deliveries.

Closed Basin - Operations and Maintenance

Operations

A total of 17,880 af of project water was delivered to various points, including 14,191 af creditable to the Rio Grande pursuant to the Rio Grande Compact. Closed Basin 2000

operations included deliveries to the Blanca Wildlife Habitat Area, Alamosa National Wildlife Refuge, San Luis Lake, and the Rio Grande. Table 1 summarizes 2000 operations of the project.

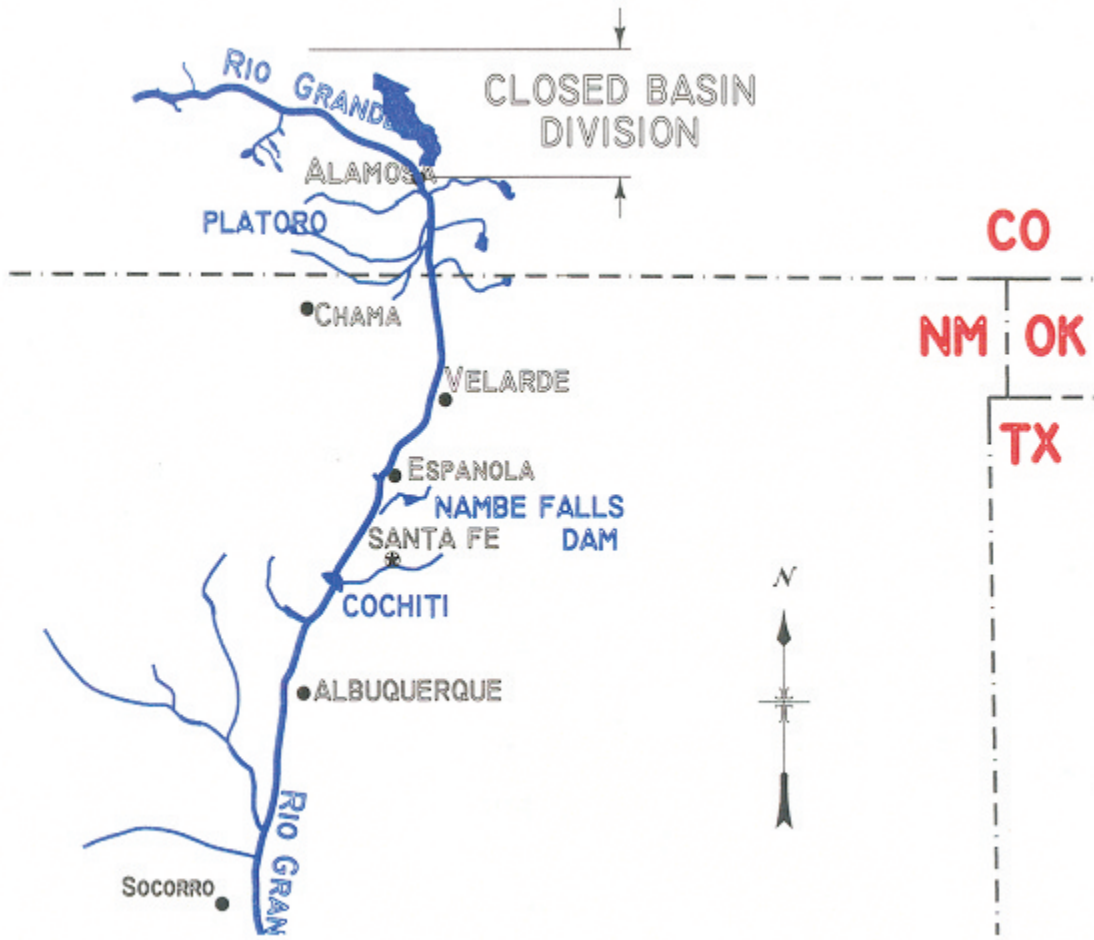


Figure 2. Area map of San Luis Valley and Conejos division.

**TABLE 1. SAN LUIS VALLEY PROJECT
CLOSED BASIN DIVISION - WATER ACCOUNTING**

(UNIT = ACRE-FEET)

| TABLE 13 SLV CBO | BLANCA WILDLIFE HABITAT AREA | | | PARSHALL FLUME | | ALAMOSA NATL WILDLIFE REFUGE (ANWR) | | | | DELIVERY TO THE RIO GRANDE | | | PROJECT TOTALS |
|---------------------|------------------------------|-----------------|--------------|---------------------|-----------------------------|-------------------------------------|-------------------|---------------|--------------|---------------------------------|---|---------------------------|----------------|
| | CH03 STA 730+00 | CH04 STA 759+00 | 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 | edit. Amt. d to FG and not used by ANWR | NON CREDIT-ABLE @ LOBATOS | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | |
| JAN | 0 | 0 | 0 | 2120 | 2120 | 0 | 0 | 0 | 0 | 2120 | 2120 | 0 | 2120 |
| FEB | 0 | 0 | 0 | 1985 | 1985 | 0 | 0 | 0 | 0 | 1985 | 1985 | 0 | 1985 |
| MAR | 32 | 32 | 64 | 1952 | 1952 | 375 | 356 | 48 | 779 | 1173 | 1173 | 0 | 2016 |
| APR | 7 | 0 | 7 | 1857 | 1857 | 0 | 0 | 0 | 0 | 1857 | 1857 | 0 | 1864 |
| MAY | 0 | 0 | 0 | 1618 | 1618 | 0 | 0 | 0 | 0 | 1618 | 1618 | 0 | 1618 |
| JUN | 52 | 57 | 109 | 1148 | 1148 | 0 | 0 | 0 | 0 | 1148 | 1148 | 0 | 1257 |
| JUL | 68 | 41 | 109 | 1125 | 1125 | 468 | 484 | 0 | 940 | 185 | 185 | 0 | 1234 |
| AUG | 118 | 107 | 225 | 797 | 797 | 379 | 379 | 0 | 758 | 39 | 39 | 0 | 1022 |
| SEP | 69 | 48 | 117 | 758 | 758 | 159 | 157 | 48 | 364 | 394 | 394 | 0 | 875 |
| OCT | 65 | 100 | 165 | 687 | 687 | 0 | 0 | 48 | 48 | 639 | 639 | 0 | 852 |
| NOV | 0 | 4 | 4 | 1436 | 1436 | 0 | 0 | 0 | 0 | 1436 | 1436 | 0 | 1440 |
| DEC | 0 | 0 | 0 | 1597 | 1597 | 0 | 0 | 0 | 0 | 1597 | 1597 | 0 | 1597 |
| ANNUAL | 411 | 389 | 800 | 17080 | 17080 | 1369 | 1376 | 144 | 2889 | 14191 | 14191 | 0 | 17880 |

(1), (2), (6), (7) AND (8) = FROM MONTHLY CLOSED BASIN REPORTS.

(3) = (1) + (2)

(4) = TOTAL FLOW PASSING CEPALACO GAGING STATION

(5) = MONTHLY PARSHALL FLUME ACCOUNTING. THIS IS NOT NECESSARILY THE SAME NUMBER AS CREDITABLE AMOUNT AT LOBATOS

(9) = (6) + (7) + (8)

(10) = (4) - (9)

(11) = (10) - AMOUNT OF WATER NOT CREDITABLE TO RIO GRANDE BUT USED BY ANWR

(12) = (10) - (11)

The project continued flow-through operations at San Luis Lake during 2000 with 4,318 af delivered to the lake through San Luis Lake Feeder Canal. No natural inflows were measured at the San Luis Lake Parshall flume or estimated at the spillway and culverts. During the 2000 water year, 1,501 af were pumped from the lake.

Deliveries to the Blanca Wildlife Habitat Area included the annual mitigation delivery of 800 af. Deliveries to the Alamosa Wildlife Refuge included the annual mitigation delivery of 2,889 af. No water exchanges were authorized for the 2000 water year.

Construction of the Blanca Wetlands Siphon under the canal at Stanley Road crossing was completed in 2000. The structure will deliver water to improve aquatic habitat for native wildlife and establish 8 acres of wetlands within Reclamation right-of-way. Also, the structure will re-direct the runoff in that area and avoid damage to the canal.

In cooperation with the U.S. Geological Survey's (USGS) Pueblo Colorado Office, Reclamation is continuing to review data collection quality control of its observation well network.

Salvage operations continued to be modified in 2000 to reduce the amount of flow out of 34 project wells in Stages 3, 4 and 5 as recommended by the Operating Committee for hydrologic impact analysis. This change in operation began in 1999.

A new program to verify and document all the measuring points for the elevation wells was implemented by the project hydrologist and was completed this year. In April a report was presented to the Operating Committee.

A program was initiated to re-design the observation well vaults and make them rodent-proof due to the potential of hanta virus. The new design has been implemented and ten sites have been completed.

Maintenance

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

Excessive algae growth along the canal continues to be a bio-fouling problem. The algae has been identified as a blue-green algae called *Oscillatoria* (non-branching filamentous algae). In the summer of 2000 a treatment utilizing barley straw, which creates hydrogen peroxide as it rots, was applied to a 6 mile stretch of the canal with limited success. In September 2000, AC-310 (acetic acid), chlorine dioxide and

surfactant soap were used on the bio-fouling problem that exists in the project wells. The combinations of the chemical treatments throughout the year showed minimal improvement. In-house treatments along with new treatment processes continue to be a priority in dealing with the bio-fouling problems.

Problems continue with poor health conditions of the grass carp, which are used to control aquatic weed growth in the canal system. Super-saturation levels of dissolved nitrogen in the canal are a serious threat to the success of the grass carp program. Pumping water into the air is reducing dissolved nitrogen to tolerable levels and appears to be a viable solution. This extreme dissolved nitrogen condition is only present in the northern half of the canal and may be the reason that grass carp insist on migrating to the overcrowded southern end of the canal and allowing aquatic weeds to thrive in areas vacated by these fish. To prevent the movement of the fish to the southern end of the canal, an additional drum screen fish barrier was installed. This barrier, along with more favorable water quality conditions, should improve the situation.

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 2000. In addition to the standard water quality parameters, dissolved oxygen, nitrogen and carbon dioxide are being monitored in the canal to assist grass carp survival studies .

The Water Quality Laboratory participated in the USGS Evaluation Program for Standard Reference Water Samples. Two set of samples were distributed, one in March and one in November. Results were rated on a scale of zero to four. The overall laboratory rating for the Spring samples was 3.0, a "good" rating. Results for the fall study have not been received.

The laboratory has acquired a new ion chromatograph to monitor major anions and cations in aqueous project samples. This instrument significantly decreases sample analysis time while improving accuracy and precision.

The laboratory has begun a "student volunteer" program with Adams State College, Alamosa, Colorado. The current student will investigate an alternative algae eradication technique and, upon completion, receive academic credits for the research.

Rio Grande Water Conservation District

The Rio Grande Water Conservation District (District) continues to perform civil maintenance on the project. Canal berms were maintained, with some sections being

resurfaced. Other work included maintenance of lateral access roads, mowing of canal berms and rights-of-way, mowing and removal of aquatic weeds from the conveyance channel, removal of aquatic weeds from structures, repair of fences, and assisting Reclamation personnel with equipment maintenance. The District continued their involvement in the ground water monitoring program and continues maintenance of the irrigation systems for shelter belt areas.

Stockman's Water Company Development Proposal

Stockman's Water Company was exploring the possibility of constructing a well field and pipeline system to export San Luis Valley water for sale to Colorado Front Range communities. The proposed development was adjacent to, and could impact upon, Closed Basin Division facilities and operations. Stockman's Water Company's proposal, as presented by the developers, is similar to American Water Development Incorporated's past proposal. The primary difference is that Stockman's Water Company has acknowledged the "tributary" nature of the water they propose to export and have presented a plan for augmentation that is intended to compensate any damage to the water rights of others.

Stockman's Water Company's proposal includes 25,000 af of water to the Closed Basin Division at no cost to the Government as part of their augmentation plan. In exchange, they propose that Reclamation stop operating Stages 4 and 5 of the project. Reclamation has identified many issues that have not been addressed in the proposal.

This proposal was defeated and no further action is anticipated. As of this time, Stockman's has not filed an application to secure the water rights for the project.

