

Department of the Interior

U. S. Bureau of Reclamation

Upper Colorado Region

1993 Report to the  
Pecos River Commission

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**INTRODUCTION**

The Upper Colorado Region has two projects offices with responsibility on the Pecos River: the Albuquerque Projects Office, located in Albuquerque, New Mexico; and the Rio Grande Projects Office, located in El Paso, Texas.

In 1993, the Albuquerque Projects Office was responsible for advising, planning, developing, coordinating, and carrying out field activities of the Bureau of Reclamation (Reclamation) related to the Carlsbad Project, which Project includes Brantley Dam, Sumner Dam, and Avalon Dams; Pecos River Basin Water Salvage Project; and Fort Sumner Project.

The agreement between Reclamation and Carlsbad Irrigation District (CID), finalized on October 2, 1989, provided for CID to operate and maintain Brantley Dam, Sumner Dam, and the Pecos River Water Salvage Project. This contract was implemented during 1990 and has continued during 1993. Reclamation continues to be responsible for assuring that this work is accomplished in compliance with all applicable agreements, contracts, regulations, compacts, and other related laws.

In 1993, the Rio Grande Projects Office in El Paso, Texas, was responsible for coordinating study activities relating to the Malaga Bend Salinity Alleviation Project.

## CARLSBAD PROJECT

All Carlsbad Project reservoirs were operated in accordance with the requirements of the Pecos River Compact and the Flood Control Criteria of the Corps of Engineers.

Storage entitlements in 1993 were granted by the New Mexico State Engineer. The following table represents the 1993 storage entitlements for the four Pecos River Reservoirs:

<u>Reservoir</u>	<u>Conservation Storage Amount (ac-ft)</u>	<u>Elevation (ft)</u>
Santa Rosa	94,486	4745.55
Sumner	39,048	4261.00
Brantley	40,000	3255.20
Avalon	<u>2,966</u>	3177.40
Total:	176,500	

### Sumner Dam

On January 1, 1993, Sumner Reservoir was at elevation 4252.54 feet, a total storage of 23,856 acre-feet (conservation storage of 19,136 acre-feet). Under a water right permit granted by the State of New Mexico, CID is allowed to store up to an additional 20,000 acre-feet in Sumner Reservoir from November 1 to April 30 each year, provided that the accumulated conservation storage of all four reservoirs on the Pecos River in New Mexico does not exceed 176,500 acre-feet. No additional water was stored in 1993.

A block of water was moved downstream to Brantley beginning in April. The transfer or move was to provide a sufficient quantity of better quality water for irrigation purposes. The release was ramped beginning on April 3 to a maximum discharge of approximately 1,100 ft<sup>3</sup>/s on April 10. On April 18 the flows were ramped down to match 50 percent of the inflow at Santa Rosa Reservoir (Corps of Engineers). In order to assure filling Santa Rosa and Sumner Reservoirs during spring runoff, approximately 75 percent of the inflow to Santa Rosa was released downstream to Sumner Reservoir, and the releases from Sumner Reservoir were maintained at 50 percent of the 3-day average inflow at Santa Rosa. This allowed the upper system to fill and established a release below Sumner Dam that mimicked a natural hydrograph. During the operation, Sumner Reservoir reached its maximum storage on June 24, at elevation 4261.20 feet, a total storage of 44,336 acre-feet (conservation storage of 39,048 acre-feet, plus additional inadvertent storage of 568 acre-feet). Santa Rosa Reservoir also reached its maximum storage during the latter part of June. The peak release for 1993 from Sumner Dam occurred on July 23 at 1,120 ft<sup>3</sup>/s.

After Sumner reached its storage entitlement during the latter part of June, releases were reduced to 142 ft<sup>3</sup>/s for a short period before a block of water was moved downstream to Brantley from July 3 to July 27. Another block was moved from September 30 to October 19. Both blocks were needed to provide irrigation water for CID and to assist the State of New Mexico in its delivery of water to the State of Texas for Pecos River Compact purposes. During each block release, discharge measurements were made by a Reclamation contractor. The measurements will be used as part of work under way to develop a river simulation computer model as part of on-going endangered species work on the Pecos River.

During the period between the July and October block releases, flows below Sumner Dam were set at 142 ft<sup>3</sup>/s and later reduced to 108 ft<sup>3</sup>/s on August 15 so as to provide a minimum flow below Taiban Creek of 75 ft<sup>3</sup>/s through the end of October.

Heavy rains during the middle of July required that Reclamation's discharge measurement effort be discontinued. The maximum mean daily discharge for the Pecos River near Acme gage was 2,050 ft<sup>3</sup>/s on July 15.

On October 30, Sumner Reservoir reached its lowest point of the year at elevation 4246.21 feet, a total storage of 13,869 acre-feet (conservation storage 9,149 acre-feet). The gates at Sumner Dam were closed on October 31, finishing the irrigation season, and the dam began to store fall and winter inflows. Sumner Reservoir ended the year at elevation 4252.23 feet, a total storage of 23,290 acre-feet (conservation storage of 18,570 acre-feet).

### Brantley Dam

Construction of Brantley Dam was authorized under Title II of Public Law 92-514 on October 20, 1972. Recently, the former "Brantley Project" was incorporated into the Carlsbad Project. Sumner, Brantley, and Avalon are now considered part of the Carlsbad Project.

On January 1, 1993, Brantley Reservoir was at elevation 3245.23 feet, a total storage of 21,735 acre-feet (conservation storage 15,356 acre-feet). A minimum release of 20 cubic feet per second (ft<sup>3</sup>/s) continued from Brantley Dam until the middle of March. On March 16, CID began releases from Brantley Dam to start the irrigation season. A large block of water was released from Sumner Dam from April 3 to April 22 to provide an adequate supply of better quality water in Brantley Reservoir. Brantley Reservoir did not fill its conservation space in 1993. A peak release of 833 ft<sup>3</sup>/s occurred on July 20 during movement of a block of water that was leased from CID by the State of New Mexico. This block was released for delivery to the State of Texas for Compact purposes. The yearly maximum reservoir level was reached on May 2 at elevation 3250.49 feet, a total storage of 33,205 acre-feet (conservation storage of 26,826 acre-feet). On July 11, Brantley Reservoir reached its lowest point of the year

at elevation 3241.47 feet, a total storage of 15,402 acre-feet (conservation storage of 9,023 acre-feet).

Irrigation releases were made to satisfy demands until July 15, when releases were increased to deliver a block of water downstream to assist the State of New Mexico during its delivery of leased water to the State of Texas. Delivery was complete by July 22, with a gross release of 12,230 acre-feet being accomplished. Normal irrigation releases continued until October 18, when releases were increased to deliver another block of water downstream to the State of Texas. Delivery was complete by October 26, with a gross release of 11,130 acre-feet being accomplished.

On October 31, CID's irrigation season ended and releases were reduced to a minimum flow of 20 ft<sup>3</sup>/s. On December 31, Brantley Reservoir ended 1993 at elevation 3246.90 feet, a total storage of 25,049 acre-feet (conservation storage of 18,670 acre-feet).

#### Land Acquisition Program

Reclamation land acquisition program consists of the following at the end of 1993:

<u>Tracts Acquired</u>	<u>Cost</u>
191 surface tracts	\$14,115,526 - 2 tracts acquired in 1993
105 mineral tracts	\$ 1,026,428 - None in 1993
112 easements	\$ 1,178,578 - 2 easements acquired in 1993
1 water right tract	\$ <u>679,600</u> - None in 1993
Total:	\$17,000,132

Six mineral subordination easements and two flowage easements remain to be acquired. The condemnations are categorized as follows: surface tracts - two are being processed and two are planned for the future; easements - one is being processed and one is planned for the future. Uncontested acquisitions will be completed in approximately 18 months. Contested acquisitions or condemnations are anticipated to be complete in the next 2 years, depending on the time frame of the court process. Two wildlife mitigation water tracts, at an estimated cost of \$260,000, remain to be acquired. These acquisitions should be completed in fiscal year 1994.