SAN JUAN-CHAMA PROJECT, COLORADO-NEW MEXICO

San Juan-Chama Diversion Dams

Work on the diversion dams included operating and maintaining Blanco, Oso, and Little Oso Diversion Dams (Figure 3); cleaning sediment and debris from the diversion dams; and water accounting and measurement.

Heron Dam and Reservoir Operations

Computations of the Rio Grande basin inflow to Heron Reservoir for 2000 were made using the ratio method. The ratio method is the basis for determining the natural flow (Rio Grande) within the Willow Creek drainage area. The daily volume was measured directly using the Willow Creek gage above Heron Reservoir, and when San Juan-Chama (SJ-C) diversions were in progress, the gaged flow was adjusted for Azotea Tunnel outlet gaged flow less a small channel loss. The natural volume was then adjusted by the appropriate historical correlation factor to arrive at the amount to be bypassed at Heron Dam. The correlation factors were developed using the historical gage data for Willow Creek above Heron Reservoir and Willow Creek at Parkview (Heron Dam).

Frequency analyses of the stream flow data for Willow Creek at Parkview between 1943 and 1970 indicate that flows of 1 cubic feet per second (ft^3/s) were exceeded approximately 60% percent of the time. The mean annual stream flow values indicate only one year in the period that averaged less than 2 ft^3/s . Seepage from Heron Dam averages between 2 and 3 ft^3/s at current storage levels. Thus, the seepage from the dam approximates base flow of Willow Creek at Heron Dam (Rio Grande flow).

Diversions into the Azotea Tunnel began on March 25, continued most of the year as water was available, and ended on August 20. Total amount diverted was 42,741 af, Table 2. This amount is less than half of the running 10-year average of 92,688 af. It was the second worst diversion season on record, with only 1977 being worse at 19,390 af. Heron content decreased during 11 of the 12 months. The reservoir began the year at a yearly high elevation of 7182.39 ft, (379,764 af) and finished the year at its minimum elevation of 7160.76 ft (267,389 af). The January 2001 combined forecast for San Juan Basin is 98% of the 30 year average. Due to the current low reservoir elevation and just an average runoff forecast, it is unlikely that Heron Reservoir will fill, for the sixth straight year. Reclamation will maximize diversions as water becomes available in 2001.

Table 3 lists SJ-C water delivered for each contractor from Heron Reservoir in 2000. Table 4 illustrates actual operations of Heron Reservoir for 2000. Column 5 is a

balance between the end of month contents using the operational inflow and outflow data. Table 4 also shows Heron Reservoir end-of-month water storage.

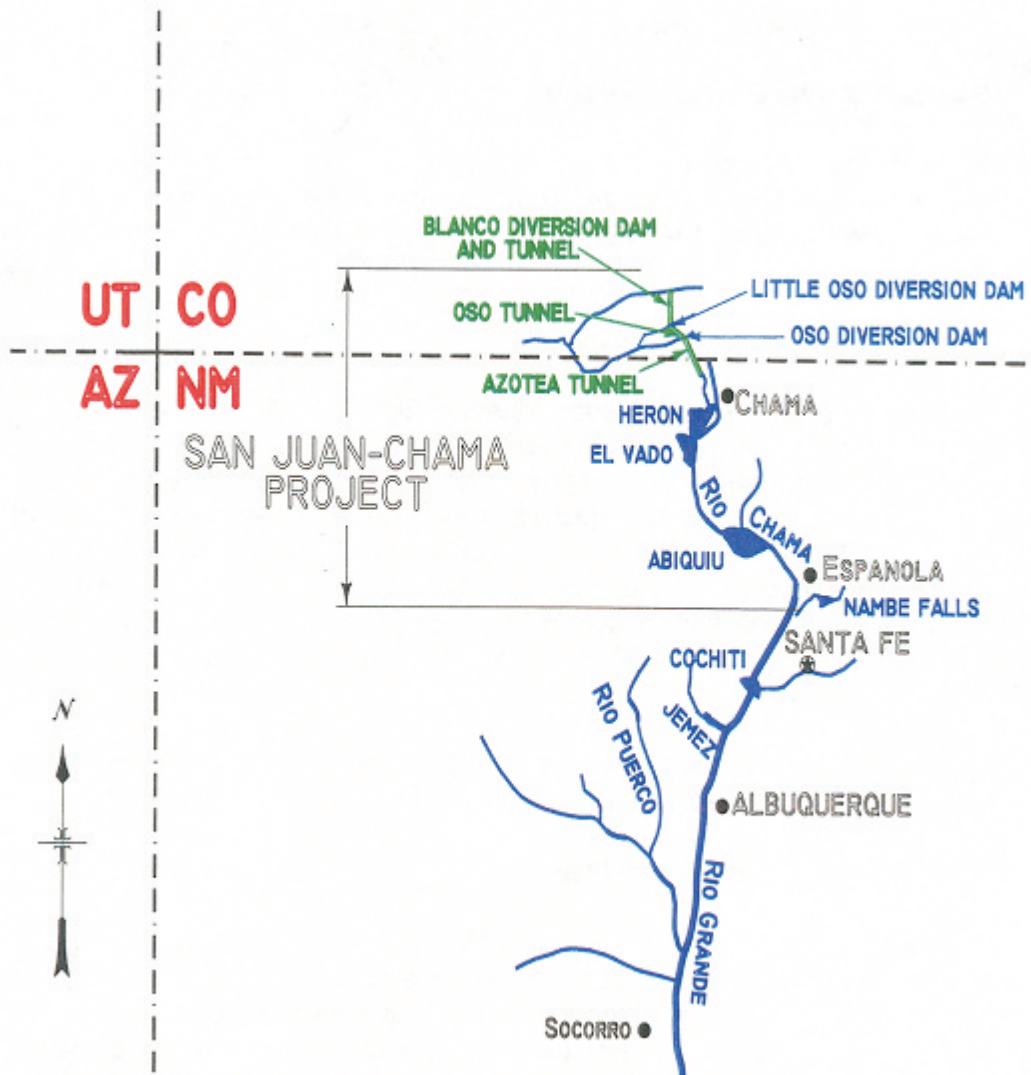


Figure 3. Area map of the San Juan-Chama Project.

TABLE 2

DIVERSIONS THROUGH AZOTEA TUNNEL
(UNIT=ACRE-FEET)

| Azotea | | | | | | | | | | | | |
|---------|--------|-------|-------|-------|-------|-------|--------|-------|--------|-------|------------------|--|
| MONTH | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 10 YEAR TOTAL | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | |
| JANUARY | 0 | 0 | 0 | 0 | 0 | 0 | 349 | 0 | 0 | 0 | 349 | |
| FEBRUAR | 0 | 0 | 0 | 0 | 0 | 0 | 76 | 0 | 0 | 0 | 76 | |
| MARCH | 250 | 820 | 0 | 0 | 0 | 1400 | 9299 | 2329 | 4152 | 536 | 18766 | |
| APRIL | 27020 | 27880 | 7430 | 21060 | 10010 | 16370 | 13890 | 11516 | 12516 | 15864 | 163556 | |
| MAY | 42650 | 44700 | 46170 | 48050 | 38090 | 30760 | 43720 | 41822 | 32806 | 20987 | 387755 | |
| JUNE | 35660 | 9330 | 37050 | 12320 | 37200 | 5820 | 48442 | 28598 | 39659 | 5019 | 259088 | |
| JULY | 5700 | 2870 | 3050 | 780 | 1900 | 2620 | 11634 | 8846 | 12734 | 106 | 60240 | |
| AUGUST | 1030 | 1310 | 3430 | 0 | 1050 | 70 | 9108 | 1668 | 13019 | 229 | 30914 | |
| SEPTEMB | 1080 | 150 | 1670 | 0 | 0 | 210 | 3406 | 153 | 4015 | 0 | 10684 | |
| OCTOBER | 20 | 0 | 10 | 0 | 0 | 270 | 2350 | 200 | 0 | 0 | 2850 | |
| NOVEMBE | 0 | 0 | 0 | 0 | 0 | 980 | 0 | 1188 | 0 | 0 | 2168 | |
| DECEMBE | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 381 | 0 | 0 | 411 | |
| ANNUAL | 113400 | 87060 | 98810 | 82210 | 86250 | 58530 | 142274 | 96701 | 118901 | 42741 | 926877 | |

TEN YEAR AVERAGE = 92688

2000

TABLE 3. SAN JUAN-CHAMA WATER RELEASES FROM HERON RESERVOIR

(UNIT = ACRE-FEET)

| TABLE 4 SJC-Heron Res | MFGCD | SANTA FE | COCHITI | CITY OF ALBUQU- ERQUE | POJO- AQUE UNT | TADS | COUNTY OF LOS ALAMOS | CITY OF ESPANA- OLA | TWINING SAN- TATION | MILLAGE OF LOS LUNAS | TOWN OF BERNA- LILLO | BELEN | FED RIVER | OTHER SJC | TOTAL |
|--------------------------|-------|-------------|---------|--------------------------------|----------------------|------|-------------------------------|------------------------------|---------------------------|-------------------------------|-------------------------------|-------|--------------|--------------|--------|
| MONTH | 2000 | 5875 | 5000 | 48200 | 1030 | 400 | 1200 | 1000 | 15 | 400 | 400 | 500 | 80 | 11490 | 96200 |
| JANUARY | 0 | 3069 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3069 |
| FEBRUARY | 1963 | 908 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2871 |
| MARCH | 18617 | 0 | 0 | 0 | 0 | 0 | 1200 | 1000 | 0 | 0 | 0 | 0 | 0 | 9637 | 30454 |
| APRIL | 320 | 0 | 0 | 15952 | 0 | 400 | 0 | 0 | 15 | 400 | 400 | 500 | 60 | 1853 | 19900 |
| MAY | 0 | 5605 | 0 | 0 | 0 | 400 | 1200 | 0 | 0 | 0 | 0 | 0 | 60 | 3160 | 10425 |
| JUNE | 0 | 0 | 0 | 6668 | 0 | 0 | 0 | 1000 | 15 | 0 | 0 | 0 | 0 | 8345 | 16028 |
| JULY | 0 | 0 | 0 | 2889 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2889 |
| AUGUST | 1429 | 0 | 0 | 12478 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13907 |
| SEPTEMBER | 19471 | 0 | 405 | 7522 | 501 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27899 |
| OCTOBER | 0 | 0 | 3729 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3729 |
| NOVEMBER | 0 | 0 | 866 | 7252 | 0 | 0 | 0 | 0 | 0 | 400 | 400 | 0 | 0 | 0 | 8918 |
| DECEMBER | 0 | 0 | 0 | 5552 | 156 | 0 | 0 | 0 | 0 | 0 | 0 | 500 | 0 | 0 | 6208 |
| 2000 CY Total | 41800 | 9582 | 5000 | 58313 | 657 | 800 | 2400 | 2000 | 30 | 800 | 800 | 1000 | 120 | 22995 | 146297 |

2000

**TABLE 4. HERON RESERVOIR
MONTHLY WATER STORAGE--SAN JUAN - CHAMA PROJECT
(UNT = ACRE-FEET)**

| MONTH | INFLOW | | OUTFLOW | | SAN JUAN CHAMA LOSS | END-OF-MONTH CONTENT | | | ELEVATION (FEET) |
|-----------|------------|----------------|------------|----------------|---------------------|----------------------|----------------|--------|------------------|
| | RIO GRANDE | SAN JUAN CHAMA | RIO GRANDE | SAN JUAN CHAMA | | RIO GRANDE | SAN JUAN CHAMA | TOTAL | |
| | (1) | (2) | (3) | (4) | | (6) | (7) | (8) | |
| DEC. 1999 | | | | | | -375 | 380311 | 379936 | 7182.42 |
| JANUARY | 154 | 0 | 154 | 3069 | 470 | -375 | 376772 | 376397 | 7181.80 |
| FEBRUARY | 144 | 0 | 144 | 2871 | 593 | -375 | 373308 | 372933 | 7181.19 |
| MARCH | 4816 | 536 | 150 | 30454 | 0 | 4291 | 343390 | 347681 | 7176.64 |
| APRIL | 2234 | 15832 | 7819 | 19900 | 0 | -1294 | 339322 | 338028 | 7174.85 |
| MAY | 147 | 20945 | 345 | 10425 | 995 | -1492 | 348847 | 347355 | 7176.58 |
| JUNE | 342 | 5009 | 141 | 16028 | 1922 | -1291 | 335906 | 334615 | 7174.21 |
| JULY | 143 | 106 | 143 | 2889 | 2246 | -1291 | 330877 | 329586 | 7173.26 |
| AUGUST | 142 | 229 | 142 | 13907 | 524 | -1291 | 316675 | 315384 | 7170.53 |
| SEPTEMBER | 130 | 0 | 140 | 27899 | 1149 | -1301 | 287627 | 286326 | 7164.72 |
| OCTOBER | 131 | 0 | 130 | 3729 | 1941 | -1300 | 281957 | 280657 | 7163.55 |
| NOVEMBER | 1486 | 0 | 125 | 8918 | 0 | 61 | 273039 | 273100 | 7161.97 |
| DECEMBER | 624 | 0 | 127 | 6208 | 0 | 558 | 266831 | 267389 | 7160.76 |
| SUB-TOTAL | 10493 | 42657 | 9560 | 146297 | | | | | |
| ADJUST. | | | | | | -350 (A) | | | |
| ANNUAL | | 53150 | | 155857 | 9840 | 208 | 267181 | 267389 | |

(1) FROM 1(7)

(2) FROM 1(1) - 1(2)

(3) ACTUAL RIO GRANDE RELEASE INCLUDING SEEPAGE.