#### Avalon Dam

Avalon Reservoir, used as hydraulic head for diversion into the Carlsbad Main Canal, started 1993 at elevation 3174.30 feet, a total storage of 1,816 acre-feet. Diversion into the main canal for irrigation began early (February 15 to February 21) for small grains.

The irrigation season began in earnest on March 15. The reservoir reached its maximum level for the year on February 7 at elevation 3175.20 feet, a total storage of 2,480 acre-feet. From July 16 to July 23 and from October 18 to October 25, two blocks of water (8,296 acre-feet and 9,005 acre-feet respectively as measured in the river below Avalon Dam) were bypassed to the Pecos River from Brantley storage for delivery to the State of Texas for Pecos River Compact purposes. The peak release to the river during these periods occurred on October 22 and was 618 ft<sup>3</sup>/s.

The peak diversion of 388 ft<sup>3</sup>/s into the Carlsbad Main Canal occurred on June 17, 1993. On October 31, diversions to the main canal were discontinued, signaling the end of the irrigation season. Carlsbad Irrigation District diverted a total of 97,820 acre-feet for irrigation during 1993. From November 1 to December 31, the minimum flow from Brantley Dam was stored in Avalon Reservoir with the exception of 673 acre-feet that was bypassed down the river in December. On December 31, 1993, Avalon Reservoir was at elevation 3173.50 feet, a total storage of 1,277 acre-feet.

A problem developed this year using the estimated sediment accumulation and subsequent computed conservation storage for Avalon. The computed conservation storage became negative after the sediment pool was deducted from the 1979 Area-Capacity Table content. This was especially a problem from September to December when the total content was less than the estimated accumulated sediment loading in Avalon (i.e. < 768 acre-feet). The estimated sediment loading was re-evaluated for the 1994 storage entitlements and should be more representative of the actual sediment loading since 1979. A new sediment survey for Avalon is planned for the end of 1994.

### **PECOS RIVER BASIN WATER SALVAGE PROJECT**

Public Law 88-594, approved September 12, 1964, authorized the Pecos River Basin Water Salvage Project to reduce the non-beneficial use of water in the Pecos River Basin and provided that no work shall be commenced on clearing the McMillan Delta floodway unless provision is made to replace CID's terminal storage. This replacement of CID's terminal storage was accomplished with the completion of Brantley Dam.

The maintenance of the 53,750 acres of land cleared of salt cedar growth prior to 1990 continued during 1993. Under the Operation and Maintenance (O&M) agreement with Reclamation, CID is responsible for removing the vegetation from six miles above Sumner Reservoir through Red Bluff, Texas, to Old Highway 80 in Pecos, Texas. Root plows attached to wheel and crawler tractors are generally used to accomplish this work. Extraordinary maintenance efforts were required in 1993 to combat the increased growth of phreatophytes in the Red Bluff area.

Approximately 280 tracts, representing 14,000 easement acres of private lands in both New Mexico and Texas, are being cleared in areas where the original term easements have expired. To date, 82 easements in New Mexico have either been acquired or deemed no longer necessary. The State of New Mexico provided \$75,000 in 1993 for assistance in completing this process, which is anticipated to be completed in 1995. At this time, Texas has not participated in the easement identification and renewal program. Reclamation is in discussion with Texas to begin this process.

### **FORT SUMNER PROJECT**

A total of 41,130 acre-feet was diverted during 1993 from the Pecos River by the Fort Sumner Irrigation District (FSID). No new developments occurred on FSID's Rehabilitation and Betterment loan application during 1993.

The major 1993 crop was forage (alfalfa and hay) on the 6,500 acres of irrigable area with 5,292 acres reported irrigated and harvested. Total gross crop value was \$1,004,679, with an average crop value of \$180.83 per acre. Additional revenue consisted of Federal Agriculture and Conservation Stabilization Services (ACSS) payments of \$68,000. The irrigation demand in 1993 was 45,734 acre-feet with 32,014 acre-feet delivered to farms (6.05 acre-feet per acre per acre farm delivery).

### **PECOS RIVER WATER OPERATIONS-ENDANGERED SPECIES WORK**

On August 5, 1991, the Fish and Wildlife Service (Service) issued a Final Biological Opinion (Opinion) on Pecos River Water Operations. Reclamation concurred with the Service's Opinion on September 5, 1991. A Reasonable and Prudent Alternative within the Opinion required Reclamation to finance a 5-year river research effort (1992-1996) to study fish response to different flow regimes. In concurrence with conditions of the Reasonable and Prudent Alternatives, a Memorandum of Understanding (MOU) was signed by the Service, Reclamation, New Mexico Department of Game and Fish, and CID. This MOU coordinates the release, monitoring, and protection of Pecos River flows; analyze the effects of these flows on native fishes, especially the threatened Pecos bluntnose shiner; and develops a daily time-step river simulation computer model.

The agencies met on February 17, 1993, to discuss an early spring release from Sumner Dam that would satisfy the needs of all concerned parties. However, CID initiated an alternative operation due to water quality concerns. The agencies agreed to the shape of the July and October irrigation releases so as to satisfy hydrologic and biologic study needs and irrigation requirements. In addition, the agencies agreed to maintain at least 75 ft<sup>3</sup>/s at the Taiban Creek stream gage, which is downstream from the last FSID irrigation return flow point. This minimum flow was to be maintained through the end of October.

Under this MOU, 1993 marked the second year of a 5-year study to determine the impacts and needs of the bluntnose shiner in the critical habitat areas on the Pecos River between Sumner Dam and Brantley Reservoir.

All parties to the MOU are meeting on an as-needed basis to plan and schedule operations to meet the study goals and the needs of the water users. During 1993, the hydrologic modelling efforts continued, and field data collection efforts were started in an attempt to develop river routing coefficients for the model. In addition, work began on developing water quality data collection needs for the model.

During the first part of November, public meetings were held in Fort Sumner, Roswell and Carlsbad in an attempt to inform interested parties about on-going hydrologic and biologic research work in the Pecos River. Each of the MOU signatories gave presentations at the meetings as to their role in this research effort.

Reclamation's Denver Office conducted a soil/water/crop compatibility analysis in 1993 to evaluate the current salinity status of CID project lands and to support critical operational decisions involving the amount and timing of irrigation water deliveries.

An inventory of historic water quality data from the Pecos River between Santa Rosa Dam and Red Bluff Reservoir was completed in 1993. The most serious water quality degradation was reflected in conductivity and was manifested by high concentrations of total dissolved solids, especially sulfates and chlorides.

#### **TECHNICAL ASSISTANCE TO STATES PROGRAM**

The Albuquerque Projects Office submitted the final report of the Rio Penasco and Four Mile Draw Water Conveyance Study to the New Mexico Interstate Stream Commission in January 1994. This study provides a preliminary reconnaissance evaluation of the feasibility, costs, and potential benefits of improving conveyance of water from the Rio Penasco and Four Mile Draw to the Pecos River via a constructed channel through the Lake McMillan Delta.

#### **PECOS RIVER UPPER WATERSHED WATER QUALITY STUDY**

Reclamation received appropriated funds under its General Investigations Program to conduct an investigation of water quality problems in the Upper Pecos basin. The study began in fiscal year 1993 and will be completed by September 1995. The New Mexico Institute of Mining and Technology in Socorro, New Mexico, is working with Reclamation as a partner under a 50/50 cost sharing cooperative agreement. The main portion of work performed in 1993 included snowpack sampling for mercury and ionic

contaminants, Pecos River flow measurements, sampling of sediment load and general water chemistry, mercury and other heavy metal content of water, sediment and biota.