(4) ACTUAL SAN JUAN-CHAMA RELEASE.

(5) PREVIOUS EOM SJ-C CONTENT, 3(7) + 3(2) - 3(4) - CURRENT EOM SJ-C CONTENT, 3(7).

(6) PREVIOUS RG CONTENT, 3(6) + 3(1) - 3(3) = CURRENT EOM CONTENT.

(7) TOTAL CONTENT, 3(8) - RG CONTENT, 3(6) = SJ-C CONTENT.

(8) FROM CURRENT AREA/CAPACITY TABLES.

(9) ACTUAL EOM RESERVOIR ELEVATION.

(A) 351 ACRE- FEET WERE USED FOR THE YEAR AS PER WATER RIGHTS FILE NO. 1545 AND 1699. 3 ACRE- FEET WERE USED FOR HERON RECREATION AND 348 ACRE- FEET TO REPLACE EVAPORATION LOSSES.

The SJ-C contractors 2000 and waived 1999 annual allocations were delivered for a total delivery in 2000 of 146,297 af. The remaining 2000 allocation of 15,396 af was held in Heron according to a waiver that grants an extension for the delivery date for the City of Albuquerque from December 31, 2000 to April 30, 2001. This water is released in a manner to provide water flows in the Rio Chama between El Vado and Abiquiu reservoirs.

Heron Dam Review of Operations and Maintenance Program

The hydraulic piezometers and well near the toe of Heron Dam were rehabilitated and readings are being taken again on a regular basis.

An annual inspection was conducted at the dam by the Chama Field Division Office. Other than routine maintenance items, there were no areas of concern.

A dive examination of the stilling basin and the river outlet works intake structure was performed in October 2000 in preparation for a Comprehensive Facility Review that will be completed in 2001. A mechanical examination was also conducted in 2000.

The Chama Field Division and Reclamation's Technical Service Center installed a Remote Terminal Unit (RTU) and upgraded the hydraulic system to allow for remote monitoring and operation from the Chama Field Division Office. The system still needs the local phone company to run a phone line to the control structure to allow for communications between the office and the dam before this is up and running.

Heron Dam, Safety of Dams Programs

No work was done in 2001 relating to Reclamation's Safety of Dams Program on Heron Dam.

Pojoaque Tributary Unit - Nambe Falls Dam and Reservoir

Nambe Falls began 2000 with the reservoir at elevation 6,824.63 ft providing a storage volume of 1,909 af. During the winter, releases averaged between 2 to 7 ft³/s to maximize conservation storage as agreed to by the Pojoaque Valley Irrigation District (PVID) and Indian water users. Due to a poor Spring runoff and a dismal monsoon season, the reservoir filled only once in 2000. The maximum elevation for the year was 6,826.63 ft (2,025 af) on April 30. The reservoir reached the low point of the year on September 20 at an elevation of 6,802.68 ft (926 af).

The depletion from the unit was 364 af as computed at the Otowi gage. 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. This depletion of 364 af was well below the 1,030 af PVID Heron allocation set aside to offset Nambe Falls storage. Although the 1,030 af is a "soft number," a depletion close to this amount is typically computed at Otowi during an average year Table 5. San Juan-Chama replacement water to offset the depletions for Nambe Falls operations was released first in March at Abiquiu by borrowing 154 af from Santa Fe. Later in September, an additional release was made from Heron in the amount of 501 af. Operational error caused a slightly higher amount to be released. An additional release of 156 af was made from Heron in December to pay back Santa Fe.

Nambe Falls Reservoir ended 2000 at elevation 6,812.43 ft (1,306 af). A summary of the reservoir operation is shown on Table 6.

Nambe Falls Dam Review of Operations and Maintenance Program

An annual inspection of the dam was performed by Reclamation and PVID personnel in 2000. With the hiring of a new dam tender by PVID, maintenance has improved at the dam. Reclamation has conducted training for the new dam tender and the new back up dam tender periodically through the spring and summer of 2000.

A dive examination and a mechanical examination were conducted at the dam in the fall of 2000 in preparation of a Comprehensive Facility Review in 2001. The outlet

works intake structure was found to be in good condition, with no concrete erosion or major metal work deterioration or damage to the trashracks.

2000

TABLE 5.

SAN JUAN-CHAMA WATER AT OTOWI--SAN JUAN-CHAMA PROJECT

(UNIT = ACRE-FEET)

| TABLE 8. 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 | 3069 | 0 | 0 | 3069 | -1207 | 51 | 124 | 34 | 1721 |
| FEBRUARY | 2871 | 0 | 0 | 2871 | -1229 | 46 | 53 | 35 | 1578 |
| MARCH | 30454 | 18617 | 891 | 12728 | -997 | 246 | 107 | 49 | 11427 |
| APRIL | 19900 | 12180 | 3518 | 11238 | -3593 | 192 | 112 | 35 | 7376 |
| MAY | 10425 | 0 | 0 | 10425 | 18143 | 372 | 24 | 25 | 28197 |
| JUNE | 16028 | 6000 | 12743 | 22771 | 20601 | 641 | 19 | 73 | 42785 |
| JULY | 2889 | 0 | 22688 | 25571 | 20682 | 698 | 25 | 81 | 45617 |
| AUGUST | 13907 | 0 | 19496 | 33406 | 24850 | 892 | 145 | 53 | 57269 |
| SEPTEMBER | 27899 | 0 | 2928 | 30832 | 15093 | 752 | 30 | 30 | 45168 |
| OCTOBER | 3729 | 0 | 12901 | 16630 | -6420 | 275 | 56 | 51 | 9930 |
| NOVEMBER | 8918 | 4547 | 5041 | 9412 | -6357 | 131 | 180 | 30 | 2774 |
| DECEMBER | 6208 | 345 | 0 | 5866 | -4802 | 74 | 157 | 27 | 857 |
| ANNUAL | 146297 | 41689 | 80206 | 184819 | 74764 | 4370 | 1032 | 523 | 254699 |

RELEASE OF SAN JUAN-CHAMA WATER FROM ANY RESERVOIR MADE ON THE LAST DAY OF PRIOR MONTH WILL BE ACCOUNTED FOR AT OTOWI ON THE FIRST DAY OF THE MONTH.

$$(9) = (4) + (5) - (6) - (7) + (8)$$

2000

**TABLE 6. NAMBE FALLS RESERVOIR
MONTHLY WATER STORAGE--SAN JUAN-CHAMA PROJECT**

(UNT = ACRE-FEET)

| TABLE 5 NF Monthly MONTH | INFLOW | OUTFLOW | | | RESER. LOSSES | TOTAL OUTFLOW + LOSSES | END OF MONTH | | RELEASE AF from Table "Daily Res. Comps" BLUE BOOK | Mass B.d. Check |
|------------------------------------|--------|--------------|-----------------|-------|------------------|------------------------------|--------------|-----------|--|--------------------|
| | | BY PASSED | STORAGE RELEASE | | | | CONTENT | ELEVATION | | |
| | | | OPER | IBBIG | | | | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | |
| DEC. 1999 | | | | | | | 1903 | 6824.51 | | |
| JANUARY | 225 | 95 | 0 | 45 | 8 | 148 | 1980 | 6825.86 | 140 | 140 |
| FEBRUARY | 392 | 312 | 0 | 176 | 28 | 516 | 1956 | 6823.68 | 488 | 488 |
| MARCH | 265 | 155 | 0 | 22 | 11 | 188 | 1933 | 6825.05 | 177 | 177 |
| APRIL | 704 | 590 | 0 | 5 | 17 | 612 | 2025 | 6826.63 | 595 | 595 |
| MAY | 803 | 760 | 0 | 477 | 23 | 1260 | 1568 | 6818.12 | 1237 | 1237 |
| JUNE | 410 | 373 | 0 | 473 | 22 | 868 | 1110 | 6807.77 | 846 | 846 |
| JULY | 230 | 203 | 0 | 156 | -1 | 358 | 982 | 6804.32 | 359 | 359 |
| AUGUST | 278 | 133 | 0 | 14 | 0 | 147 | 1113 | 6807.85 | 147 | 147 |
| SEPTEMBER | 121 | 61 | 0 | 207 | 32 | 300 | 934 | 6802.95 | 268 | 268 |
| OCTOBER | 213 | 157 | 0 | 7 | -2 | 162 | 985 | 6804.42 | 164 | 164 |
| NOVEMBER | 334 | 154 | 0 | 12 | 3 | 169 | 1150 | 6808.77 | 166 | 166 |
| DECEMBER | 210 | 53 | 0 | 0 | 1 | 54 | 1306 | 6812.43 | 53 | 53 |
| ANNUAL | 4185 | 3046 | 0 | 1594 | 142 | 4782 | 1306 | 6812.43 | 4640 | 4640 |

1999 EOY CONTENT + TOT. INFLOW - TOT. OUTFLOW - LOSSES = 1306 ACRE- FEET

SJ-C REQUIRED AT OTOWI= (INFLOW - BYPASS - RETURN FLOW CREDIT - LOSSES
ACCRUED DURING DRAWDOWN) = (4185 - 3046 - 523 - 107) = 509 ACRE- FEET

ACTUAL SJ-C RELEASED FOR NAMBE FALLS IN 2000 = 655 ACRE- FEET (A)
EQUIVALENT SJ-C RELEASED FROM HERON IN 2000 = 657 ACRE- FEET

COL (5) LOSSES ACCRUED DURING RESERVOIR DRAWDOWN = 107 ACRE- FEET
ACCRUED DURING RESERVOIR RISE OR STEADY STATE= 35 ACRE- FEET

(A) SJ-C WATER REQUIRED AT OTOWI MAY NOT COME DIRECTLY FROM
HERON. RELEASES MAY BE MADE FROM EL VADO OR ABIQUIU ON A
GIVEN MONTH BUT WILL EVENTUALLY BE REPLACED FROM HERON
WITH LOSSES ADJUSTED ACCORDINGLY.

NOTE: OPERATIONS ARE BASED ON DAILY ACCOUNTING

Nambe Falls Dam Safety of Dams Program

No work was done in 2000 relating to Reclamation's Dam Safety Program at Nambe Falls Dam.

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 authorizes 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 182,824 af in 2000. The amount of SJ-C water in storage peaked on March 14 at 181,213 af and ended the year at 88,646 af (Table 7). The Middle Rio Grande Conservancy District (MRGCD) was granted storage by the City of Albuquerque to temporarily store SJ-C water which was vacated from El Vado to facilitate the cleaning of the intake structure (see **El Vado Dam and Reservoir Operations**). Approximately 257,332 af of SJ-C water was released from Abiquiu Dam in 2000. Approximately 99,600 af of this was water released from Abiquiu as supplemental water leased by Reclamation or by the City of Albuquerque to insure flows between San Acacia and Elephant Butte.

Work on the gates at Abiquiu which took place the previous year was found to be unsatisfactory. The contractor was called back in November of 2000 to correct the problem. A bulkhead was placed over the intake which restricted flow to approximately 50 ft³/s. Releases will remain at that level until work is completed in 2001.