### **RIO GRANDE PROJECT OFFICE - MALAGA BEND PROJECT**

The Malaga Bend Salinity Alleviation Project was authorized by Congress by Public Law 85-333, dated February 20, 1958. The main provisions of this act were (1) construction was required to be substantially in accordance with the December 1954 report by the Geological Survey, Possible Improvement of Quality of Water of the Pecos River by Diversion of Brine at Malaga Bend, Eddy County, New Mexico; (2) changes to the plan could be made as the Secretary of the Interior finds appropriate to accomplish purposes of the Act; (3) right-of-way was to be acquired by the State of New Mexico for wells, pipeline, and disposal areas; and (4) the operation and maintenance was to be accomplished by the State of Texas or other state agency.

Experimental facilities were constructed and pumping began in 1963. A December 1979 report by the Geological Survey, Experimental Salinity Alleviation at Malaga Bend of the Pecos River, Eddy County, New Mexico, contains the results of the pumping. The report concluded that pumping was an effective method of reducing brine inflow to the river.

The possibility of re-initiating the pumping at Malaga Bend using the previously constructed system was virtually eliminated during the past year for the following reasons:

1. The discovery that the existing pond could not be utilized without major revisions.
2. The use of an evaporation pond was discouraged due to concerns of increased hazards to waterfowl.
3. The lack of interest of the United Salt Company in submitting an alternate proposal.

The Texas Commission for the Pecos River Compact Commission, supported by the State of New Mexico and the Texas Natural Resource Conservation Commission, has requested that Reclamation initiate a study under our Technical Assistance to States Program to evaluate the salinity alleviation of Malaga Bend. The study would be conducted in phases as follows:

1. The effect of salinity removal at Malaga Bend on the Pecos River and the Rio Grande.

2. The economic benefits of removal of salt as identified above.
3. Possible methods of removal of the salt at Malaga Bend and at other identified sources of contamination.

In March an additional salt company requested consideration of a proposal for them to mine the existing salt. Company equipment would be used to re-initiate pumping to an evaporation pond located on private land. The proposal is currently being considered.

HIGHLIGHTS

**CARLSBAD PROJECT**

- All Carlsbad Project reservoirs were operated in accordance with the requirements of the Pecos River Compact and the Flood Control Criteria of the Corps of Engineers.
- 1993 storage entitlements for the four Pecos River Reservoirs:

<u>Reservoir</u>	<u>Cons Stor (af)</u>	<u>Elev (ft)</u>
Santa Rosa	94,486	4745.55
Sumner	39,048	4261.00
Brantley	40,000	3255.20
Avalon	<u>2,966</u>	3177.40
Total:	176,500	

Sumner Dam

- B-O-Y storage: El 4252.54 ft; Tot stor 23,856 af; Cons stor 19,136 af
- Max stor (6/24): El 4261.20 ft; Tot stor 44,336 af; Cons stor 39,048 af
- Min stor (10/30): El 4246.21 ft; Tot stor 13,869 af; Cons stor 9,149 af
- E-O-Y storage: El 4252.23 ft; Tot stor 23,290 af; Cons stor 18,570 af
- Top of conservation was reached during the end of June
- No additional water was stored above the top of conservation during the period November 1 to April 30
- Max rel (7/23): 1120 cfs
- End of irrigation season was October 31
- Min flow of 75 cfs was set below Taiban Creek for the irrigation season.
- Irrigation block releases:
  - Apr 03 to Apr 18 (start of irrigation, want to "sweeten" WQ in Brantley)
  - Jul 03 to Jul 27 (irrigation needs and NM's leased water delivery to TX)
  - Sep 30 to Oct 19 (irrigation needs and NM's leased water delivery to TX)
- Heavy rains in July and resulted in a max mean daily discharge at Acme of 2050 cfs and occurred on July 15.