Cochiti Dam and Lake is a U.S. Corps of Engineers facility and Public Law 88-293 authorizes the Secretary of the Interior to make SJ-C water available to maintain a permanent pool of 1,200 surface acres for fish, wildlife and recreation. San Juan-Chama deliveries to replace losses on the reservoir's permanent recreation pool are usually performed in accordance with the recommendations made in the **Cochiti Lake Re-Regulation Interagency Biological Report** published on June 30, 1993. 1999 deliveries of SJ-C water to Cochiti were completed in January, 2000. As of December 31, 2000, a total of 4,025 af of 2000 deliveries were made to Cochiti, with the remainder of SJ-C deliveries to Cochiti to occur in January 2001.

Jemez Canyon Dam and Reservoir is a U.S. Army Corps of Engineers facility. Jemez Canyon Reservoir started the year with approximately 17,226 af of SJ-C storage and ended the year with a SJ-C content of approximately 3,927 af. The entire operation of Jemez Reservoir is being revised due to the expiration of the agreement between the New Mexico Interstate Stream Commission (NMISC) and the City of Albuquerque. The dam will be used mainly for flood control only. Sediment which was trapped by the dam will now be allowed to reach the Rio Grande where degradation of fish habitat has

occurred due to the lack of sediment. It is doubtful that the City of Albuquerque will continue to lease SJ-C water to the NMISC to maintain the sediment pool in Jemez.

2000

TABLE 7.

RESERVOIR OPERATION FOR ABIQUIU DAM

(UNIT = ACRE-FEET)

| Abiquiu Res. Op. MONTH | INFLOW | | OUTFLOW | | LOSSES | | EOM CONTENT | | | |
|---------------------------|--------|--------|---------|--------|--------|-------|-------------|------|--------|--------|
| | RG | SJ-C | RG | SJ-C | RG | SJ-C | SEDIMENT | RG | SJ-C | TOTAL |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| DEC. 1999 | 0 | 4648 | 2271 | 3644 | 0 | 212 | 1057 | -16 | 176272 | 177313 |
| JANUARY | 4157 | 3038 | 4166 | 1831 | 0 | 214 | 1069 | -114 | 177265 | 178220 |
| FEBRUARY | 4924 | 2851 | 4811 | 1622 | 0 | 487 | 1084 | -2 | 178007 | 179089 |
| MARCH | 13418 | 12351 | 13787 | 11354 | 0 | 670 | 1166 | -370 | 178334 | 179130 |
| APRIL | 25032 | 11170 | 25640 | 7577 | 0 | 1558 | 1289 | -979 | 180369 | 180679 |
| MAY | 32917 | 9253 | 32607 | 27396 | 0 | 2409 | 1426 | -664 | 159817 | 160579 |
| JUNE | 40870 | 22664 | 40661 | 43265 | 0 | 2117 | 1585 | -455 | 137099 | 138229 |
| JULY | 30988 | 25586 | 31416 | 46268 | 3 | 1764 | 2023 | -887 | 114653 | 115789 |
| AUGUST | 12609 | 32334 | 12592 | 57184 | 0 | 1563 | 2332 | -876 | 88240 | 89696 |
| SEPTEMBER | 15355 | 31630 | 13655 | 46723 | 5 | 1410 | 2730 | 818 | 71737 | 75285 |
| OCTOBER | 5383 | 15796 | 5345 | 9376 | 1 | 273 | 2896 | 859 | 77884 | 81639 |
| NOVEMBER | 177 | 10093 | 89 | 3736 | 5 | 219 | 2920 | 943 | 84022 | 87885 |
| DECEMBER | 984 | 5802 | 2179 | 1000 | 1 | 178 | 2929 | -255 | 88646 | 91320 |
| ANNUAL | 186814 | 182568 | 186948 | 257332 | 15 | 12862 | | | | |

RG REFERS TO RIO GRANDE WATER.
SJ-C REFERS TO TRANSMOUNTAIN WATER IN ABIQUIU.

M&I Water Use National Environmental Policy Act Compliance

Reclamation is serving as the lead federal agency for the City of Albuquerque's Drinking Water Supply Project Environmental Impact Statement (EIS) which is addressing the City's plan to divert, treat, and directly use its SJ-C water for municipal and industrial purposes. Several interagency workgroup meetings were held during 2000 to discuss various aspects of this and other City water resources projects. Coordination with Native Americans is ongoing. Stakeholders and interested organizations participated in an Alternatives Workshop to assess and refine EIS alternatives. Three different types of diversions will be analyzed: a new diversion dam, a subsurface diversion gallery, and use of the existing Angostura diversion. A Draft EIS is expected to be released in 2001.

Reclamation will serve as the lead agency for the City of Santa Fe's Regional Water Management and River Restoration Strategy EIS which is an integrated plan for Santa Fe's direct use of its SJ-C water supply for municipal and industrial purposes and wastewater reuse. The scope of work and request for proposals for the EIS are being prepared. National Environmental Protection Act (NEPA) compliance was completed for a demonstration subsurface diversion facility that will be constructed in 2001.

MIDDLE RIO GRANDE PROJECT, NEW MEXICO

El Vado Dam and Reservoir Operations

The State of New Mexico began 2000 with a credit, per the Rio Grande Compact, which allowed for Rio Grande inflow into El Vado (Figure 4) to be stored during spring runoff to benefit the Middle Rio Grande Conservancy District. The total SJ-C water in storage at the end of the year 2000 was 14,920 af Table 8.

El Vado came close but did not spill in 2000. The maximum storage content was 179,881 af which occurred on May 11, 2000. Due to low flows in the Rio Grande mainstem, the MRGCD had already begun releasing water for irrigation by that time. In addition, Reclamation was releasing water which it had leased from other contractors with storage in El Vado to exchange with the MRGCD native water.

The MRGCD began the year with 34,004 af of SJ-C water in El Vado. This amount had been reduced to 2,490 af by the end of the year. At the end of 2000 there was 19,178 af of MRGCD SJ-C water in Abiquiu which included 17,249 af that was released from El Vado in October and November to facilitate work on the outlet works intake structure.

Irrigation releases ended two weeks early this year due to reduced reservoir storage levels. The six Southern Pueblos continued to direct diversions through November 15, 2000.

Flows out of El Vado were reduced to their Winter operations level by early October, 2000. It was believed that they would remain at the level until Spring 2001. It was decided that since the reservoir was at such a low level it would be prudent to take the reservoir level down to the top of the intake structure so that the debris could be examined and removed. Releases from El Vado were increased to 500 cfs which dropped the level by the maximum allowed reservoir drawdown of one foot per day. The total amount released to Abiquiu in this operation was 17,249 af. Once the debris was removed flows were brought back to the winter release rate of 100 ft³/s. The water provided to meet with flows of 100 cfs is the City of Albuquerque's 2000 allocation that is being moved from Heron to Abiqui. During the 2000-2001 non-irrigation season all native inflow to El Vado was captured.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

ALBUQUERQUE AREA OFFICE

MIDDLE RIO GRANDE PROJECT

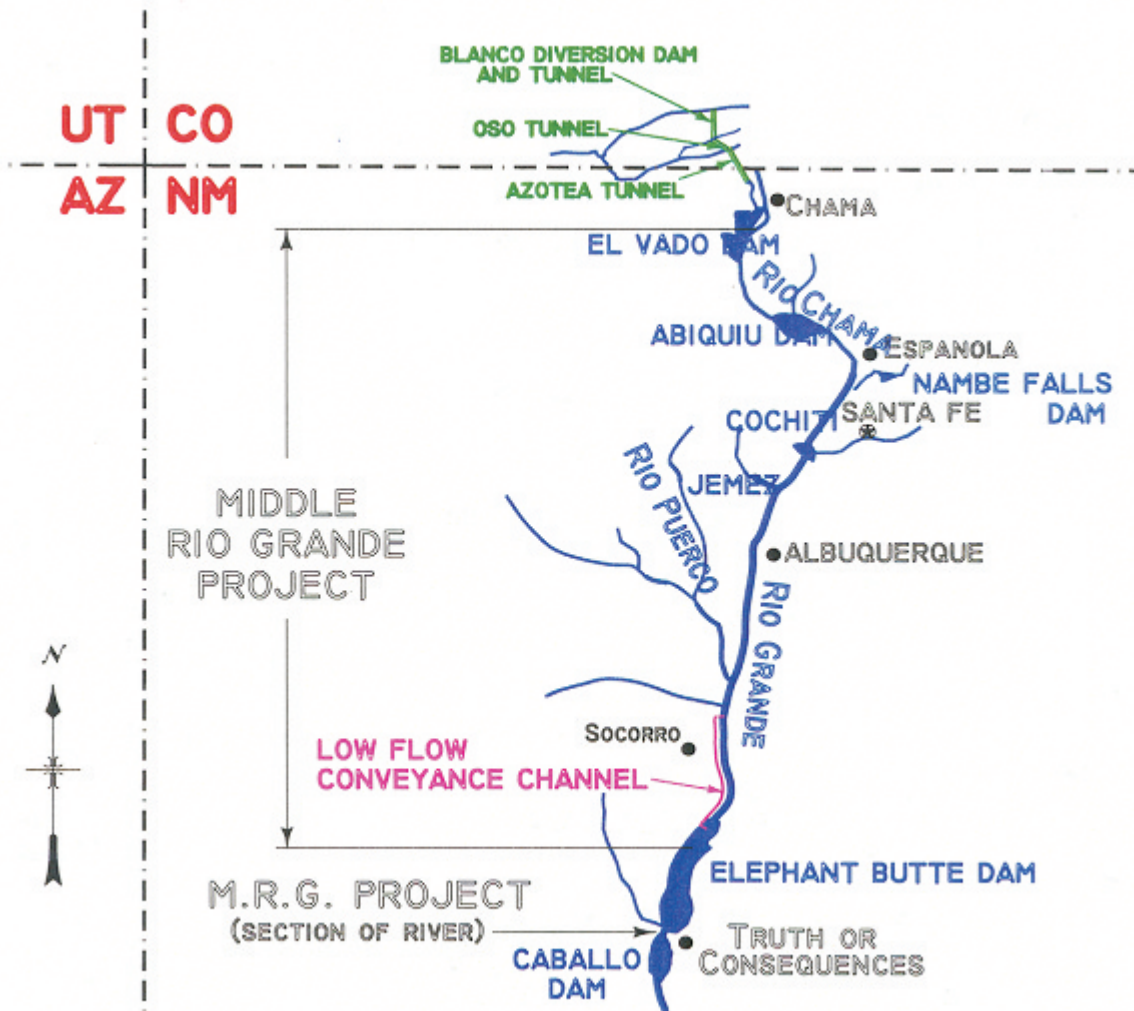


Figure 4. Area map of the Middle Rio Grande Project.

2000

TABLE 8.

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. 1999 | 3398 | 4400 | 2588 | 4598 | 94 | 58 | 82109 | 57371 | 139480 |
| JANUARY | 3496 | 3069 | 3079 | 3069 | 101 | 45 | 82425 | 57326 | 139751 |
| FEBRUARY | 3028 | 2871 | 3013 | 2871 | 162 | 97 | 82278 | 57229 | 139507 |
| MARCH | 1149 | 30454 | 12211 | 12728 | 289 | 12 | 70927 | 74943 | 145870 |
| APRIL | 41271 | 19900 | 19767 | 11238 | 416 | 431 | 92015 | 83174 | 175189 |
| MAY | 21844 | 10425 | 28288 | 10425 | 614 | 549 | 84957 | 82625 | 167582 |
| JUNE | 15046 | 16028 | 46851 | 22771 | 445 | 1211 | 52707 | 74671 | 127378 |
| JULY | 1454 | 2889 | 27250 | 25571 | 175 | 657 | 26736 | 51332 | 78068 |
| AUGUST | -172 | 13907 | 8674 | 33406 | 20 | 583 | 17870 | 31250 | 49120 |
| SEPTEMBER | -704 | 27899 | 13398 | 30832 | -80 | 248 | 3848 | 28069 | 31917 |
| OCTOBER | 4729 | 3729 | 3101 | 16630 | 191 | 77 | 5285 | 15091 | 20376 |
| NOVEMBER | 2626 | 8918 | 118 | 9412 | 125 | 2 | 7668 | 14595 | 22263 |
| DECEMBER | 1374 | 6208 | 6 | 5866 | 16 | 17 | 9020 | 14920 | 23940 |
| ANNUAL | 95141 | 146297 | 165756 | 184819 | 2474 | 3929 | | | |

RG REFERS TO RIO GRANDE WATER.

SJ-C REFERS TO TRANSMOUNTAIN WATER IN EL VADO.

El Vado Dam Review of Operations and Maintenance Program

The spillway bridge was inspected on March 23, 1999 by a certified bridge inspection team as part of Reclamations bridge inspection program and from concern about the condition of the bridge from previous exams. As a result of the inspection, the bridge was temporarily closed, then reopened with a restrictive weight and width limit. The bridge repair was coordinated and completed by contract by the NM State Highway Department in May 2000. A followup inspection made note of the repair but it also indicated that sometime in the future, the NM State Highway Department will replace this bridge with a new bridge added downstream of the dam. The State Highway Department has taken responsibility for bridge inspections on this dam.

A dive examination in October 2000 showed that a lot of debris and rock was on top of the river outlet works intake structure. Since this structure was not designed for this load, the reservoir was lowered and the debris was removed. It turns out that this material was construction debris from the construction activities related to the El Vado Dam power plant, owned by Los Alamos County.

An annual inspection was performed by the Chama Field Division.

Cooperative Program with the State of New Mexico

Reclamation cooperates with the NMISC on water salvage and drain improvement efforts. During 2000, the NMISC, provided funds to Reclamation for design, construction, and miscellaneous maintenance work.

In 2000, Reclamation constructed a new State Coop funded Elmendorf Drain outfall. The structure consists of a 128" x 83" x 68' long corrugated metal arch pipe which empties into the Low Flow Conveyance Channel (LFCC). Shortly after the outfall was completed, water was routed through the structure. The force of the water exiting the pipe washed out the riprap in the LFCC resulting in a near collapse of the end of the pipe. Flows were rerouted to the old outfall along the south boundary of the Bosque del Apache Wildlife Refuge. A new design was put together which includes concrete capped sheet piling on the downstream end of the pipe to hold the riprap in place. Completion on the repair of the structure is scheduled for 2001.

Reclamation performed vegetative mowing along the Elmendorf, La Joya, Escondida Drains, and Drain Unit 7.

Temporary Channel into Elephant Butte

Below San Marcial at the headwaters of Elephant Butte reservoir, a pilot channel is currently being excavated to the reservoir pool. The purpose of the project is to

alleviate the channel aggradation caused by sedimentation in the upstream San Marcial area for effective delivery of water and sediment into the reservoir. This project will increase the channel capacity in the upstream San Marcial reach allowing for higher spring runoff releases and efficient water delivery. This project also decreases the threat to the levee system and railroad bridge crossing in the area. This project commenced in August of 2000 and is planned to continue through August of 2002. This project involves the excavation of a 250 ft. wide channel into the reservoir pool. In 2000, approximately 60,000 cubic yards (cy) of material has been excavated for the temporary channel over a length of 3500 ft. Also, approximately 6,000 cy of material has been utilized for the construction of a berm upstream of the channel alignment to divert flood flows away from the temporary channel alignment. Prior to the spring runoff of 2001, Reclamation plans to excavate an additional 1.5 miles of channel into the reservoir.

River Maintenance

Reclamation's responsibility for Rio Grande channel operation and maintenance involves that part of the river from Velarde, New Mexico, to the narrows of Elephant Butte Reservoir, and from Elephant Butte Dam to Caballo Reservoir.

At the Santa Ana Pueblo, a Gradient Restoration Facility (GRF) is being installed to halt channel bed degradation in the reach. The GRF is a sheet pile and rock structure that acts as a grade control structure with an apron that allows for fish passage. In 2000, approximately ½ of the sheet pile wall (500' length) was driven. Approximately 15,380 cy of rock material was placed for the apron. Also, a 25 ft. wide pilot channel was excavated upstream of the GRF for a length of 1800 ft. The purpose of the pilot channel is to create a new channel alignment away from the toe of the existing eastern levee system and relocate the existing channel over the GRF. For the channel re-alignment work a new floodplain is being constructed. In 2000, this activity has involved approximately 90,000 cy of excavation. Previously, due to the channel bed degradation the river was eroding into the levee system and threatened both a drain system and agricultural properties outside the levee system. When completed this project will eliminate that threat.

In the San Marcial area approximately 24,100 cy of material was used to raise the levee for protection of the AT&SF railway and the Low Flow Conveyance Channel. The river channel in the reach of the middle channel is currently experiencing an aggradational trend due to influences of the reservoir pool and inadequate sediment transport capacity due to a minimal river channel and valley slope. The levee raising was necessary for safe passage of a 2-yr return discharge of 8,500 cfs.

In the river channel between Elephant Butte Dam and Caballo Reservoir, approximately 8,000 cy of material was removed from the mouths of Cuchillo Negro Arroyo and Arroyo Hondo. Heavy sediment loads from these tributaries are deposited annually during the summer monsoon thunderstorm seasons. Due to both reservoir impoundments (Elephant Butte Dam and Caballo Dam) there exists no mechanism for adequate removal of the sediment material other than mechanical removal. The material removal was performed during the period of non-releases from Elephant Butte Dam. The maintenance work is necessary to ensure adequate flood regulation capacity of 5,000 cfs in the channelized river channel between Elephant Butte Dam and Caballo reservoir. In January of 2000 flow releases in the 4500 cfs to 5000 cfs range were performed to both evaluate the channel capacity and move water to Caballo Dam to meet downstream irrigation demands.

Rio Grande River Restoration Projects

The river restoration projects are part of an initiative to partially restore the Middle Rio Grande bosque and determine the effectiveness of creating new habitat within the floodplain via a managed effort. The goals in general are to provide opportunities for re-growth of native tree species, channel widening, widening of the flood prone area, and creation or enlargement of high flow side channels to provide greater habitat diversity and more suitable habitat for the native aquatic and terrestrial communities.

Reclamation, in cooperation with the University of New Mexico and other State and Federal agencies, have teamed up at two sites, the Albuquerque Overbank Project and the La Joya River Restoration Project, to help restore the environmental integrity of the bosque along the Rio Grande.

In collaboration with the Santa Ana Pueblo and the Corps of Engineers, approximately four miles of the Rio Grande are being rehabilitated to provide for a more stable gradient, to reconnect the floodplain with the system's hydrology, and develop aquatic/terrestrial habitats more favorable to native and endangered species. Additionally, approximately 300 acres of adjacent bosque are being cleared of non-native invasive vegetation and replanted with native trees, shrubs, and grasses. In 2000, Reclamation worked intensely on the Santa Ana Pueblo River Restoration Project on installation of a gradient restoration facility and lowering of riverside terraces for the construction of a new floodplain. It is expected that work on this project will continue into the year 2001

Endangered Species

Rio Grande Silvery Minnow

The U.S. Fish and Wildlife Service (Service) listed the Rio Grande silvery minnow (silvery minnow) as endangered in 1994 under the Endangered Species Act (ESA). The silvery minnow was formerly one of the most widespread and abundant species in the Rio Grande basin of New Mexico, Texas, and Mexico. Currently, the silvery minnow occupies less than 10 percent of its historic range and is restricted to the reach of the Rio Grande in central New Mexico from Cochiti Dam to the headwaters of Elephant Butte Reservoir. In July 1999, the reach from the State Highway 22 bridge below Cochiti Dam downstream to the railroad bridge crossing near San Marcial, New Mexico was designated as critical habitat. This designation is being challenged in court.

In November 1999, environmental groups collectively filed suit against Reclamation and the Corps of Engineers (Corps) for alleged ESA and NEPA violations (*Minnow v. Martinez*). Court-directed mediation began in July 2000 and resulted in an Agreed Order and a related supplement. The Agreed Order resolved the Plaintiff's motion for Preliminary Injunction which asked the court to direct Reclamation and the Corps to maintain continuous flows to Elephant Butte Reservoir.

Reclamation continued to lease water for middle valley use and manage it cooperatively with the Middle Rio Grande Conservancy District during 2000. In spite of these efforts, flow downstream of San Acacia Diversion Dam fell below target levels during the last week of July. As a result, the river became intermittent for at least 7 miles in the reach between the southern boundary of the Bosque del Apache National Wildlife Refuge and Ft. Craig. With the exception of this period, the Rio Grande was kept free flowing for the duration of the irrigation season. Throughout the year, water operations were constantly evaluated for short- and long-term opportunities to maximize available water supplies.

Fish monitoring in 2000 continued to show that silvery minnow were uncommon in the reach between Angostura and San Acacia diversion dams and were distributed in reduced numbers throughout the reach from San Acacia to the headwaters of Elephant Butte Reservoir. It is estimated that over 95 percent of the existing silvery minnow population occurs downstream of San Acacia Diversion Dam. Intensive monitoring was conducted by Reclamation in this reach during the later part of the irrigation season to document the effects of actions carried out in accordance with the aforementioned Agreed Order on the distribution and abundance of silvery minnow. This information is available on a new Reclamation web page:
<http://www.uc.usbr.gov/progact/rg/rgm/index.html>.

Reclamation continues to take a pro-active approach to Rio Grande aquatic issues, especially those relating to the silvery minnow, through activities such as developing and funding aquatic research and monitoring programs, securing and overseeing the management of leased water, conducting river restoration, and participating in collaborative efforts for the benefit of endangered species.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (flycatcher) was listed as endangered by the Service effective March 29, 1995. Critical habitat was designated effective August 21, 1997 in some areas of New Mexico and other states throughout the species range. The Rio Grande was not designated as critical habitat for the flycatcher. However, Section 7 of the ESA requires all Federal agencies to consult with the Service 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 Service pursuant to Section 7 over numerous actions, mainly operations and maintenance activities along the Rio Grande since 1995.

Reclamation continues to conduct flycatcher surveys and nest monitoring along portions of the Rio Grande. Related surveys have been conducted by Reclamation since 1995 primarily in the Espanola Valley and the San Marcial area above Elephant Butte Reservoir. The surveys and nest monitoring will continue in 2001.

Middle Rio Grande Endangered Species Act Collaborative Program

On January 3, 2000, Reclamation signed a Memorandum Of Understanding with other partners to develop a Middle Rio Grande Endangered Species Act Collaborative Program (Program) for the purpose of protecting and improving the status of endangered species, while existing and future water uses are protected and proceed in compliance with all applicable laws. Involved parties currently include representatives from the Bureau of Reclamation, Fish and Wildlife Service, Bureau of Indian Affairs, Corps of Engineers, State of New Mexico, Middle Rio Grande Conservancy District, Alliance for Rio Grande Heritage, Plaintiffs in the *Minnow v. Martinez* lawsuit, City of Albuquerque, National Association of Industrial and Office Properties, and New Mexico Farm and Livestock Bureau. Other parties may sign on at a later date. By the end of 2000, an ESA Workgroup had developed a draft Cooperative Agreement and associated Program documents defining areas such as Program organization, long range planning, schedule and budget, cost sharing and funding, and ESA compliance. These documents are currently under review.

Reclamation is committed to continuing these efforts and actively collaborating with other federal and non-federal stakeholders on the middle Rio Grande to develop and

implement solutions that will provide for the continued delivery of water for agriculture, municipal and industrial uses, the river and the bosque, and the protection of threatened and endangered species.

Programmatic Water Operations and River Maintenance Assessment

In December 1997, Reclamation and the Corps, in compliance with Section 7 of the ESA, jointly initiated a programmatic consultation to cover a multi-year period with a goal of developing sideboards for proposed water operations and river maintenance actions to avoid adverse effects on federally listed species. In November 2000, the Corps withdrew from the programmatic consultation. Subsequently, Reclamation and the Service entered into a Memorandum of Agreement establishing a schedule to complete the programmatic consultation prior to the 2001 irrigation season. In January 2001, Reclamation updated the biological assessment of its discretionary actions related to water management on the middle Rio Grande in New Mexico. The assessment, which focuses on the Rio Grande silvery minnow, southwestern willow flycatcher, and bald eagle, describes Reclamation's discretionary actions related to water management on the Middle Rio Grande in New Mexico. Reclamation continues to work with the Service to complete this ESA consultation.