Brantley Dam

- Brantley Dam is now part of the Carlsbad Project as is Sumner & Avalon Dams
- B-O-Y storage: El 3245.23 ft; Tot stor 21,735 af; Cons stor 15,356 af
- Max stor (5/2): El 3250.49 ft; Tot stor 33,205 af; Cons stor 26,826 af
- Min stor (7/11): El 3241.47 ft; Tot stor 15,402 af; Cons stor 9,023 af
- E-O-Y storage: El 3246.90 ft; Tot stor 25,049 af; Cons stor 18,670 af
- Top of conservation was **NOT** reached in 1993
- Max rel (7/20): 833 cfs
- End of irrigation season was October 31
- Min. fishery flows from Jan 1 to Mar 15 and Nov 1 to Dec 31 of 20 cfs

## Avalon Dam

- Used to provide irrigation head for the Carlsbad Main Canal
- B-O-Y storage: El 3174.30 ft; Tot stor 1,816 af
- Max stor (2/7): El 3175.20 ft; Tot stor 2,480 af
- E-O-Y storage: El 3173.50 ft; Tot stor 1,277 af
  
- Max release down river (10/22): 618 cfs
- Max diversion into Carlsbad Main Canal (6/17): 388 cfs
- Total diversion for Carlsbad Irrigation District was 97,820 ac-ft
- End of irrigation season was October 31
- Min. winter fishery flows from Brantley were captured in Avalon
  
- Delivery of leased water to the State of TX for Compact Purposes as measured in the river below Avalon Dam: Jul 16 to Jul 23 8,296 ac-ft  
Oct 18 to Oct 25 9,005 ac-ft
  
- Problem with over estimated sediment loading since 1979 and subsequent 1993 conservation storage for Avalon. Tentative plans to perform a new sediment survey during 1994.

## PECOS RIVER BASIN WATER SALVAGE PROJECT

- Maintenance of the 53,750 acres of land cleared of salt cedar growth prior to 1990 continued during 1993
- Extraordinary maintenance efforts were required in 1993 to combat the increased growth of phreatophytes in the Red Bluff area.
- 82 easements in New Mexico have either been acquired or deemed no longer necessary so far
- The State of New Mexico provided \$75,000 in 1993 for assistance in completing this process
- Reclamation is in discussion's with Texas to participate in the easement identification and renewal program

## FORT SUMNER PROJECT

- A total of 41,130 acre-feet was diverted during 1993 for FSID
- 5,292 ac of irrigated and harvested lands
- 32,014 ac-ft of water delivered to farms

## **PECOS RIVER WATER OPERATIONS-ENDANGERED SPECIES WORK**

- MOU meeting on February 17, 1993 to discuss an early spring release from Sumner Dam. CID initiated an alternative operation due to water quality concerns.
- Cooperating agencies agreed to the shape of each of the 3 irrigation releases from Sumner Dam for research and data collection purposes
- Cooperating agencies agreed to maintain a minimum flow below Taiban Creek of 75 cfs during the irrigation season
- 1993 was the second year of the 5-year study
- Began hydrologic data collection and data analysis work for the river and reservoir simulation model
- Began analysis of water quality data and soil/water/crop compatibility analysis for study purposes
- Public meetings held in Ft Sumner, Roswell and Carlsbad during early November

## **TECHNICAL ASSISTANCE TO STATES PROGRAM**

- Final report of the Rio Penasco and Four Mile Draw Water Conveyance Study was submitted to the NMISC

## **PECOS RIVER UPPER WATERSHED WATER QUALITY STUDY**

- Study began in FY 93 and will be completed by September 1995
- Work includes snowpack sampling for mercury and ionic contaminants
- Other work includes general water chemistry of Pecos River flows