Rio Grande and Low Flow Conveyance Channel Modifications and EIS

Over the past 20 years, increased flow in the Rio Grande, a relatively full Elephant Butte Reservoir, and continuing sediment deposition have put the channel system in the reach below San Marcial under great stress. There is an increasingly high risk of the levee breaching and diversions to the Low Flow Conveyance Channel have been suspended since 1985. In September 2000, Reclamation released a Draft Environmental Impact Statement (DEIS) on proposed modifications that would alleviate some of the most critical problems in the San Marcial area. The DEIS consolidates and incorporates a number of engineering and biological studies completed or currently ongoing under the Middle Rio Grande Project program.

The DEIS 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.

A final EIS will be released following completion of consultation with the U.S. Fish and Wildlife Service on potential effects to endangered species as required by Section 7 of the Endangered Species Act. Release of the final EIS is expected in June 2001.

RIO GRANDE PROJECT (NEW MEXICO - TEXAS)

The Albuquerque Area Office's El Paso and Elephant Butte Field Divisions, are jointly responsible for the operations of the Rio Grande Project (Figure 5). Elephant Butte Field Division operated and maintained Elephant Butte and Caballo Dams. The Elephant Butte Irrigation District and the El Paso County Water Improvement District No. 1 (Districts) operated and maintained 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. The Elephant Butte Irrigation District operated and maintained the three diversion dams in New Mexico under a contract with Reclamation. The El Paso County Water Improvement District No. 1 operated and maintained the diversion into the Riverside Canal in Texas under a contract with Reclamation.

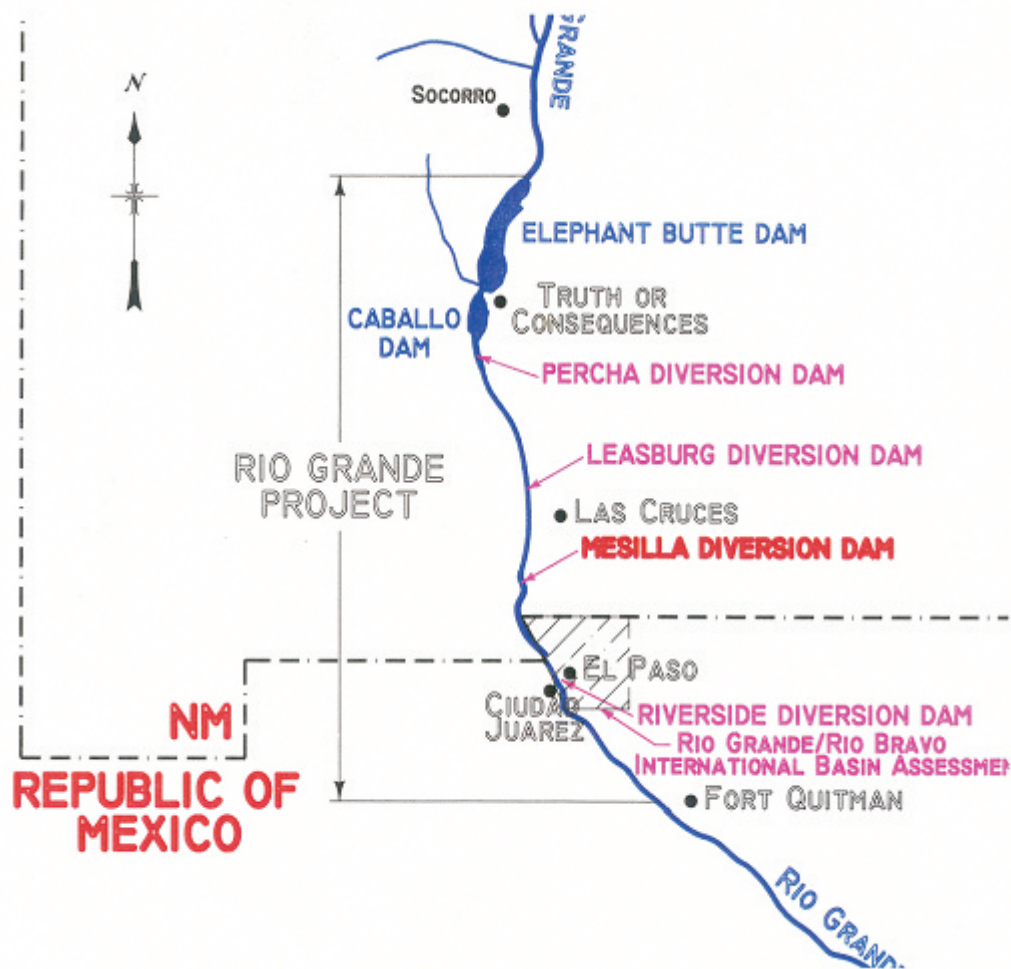


Figure 5. Area map of the Rio Grande Project.

Water Supply Conditions

Inflow into Elephant Butte Reservoir during 2000, measured at the Rio Grande Floodway (FW) plus the Low Flow Conveyance Channel at San Marcial (FW+LFCC), was 433,820 af. The 85-year average annual inflow, measured at San Marcial (FW+LFCC) is 879,392 af. The actual 2000 March through July runoff, measured at San Marcial (FW+LFCC) was 160,560 af which was 32 percent of the 30-year average of 501,000 af. During 2000, 785,670 af of water was released from Elephant Butte Reservoir. There was a release of 751,370 af to meet the irrigation requirements of Project water users from Caballo Reservoir.

The January through June National Weather Service and Natural Resources Conservation Service coordinated forecasts for the 2000 March through July runoff season is presented in Table 9.

Table 9. Summary of 2000 Rio Grande coordinated spring runoff forecast.

| Month | Otowi Runoff (af) | % of 30-Year Average | San Marcial Runoff (af) | % of 30-Year Average |
|-----------|-------------------|----------------------|-------------------------|----------------------|
| Jan 1 | 290,000 | 42 | 120,000 | 24 |
| Feb 1 | 200,000 | 29 | 50,000 | 10 |
| Mar 1 | 230,000 | 34 | 70,000 | 14 |
| Apr 1 | 330,000 | 48 | 161,000 | 32 |
| May 1 | 260,000 | 38 | 85,000 | 17 |
| Jun 1 | 230,000 | 34 | 75,000 | 15 |
| Developed | | | 160,560 | 32 |

Combined storage for Elephant Butte and Caballo Reservoirs was 1,327,850 af on December 31, 2000. This combined storage was 57.6 percent of the total capacity of both reservoirs, and 61.0 percent of the available storage. The available storage for both reservoirs during the winter months (October 1 to March 31) is equal to the capacity of Elephant Butte Reservoir, 2,065,010 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, 238,359 af minus 100,000 af for flood control space, or 2,178,369 af during the winter (2,153,369 af during the summer).

A full allotment was declared by Reclamation in December 1999 for the 2000 irrigation season. This was the 20th consecutive year that a full allotment has been declared at the beginning of each irrigation season. The Rio Grande Project has enjoyed a full supply for the last 22 years. A full allotment was also declared in December 2000 for the 2001 irrigation season.

The coordinated forecast from the National Weather Service and the Natural Resource Conservation Service for the 2001 March through July runoff season is presented in Table 10.

Table 10. Coordinated spring runoff 2001 Rio Grande forecast.

| Month | Otowi Runoff (af) (Mar-Jul) | % of 30-Year Average | San Marcial Runoff (af) (Mar-Jul) | % of 30-Year Average |
|-------|-----------------------------|----------------------|-----------------------------------|----------------------|
| Jan 1 | 690,000 | 101 | 460,000 | 92 |
| Feb 1 | 715,000 | 104 | 500,000 | 100 |
| Mar 1 | 715,000 | 104 | 500,000 | 100 |

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. Therefore, in 2000, the irrigation and drainage system continued to be operated and maintained by Elephant Butte Irrigation District in the New Mexico portion of the Project and by El Paso County Water Improvement District No. 1 in the Texas portion of the Project. Reclamation continues to administer the lands and rights-of-way activities of the reservoirs and diversion dams 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 reserved works for the diversion dams. The Districts performed water accounting flow measurements at canal headings, river stations, and lateral headings during 2000. 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 2000. The International Boundary and Water Commission (IBWC) continued to operate and maintain the American Diversion Dam and the American Canal during 2000 in accordance with the International Treaty with Mexico. In addition, the IBWC operated the International Diversion Dam which diverts irrigation waters into the Acequia Madre head gates operated by Mexico.

Drainage waters from the Rio Grande Project lands provide a supplemental irrigation water supply for approximately 18,342 acres of the Hudspeth County Conservation and Reclamation District No. 1 (HCCRD). Total flows out of the Project to HCCRD, through the Hudspeth Feeder Canal, Tornillo Canal at Alamo Alto, and Tornillo Drain were 125,418 af during 2000. Under the Warren Act contracts, HCCRD was charged for drainage water from the Project between March 1 and September 30 which amounted to 93,205 af.

Water flows measured by IBWC at the Rio Grande at Fort Quitman Station, downstream of the Project and HCCRD boundaries, amounted to 163,100 af during 2000.

Rio Grande Diversion Dam Review of Operations and Maintenance Program

Reclamation conducted a field examination of the Rio Grande Project diversion dam structures - Percha, Leasburg, Mesilla, and Riverside Diversion Dams, on October 28-29, 1998. The final examination report was distributed in November 2000.

Elephant Butte Reservoir and Powerplant

Elephant Butte Reservoir reached a maximum storage of 1,739,300 af (elevation 4,397.55 ft) on February 1, 2000. A minimum storage of 1,182,100 af (elevation 4,377.58 ft) was reached on October 10, 2000. Storage levels in Elephant Butte Reservoir did not enter into the 50,000 af prudent flood control space in 2000.

Net power generation for 2000 was 90,883,090 kilowatt-hours which was 119.8 percent of the 61-year average (1940 through 2000) of 75,836,981 kilowatt-hours.

A fire at the transformer yard of the power plant on July 22, 2000 caused the shutdown of the power plant and its releases until August 26, 2000. The balance valves were utilized to meet downstream irrigation demand and manage Caballo Reservoir storage level.

Elephant Butte Dam Review of Operations and Maintenance Program

Due to the cracking and cavitation on the turbine runners at the power plant, the power plant use was restricted to 90 percent of capacity, which reduced the discharge capacity through the powerplant. A contract to replace the turbines was awarded in 1999 and one turbine per year will be replaced for the next three years leaving just two turbines to make releases through the power plant. As a result, if needed to meet downstream demand below Caballo Dam, additional releases would be made using either the spillway cylinder gates or the balance valves, depending on the reservoir elevation. In 2000, the balance valves were used to assist in meeting irrigation demand downstream of Caballo Dam and managing Caballo Reservoir storage level. Balance valve releases occurred during February, July, and August of 2000. During 2000, Elephant Butte Reservoir level was not high enough to utilize the spillway cylinder gates.

Facility Review for Elephant Butte and Caballo Dams

A Comprehensive Facility Review (CFR) was started in 1999 and finalized in January 2000. The CFR consisted of a state-of-the-art review of the facility, a site examination, and a report of findings. A dive inspection of the outlet works intake structure at Caballo Dam and of the straining tower for Elephant Butte Dam was also performed as part of this process.

Elephant Butte Dam Safety of Dams (SOD) Program

A risk assessment began in 1996 for Elephant Butte Dam as a normal part of Reclamation's ongoing SOD program. There was a SOD field investigation program started in 1997 that began to evaluate seismic stability issues at the dam and static loading and seismic stability concerns at the dike. A probabilistic seismic hazard analysis was completed in late 1998. Structural analysis under the seismic loads was completed in 1999. A risk analysis meeting was conducted in September 2000. A draft Risk Analysis has been written and is being reviewed.

Caballo Dam and Reservoir

Caballo Reservoir reached a maximum storage of 128,700 af (4,159.64 ft) on March 10, 2000. A minimum storage of 30,650 af (4,138.86 ft) was reached on September 27, 2000.

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 (4,144.95 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, 2000 was to maintain storage levels such that they would not exceed 138,300 af in February and not be less than 30,000 af by September. Having higher storage levels earlier in the irrigation season allowed Reclamation to: 1. reduce evaporative losses between Elephant Butte and Caballo Reservoirs; 2. provide sufficient operational hydraulic head at Caballo Reservoir for irrigation demand releases; 3. serve as a reserve pool in case releases were interrupted from Elephant Butte Dam and minimize changes to release rates from Elephant Butte Dam; and, 4. compensate for loss in discharge capacity from Elephant Butte Dam power plant due to the turbine runner replacement program.

Caballo Reservoir's operating plan for October 1, 2000 through September 30, 2001 was coordinated with the Districts by letter transmitted on November 15, 2000. It also reflects accommodations for the Elephant Butte turbine runner replacement program. Reclamation will raise Caballo Reservoir to a maximum storage level of 110,000 af (4,157.58 ft) by late February, 2001 and gradually allow the reservoir storage to decrease throughout the irrigation season to a low point of approximately 42,000 af (4,143.98 ft) by the end of August 2001.

Reclamation will draw Caballo Reservoir down to the trashrack structure level (6,600 af elevation 4,128.53 ft) by the end of September 2001 to allow an inspection of the outlet works of Caballo Dam during October and November, 2001. The last time this inspection was conducted and the reservoir drawn this low was 1981. Reclamation currently is preparing an environmental assessment of this special drawdown operation at Caballo Reservoir. The reservoir will be raised up to its normal winter operating range in December 2001.

In January 2000, Reclamation proposed temporary restriction on the Caballo Reservoir pool level due to safety concerns of operating the spillway gates under static and dynamic loading (see **Caballo Dam Safety of Dams Program** section). Under this restriction, Reclamation will not be allowed to exceed the elevation of 4161.00 ft (the spillway crest) for normal conservation storage operation. Reclamation will allow a functional flood control pool (100,000 af) from elevation 4,161.00 ft to 4,173.17 ft. This operating restriction was made official at the March 23, 2000 Rio Grande Compact Commissioners' annual meeting in El Paso, TX. The restriction will be eliminated when the spillway gates are repaired

Caballo Dam Safety of Dams Program

As a part of the SOD program, a Risk Analysis on the dam and an Arm and Truss Buckling Analysis for the Radial Gates for Caballo Dam was completed in August 2000. This analysis included a hydrologic, hydraulic, static and seismic analysis of the embankment and spillway, with a special review of the radial gates and center pier for the spillway. Analysis has indicated that the radial gates are under strength for a load created by the reservoir with concerns beginning at approximate elevation 4,173.2 feet. One result is a **temporary** reservoir restriction being set at 4,173.17 feet until the gates are modified. Depending on funding issues being clarified, this work should be started in the fall or winter of 2001.

Data Automation and Instrumentation and Flow Monitoring System

During 2000, Reclamation began researching database software applications that would eventually allow us to store and utilize our vast array of Rio Grande Project historical water data. Reclamation also plans to "link" this database to its newly established Web site for the Rio Grande Project which will allow users to browse and utilize historic water data of the Project.

The instrumentation and flow monitoring system has been upgraded and was operational as of the fall 2000. Data collection platforms (DCP's) at five river gaging stations (Caballo, Leasburg, Mesilla, American Canal, and Fort Quitman) were replaced with newer DCP models from December 1997 to January 1999. New water quality multi-probes were added to the Caballo, Leasburg, Mesilla, American Canal, and Fort Quitman gaging stations from December 1997 to February 1999. Telephone lines were installed at the Caballo Dam gatehouse and the American Canal gaging station in 1999 and at Leasburg Gauging Station in 2000. Cell phone connections were installed at Mesilla gaging station during 1999 and at Fort Quitman gauging station in 2000. These communication lines at the gaging stations will now allow Reclamation to poll the stations any time to access real-time data. This data will then be downloaded to Reclamation's computer in El Paso, TX where Reclamation will begin processing the

data and make it available on the El Paso Field Division's new home page on the Internet. Reclamation's home page for the Rio Grande Project will be available on the Internet by the end of March, 2001. Eventually, all the real-time and processed data will be housed permanently on Reclamation's database in the El Paso Field Division office.

Elephant Butte and Caballo Reservoirs Resource Management Plan

The Resource Management Plan (RMP) for Elephant Butte and Caballo Reservoirs was initiated in late 1995 and is presently in its final stage of development. The intent of the RMP is to produce a guide for Reclamation and other relevant agencies for use in the management of Elephant Butte and Caballo Reservoirs' land associated resources. The Draft Environmental Impact Statement and Preferred Management Alternative has been distributed for public review, and comments compiled for appropriate incorporation in a final EIS. The preparation of the RMP is anticipated to be completed by the end of the year 2001. Among the primary issues being discussed and evaluated are grazing management practices, lease lot ownership and management, threatened and endangered species, water quality, and recreation development. The public and related agencies are kept informed throughout the planning process by way of newsletters, planning workgroup meetings, periodic public workshops, and informational open houses.

Diversion Dam Review of Operations and Maintenance Program

Reclamation conducted a field examination of the Rio Grande Project reserved works structures - Percha, Leasburg, Mesilla, and Riverside Diversion Dams, on October 28-29, 1998. The final examination report was issued in November, 2000.

Rio Grande Project Adjudications

The United States District Court for the District of New Mexico issued a Memorandum Opinion and Order dismissing 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) in August 2000. The United States filed this case on June 12, 1997, requesting the Court to quiet legal title to the waters of the Rio Grande Project in its name.

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. During 2000, the Court met with the parties four times; the hydrology committee was reestablished with the State of New Mexico acting as secretary of the committee in order to schedule meetings and distribute minutes, agendas, and other data for

meetings of the hydrology committee. The hydrology committee continues to work toward establishing a database to which all of the technical experts can agree, then will attempt to collaborate on analyses which all believe could be useful to the Court in understanding the hydrologic aspects of the Rio Grande Project.

Concerning the issue of All Claims of Water Rights in the Upper Rio Grande (above Fort Quitman) Segment of the Rio Grande Basin; SOAH Docket No. 582-96-0144; Texas, the Texas Natural Resources Conservation Commission (TNRCC) 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, 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 claims. There continues to be a hold on these evidentiary hearings pending the outcome other cases in both State of New Mexico courts and federal courts.

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 effect the best management practices for the water resources of the west Texas and southern New Mexico area. The following sections summarize the studies that Reclamation and the Commission are cooperating on.

Aquifer Storage and Recovery

A pilot aquifer storage and recovery (ASR) project is investigating possible storage regimes and methods for excess surface water flows in the Hueco bolson (aquifer) via recharge zones for later extraction to augment water supplies during drought and shortages conditions. This study is a cooperative effort of the American Water Works Association, the El Paso Water Utilities Public Service Board, and Reclamation. The excess water for ASR will be a by-product of the El Paso-Las Cruces Regional Sustainable project utilizing surface waters of the Rio Grande/Rio Bravo as the primary source of Municipal and Industrial potable water.

Delivery of Surface Water on a Year-Round Basis

Reclamation and the El Paso County Water Improvement District No. 1 (EPCWID) successfully negotiated a contract to provide for the use of Rio Grande Project water for miscellaneous purposes and uses other than irrigation (signed on March 19, 1998). This contract reflects the current trend throughout the southwest of converting irrigation waters to municipal and industrial (M&I) purposes. The new contract was negotiated under the authority of the Sale of Water for Miscellaneous Purposes Act of February 25, 1920. This contract provides the required legal framework necessary for implementing future third party contracts. These third party contracts are for converting specified quantities of water for which negotiations and NEPA activities are presently underway. This contract has set in motion negotiations of a third-party agreement proceeding for the transfer of water use (User's Right) from the EPCWID to the El Paso Water Utilities - Public Service Board for use of Rio Grande Project water for M&I purposes.

Reclamation received a resolution passed by the City of El Paso Public Service Board on April 8, 1999 which states and requests that the Rio Grande Project begin releases of Project storage on a year-round basis for M&I use by the City of El Paso by late 2001. Reclamation continues to work with the New Mexico-Texas Water Commission in providing technical and NEPA support in the evaluation of alternatives for the year-

round delivery required by the City of El Paso to meet future potable water demands. Changes in Rio Grande Compact accounting will be necessary before year-round releases can be made. This will also require the implementation of an Operating Agreement between the Elephant Butte and El Paso County Water Improvement Irrigation Districts.

Elephant Butte and Caballo Reservoir Water Quality Assessments

Reclamation and the USGS are partners in these reservoir water quality assessments. In addition to measuring temperature, dissolved oxygen, and pH profiles throughout the year, the source and potential solution to the release of hydrogen sulfide (H₂S) gas at the Elephant Butte power production facility is being investigated. 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. This investigation will continue through 2001 and the data collected will be used to develop reservoir water quality models for the Elephant Butte and Caballo reservoirs.

El Paso-Las Cruces Regional Sustainable Water Project

The New Mexico - Texas Water Commission is the appointed oversight group for the planning and technical investigations required to meet the objectives of this Sustainability Project. Specifics of this effort include the transfer Rio Grande Project waters from the El Paso County Water Improvement District No. 1 (EP#1) to the El Paso Water Utilities (EPWU) through a third party agreement with Reclamation. Contingent upon the transfer of the use of this water is the withdrawal of surface waters on a year-round basis by the EPWU to provide 100 percent of El Paso's drinking water during non-drought years. Excess waters available from the Rio Grande could potentially be stored in an Aquifer Storage and Recovery Project. The U.S. section of the International Boundary and Water Commission (IBWC) is the lead federal agency for National Environmental Policy Act requirements with Reclamation providing assistance in the form of NEPA expertise. Reclamation has provided funding to EPWU through cost-sharing reimbursements and line item Congressional write-ins. The Draft Environmental Impact Statement was developed in 1999 and the Final Draft EIS/Record of Decision (ROD) was issued on January 18, 2001, by the IBWC. Various alternatives and strategies for withdrawal of waters from the Rio Grande and site selections for Water Treatment Plants were evaluated during this EIS process and public comments were provided on these alternatives through public scoping meetings.

To date, a third party agreement has yet to be reached for implementing transfer of water from the El Paso County Water Improvement District No. 1 to the El Paso Water Utilities via the 1920 Sale of Water for Miscellaneous Purposes - Act of Feb. 25, 1920, 41 Stat. 451, which specifies the transfer of irrigation waters in certain Reclamation Projects. Other third party agreements between EPWU and EP#1 for the transfer of water have been instituted in the past. There are also several ongoing law suits and adjudications which may impact this Sustainable Water Project.

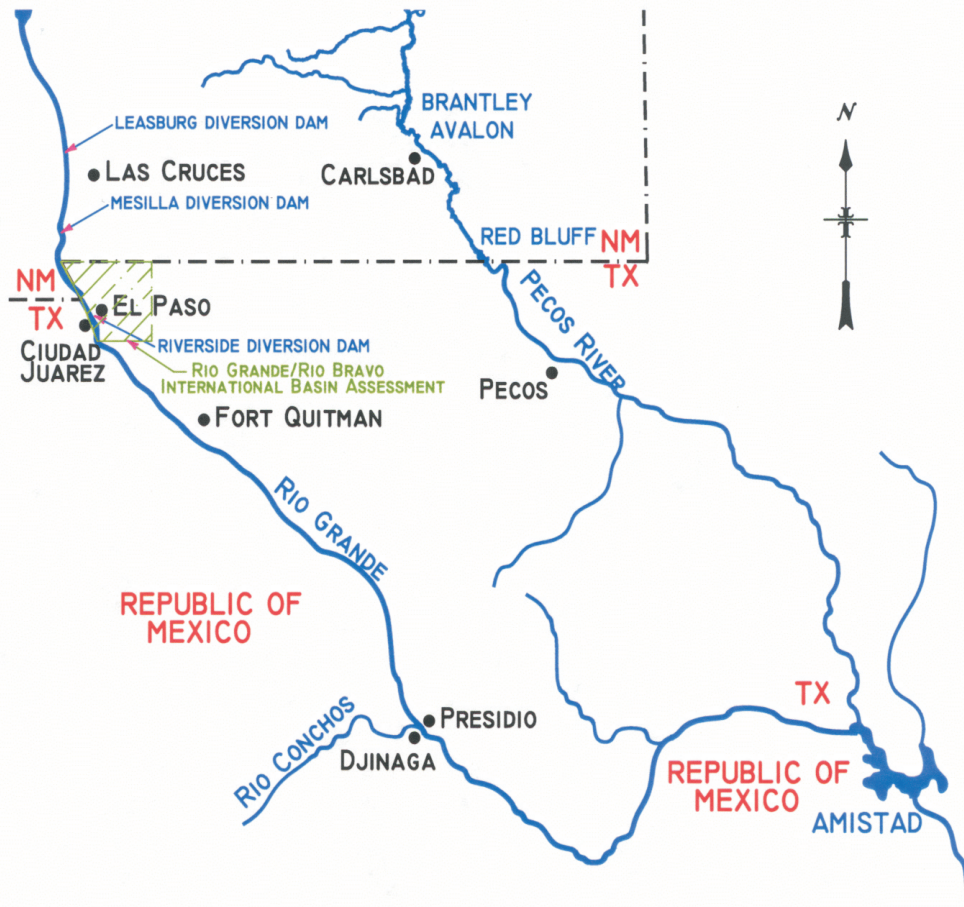


Figure 6. Area map of the Rio Grande/Rio Bravo International Basin Assessment

Rio Grande/Rio Bravo International Basin Assessment

A bi-national water and natural resources information network is being developed to provide a focal point for the collection, maintenance, and distribution of information and data for the Lower Rio Grande/Rio Bravo Basin (Figure 6).

Description of Basin:

Various groups have designated the subsections of the river differently; however, for the purposes of this assessment the "Lower Rio Grande / Rio Bravo is the Reach between El Paso, Texas and the Gulf of Mexico. Major U.S. cities located along the Lower Rio Grande include Las Cruces, New Mexico, and El Paso and Laredo, Texas. Major Mexican cities along the Rio Grande are Juarez, Chihuahua, and Nuevo Laredo and Matamoros, Tamaulipas.

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. 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. Phase one 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.)

Mission Statement:

Enhance communication and cooperation among the various organizations with interests and responsibilities for resource management in the Lower Rio Grande/Rio Bravo basin to develop a better understanding of the biological, cultural, hydrological, and land-use issues of the region.

Current Activities:

1. Contaminants in Biota
2. Observation of Peregrine falcon nests in Big Bend National Park from 1993 to 1996 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.

3. Habitat assessment/study is being conducted.
4. 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.

Report Generated:

Creating a Standardized Watersheds Database for the Lower Rio Grande/Río Bravo, Texas USGS Open-File Report 00-065

This report 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.

Computer technology allows generation of preliminary watershed boundaries in a fraction of the time needed for manual methods. This automated process reduces development time and results in quality improvements in watershed boundaries and characteristics. These data can then be compiled in a permanent database, eliminating the time-consuming step of data creation at the beginning of a project and providing a stable base data set that can give users greater confidence when further subdividing watersheds.

Sedimentation Surveys of Elephant Butte and Caballo Reservoirs

During 1999, the Elephant Butte and Caballo reservoirs bathymetric surveys were completed by the Reclamation's Technical Service Center survey team. Shallow areas at the upper reaches of both reservoirs are being surveyed by traditional range line methods. Real Time Kinematic Global Positioning System (GPS) receivers were employed providing latitude, longitude, and elevation measurements to within a few centimeters. Consequently, these surveys provide such precise estimates of sediment accumulation rates, that this survey will be used as a baseline reference (replacing the 1915 baseline) for future surveys. The Sedimentation and River Hydraulics Group from the Reclamation Technical Service Center has issued the final reports: Elephant Butte Reservoir 1999 Sedimentation Survey, Elephant Butte Area Capacity and Tables, Caballo Reservoir 1999 Sedimentation Survey, and Caballo Area Capacity and Tables. The total capacities in acre-feet of the reservoirs: 2,634,800 originally; 2,023,358 currently, and 346,736 originally; 326,672 currently for Elephant Butte and Caballo respectively. The rates of sedimentation for both these reservoirs is declining.

Caballo Mercury Study

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

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

The long term 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.

OTHER RECLAMATION PROGRAMS

Reclamation's Water Conservation Field Service Program

Reclamation has provided funding and technical assistance for the following projects in the Rio Grande Basin under the Water Conservation Field Services Program.

1. Middle Rio Grande Conservancy District water measurement program to provide instruments and telemetry to obtain operational data to improve water transport and distribution efficiencies.
2. Office of New Mexico State Engineer to support water conservation education and outreach initiatives.
3. Drip irrigation research and demonstration project with the Socorro Soil and Water Conservation District and the Natural Resource Conservation Service (NRCS).
4. Precision Irrigation Project with the NRCS and the La Union Soil and Water Conservation District to provide on farm information to improve crop production and water use efficiencies.
5. Co-sponsored water education festivals in Albuquerque and Las Cruces, New Mexico and El Paso, Texas.
6. Provided funding for water education program with the Rio Grande County Museum in southern Colorado.
7. Provided funding and technical assistance for several water management planning activities including plans for Cities of Santa Fe, Elephant Butte and Espanola, New Mexico, Elephant Butte Irrigation District and El Paso County Water Improvement District No.1.
8. Conducted an Acequia Water Management Workshop with the New Mexico Acequia Commission.

Water Reclamation and Reuse Projects

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

The Santa Fe Program consists of three parts: The first part is Santa Fe's Treated Effluent Management Program which will reclaim a portion of the City's secondary effluent for irrigation and Santa Fe River surface flows. The second is the Rio Grande Diversion Demonstration Pilot Project which will divert a small amount (300 af/yr) of surface water from Rio Grande through a subterranean infiltration gallery for non-potable irrigation use in the vicinity of San Idelfonso Pueblo, and for pilot testing to determine future treatment needs for a full-scale surface water diversion on the Rio Grande. The third part is the Santa Fe River Augmentation Project which will deliver water upstream on the Santa Fe River to augment the city's supply wells through indirect recharge of the aquifer and enhance the recreational use of the Santa Fe River corridor in the downtown area. In 2000 the City of Santa Fe completed work on the EIS for the Rio Grande Diversion Demonstration Pilot Project and planning studies and field investigations related to the Santa Fe River Augmentation Project.

The City of Albuquerque program will develop wellhead arsenic removal technology, and apply it to a production well currently out of service due to high arsenic levels. Another aspect of the program will be the development of non-potable water distribution systems for the irrigation of turf grass in public areas. The north Albuquerque area water source will be from impaired Rio Grande surface water infiltration galleries, and industrial effluent. The south area source of water will be the City's treated effluent. In 1999 Reclamation entered in to agreements with the City of Albuquerque which provides the framework for the participation and cost sharing in their arsenic demonstration project and reclamation and reuse program. Under one of these agreements, Reclamation cost sharing was approved for construction of the industrial recycling portion of the City's reclamation and reuse program and construction began on that project. Under one of these agreements, Reclamation cost sharing was approved for construction of the industrial recycling portion of the City's reclamation and reuse program, which was completed in 2000.

Funding for the Northwest portion of the El Paso Water Reclamation and Reuse Title XVI project has been allocated. This project has been expanded to include the Haskell R. Street Waste Water Treatment Plant (WWTP) in central El Paso and is referred to as the Central Portion of the El Paso Reclamation and Reuse Project. The first two of four phases of the Northwest portion have been completed and treated effluent from the Northwest WWTP is being delivered to the Coronado Golf Course and various parks along the west side of El Paso. The Northwest construction portion will be completed in 2002. Eventually, over 4,500 af of treated sewage effluent will be utilized on the northwest side of El Paso. The facilities plan for the Central Portion has been completed and a Finding of No Significant Impact (FONSI) was issued to meet NEPA compliance regulations. The Central Portion will eventually deliver over 5,000 af. of treated from the Haskell St. WWTP to area parks and a cemetery. A Cooperative Agreement for the Central portion of this project will be finalized in Spring 2000.

Upper Rio Grande Water Operations Model

The Upper Rio Grande Water Operations Model (URGWOM) is a set of computer models representing the river and reservoirs on the Rio Grande and Rio Chama (major tributary) from the Colorado border to El Paso, Texas. For URGWOM, the year 2000 was a transition year.

All prior development, from 1995 through current, underwent testing, in simulated usage mode, to make it ready to go into production in 2001. The Accounting version of the model, which is slated to replace the current daily computer programs doing Rio Grande and San Juan-Chama accounting, was tested and debugged for the years 1995, 1996, and part of 2000, to verify complete and accurate accounting in comparison to the old programs. The Water Operations version of the model, which uses "rules" to predict future operations, was used by the Corps of Engineers Reservoir Control Branch and the USBR Water Operations Team in a partial capacity to develop the coordinated Annual Operating Plan. Enhancements were made to the models in determining gains and losses particularly in the middle valley (between Cochiti Lake and Elephant Butte Reservoir), to improve their ability to replicate observed streamgage data. Modeling was also completed for Elephant Butte and Caballo Reservoirs to El Paso, with a simplified river/diversion system designed to focus on flood control operations only.

Evapotranspiration Tool Box Network

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

The goal of the ET Toolbox project is to develop a methodology for automatically inputting daily riparian and crop water use estimates, open water evaporation estimates, and rainfall estimates to the URGWOM. 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 has focused on the Middle Rio Grande area from Cochiti Dam to San Marcial, which is just south of the Bosque del Apache National Wildlife Refuge in New Mexico. ET currently accounts for an estimated 60 percent of the water depletions over this reach of the Rio Grande, including riparian vegetation, irrigated crops, and open water evaporation.

The primary purpose of the ET Toolbox is to accurately determine, and predict, daily rainfall and water depletions along the Rio Grande. These daily ET estimates and summary year-to-date cumulative ET estimates are already available to users and water managers via the Internet at the URL: <http://www.usbr.gov/rsmg/nexrad>. The daily cumulative river reach ET estimates will be automatically input into RiverWare, the modeling software basis of the URGWOM. RiverWare currently contains water accounting and ownership tools and peripheral water budget and flood routing tools that are being configured for the URGWOM. The ET Toolbox data, once incorporated directly into RiverWare, will allow daily water operation managers to make better water release decisions from upstream control structures.

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 a review of their water operations activities in the Rio Grande basin above Fort Quitman, TX. The scope of the Review will be limited to existing facilities and authorities. Because of ongoing litigation, water supply operations at Elephant Butte and Caballo Reservoirs will not be included in the Review, at least for the present time. However, flood control operations and their impacts down to Fort Quitman will be considered.

The purpose of the Review 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 Upper Rio Grande Water Operations Model will be used extensively to evaluate alternative water operations and the interrelated effects of the various facilities. A range of hydrologic conditions from surplus to drought will be considered.

The review will take place through the preparation of an Environmental Impact Statement 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 Environmental Impact Statement. 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, IBWC, Indian tribes, Congressional staff, and the general public will be part of the Review. The project is expected to continue through 2004.

Public scoping meetings began in June of 2000 and continued through October. Scoping meetings took place in nine locations from Alamosa, Co to El Paso, TX. Comments were received from various individuals and entities, and a scoping summary is being prepared.

Native American Affairs and Drought Relief Programs

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

Reclamation will be completing the design and construction of a subsurface drainage system for Isleta Pueblo in the winter of 2001-2002. A plastic ditch liner is being installed at Picuris Pueblo to reduce seepage in a particularly high seepage loss area. Windmills at Santo Domingo Pueblo are being repaired to provide water in order to open more areas to grazing. A new livestock well will be drilled at Cochiti Pueblo. A new well will be drilled at Jemez Pueblo's Red Rocks development area to provide increased capacity for firefighting purposes.

Under the Planning Program, well drilling in the Taos area has been underway for a year to help quantify water availability in a deep aquifer. These water sources can then be used to facilitate a negotiated settlement among the parties in the Abeyta adjudication. Well drilling and aquifer testing should be completed in 2001.

Negotiations are underway between the Bureau of Indian Affairs, the Bureau of Reclamation, and the Middle Rio Grande Conservancy District for a new Operation and Maintenance Agreement for District facilities on lands of the six Middle Rio Grande Pueblos. The six Middle Rio Grande Pueblos have also proposed updating the El Vado Storage Agreement between the Pueblos and the Bureau of Reclamation for storage of Prior and Paramount waters in El Vado Reservoir.

Needs assessments are being done to assist for tribes in investigating their surface water, groundwater, wastewater, and water quality needs and issues: the Mescalero Apache tribe, Jemez Pueblo, Picuris Pueblo, and San Ildefonso Pueblo. Funding is being provided through Reclamation's Native American Program.