BIOLOGICAL ASSESSMENT

OF PROPOSED PECOS RIVER

2001 INTERIM IRRIGATION SEASON OPERATIONS

ON THE PECOS BLUNTNOSE SHINER

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TABLE OF CONTENTS

TABLE OF GRAPHS

LIST OF TABLES

1. Introduction

This interim Biological Assessment (BA) analyzes the potential effects of the Bureau of Reclamation's (Reclamation) 2001 irrigation season operations plan on the Pecos bluntnose shiner (shiner), (*Notropis simus pecosensis*), a federally listed threatened species within the Pecos River basin. This plan covers the 2001 operating season from March 1, 2001 to October 31, 2001.

This species is native to the Pecos River and may be affected by irrigation season operations as proposed by Reclamation. Distribution and life requirements are discussed, as well as an analysis of the effects of the past two (1999 & 2000) irrigation season operations on this species. An Effects Determination has been made.

The purpose of this interim BA is to formally consult with the Service over the 2001 interim irrigation operations of Reclamation's discretionary actions that may affect the Pecos bluntnose shiner. During this interim period, if any new information or finding points to a need for revised operations, then Reclamation would consider modifying this current assessment or preparing a new assessment to address any significant operational changes which may be proposed.

2. BACKGROUND

The dams on the Pecos River were built for the purpose of flood control, water storage and sediment retention. Congress authorized the Santa Rosa Dam through the Flood Control Act of 1954. The Dam is owned and operated by the U.S. Army Corps of Engineers (Corps) and the water stored in this Dam is for the benefit of the Carlsbad Irrigation District (CID) through the Carlsbad Project. Sumner Dam was authorized by the President in 1935 and built in 1937 to store and release water, also for the benefit of CID. The dam is approximately 55 miles downstream from the Santa Rosa Dam. Reclamation owns and operates the Sumner Dam. Brantley Dam, 225 miles downstream of Sumner Dam, was authorized by Public Law 92-514, in 1972. This dam is also owned by Reclamation and operated by CID for the benefit of the project. Construction on this dam was completed in 1989 (U.S. Army Corps of Engineers, 1991 and 1995).

The Fort Sumner Diversion Dam is located 14 miles downstream of Sumner Dam. The Fort Sumner Diversion Dam was authorized under Public Law No. 88-192 on July 29, 1949. This law authorized Reclamation to rehabilitate the Fort Sumner Irrigation District works and to construct works. The Project was completed in 1951. Reclamation owns the Fort Sumner Diversion Dam, but FSID maintains and operates the structure by contract with Reclamation.

In 1989, in an effort to fill the newly-completed Brantley Reservoir, downstream water deliveries for the year exacerbated intermittency and long-term drying of the river channel. As a result, Reclamation consulted with the US Fish and Wildlife Service (Service) over the project's water operations impacts on the threatened Pecos bluntnose shiner. In 1991, the Service issued a

biological opinion stating that Reclamation's Pecos River operations were jeopardizing the continued existence of the shiner.

The decision by the Service resulted in a Memorandum of Understanding (MOU) between federal and state agencies along with private water users, represented through organized associations, in a process to study and manage Pecos River flows for the benefit of the shiner while continuing to meet downstream water delivery requirements.

In 1997, the data collection period ended and the National Environmental Policy Act (NEPA) process started. During the interim period, till an Environmental Impact Statement process addressing long-range water operations is completed, consultation on operations continues on a seasonal basis.

3. DESCRIPTION OF THE AREA

The Carlsbad Project Area (Project Area) is located within the Pecos River Basin of southeastern New Mexico. It includes the reach of the Pecos River from Santa Rosa Reservoir downstream to Brantley Dam. Within this area, the river has a drainage area of approximately 25,470 square miles (65,984 square kilometers) and traverses 225 miles (360 kilometers).

The Pecos River flows through alternating narrow canyons and slightly wider valleys in the reach from Santa Rosa Dam to Sumner Reservoir. From Sumner Dam downstream for 106 miles (170 kilometers) to the Pecos River near Acme gage site (Acme), the channel is generally wide, sandy and unstable. Throughout this reach, water from springs and irrigation returns provide flows in the channel during times when no bypasses were occurring from Sumner Dam. Shifts occur in the bed structure as flows fluctuate through these habitats. The channel becomes spread out and braided (Tashjian, 1992-1995).

The Sumner-Acme stretch of river is also hydrologically characterized as a losing reach. Surface water is lost both through seepage and evaporation and transpiration. Depending on the time of year, the amount of water moving down the channel, and local weather conditions, water losses in this portion of the river can be as much as 50% by the time the water reaches Acme. From Acme downstream the river begins to gain water back to the surface and is a gaining reach. In addition, the stream from this point slowly begins to narrow and deepen. The reach from near Roswell to the headwaters of Brantley Reservoir is characterized by deep entrenchment and the river is confined to a single channel.

4. CONSULTATION TO DATE

In 1989, Reclamation released water from Santa Rosa Dam and Ft Sumner Dam to fill the newly-completed Brantley Reservoir. Downstream water deliveries for the year created an intermittent situation, drying the river channel for several weeks. Reclamation consulted with

the Service over the Carlsbad Irrigation Project's (Project) water operations impacts on the threatened Pecos bluntnose shiner. In 1991, Reclamation submitted a biological assessment to the Service. The Service issued a Biological Opinion on that assessment in the same year, stating that Reclamation's Pecos River operations were jeopardizing the continued existence of the shiner.

The outcome resulted in a MOU, (U.S. Bureau of Reclamation, 1992) which provided the framework for a 5-year research program and established biannual meetings for MOU parties including Reclamation, CID, the Service, and the New Mexico Department of Game and Fish (NMDGF). These meetings provided the forum to discuss Pecos River biological and hydrological issues and to develop flow recommendations for irrigation and research needs.

Upon expiration of the original MOU (dated February 1997) (U.S. Bureau of Reclamation, 1997) a subsequent MOU extended the relationships another three years. The new agreement included the New Mexico Office of the State Engineer (OSE) as a signatory. The new MOU marked a crossover from the completion of the study phase to the beginning of the decision making process through the National Environmental Policy Act (NEPA) portion.

The NEPA process is ongoing and no long-range operational decisions have yet been made. As part of the NEPA process, Reclamation plans to continue consultation with the Service over interim operations till the completion of the Pecos Environmental Impact Statement.

5. DESCRIPTION OF THE PROPOSED ACTION

The proposed Interim Operations will address the irrigation season plans for operating Sumner Dam. These plans are similar to previous plans submitted for the 1999 and 2000 irrigation seasons. The proposed Pecos River irrigation season operations plan has been developed to manage water operations for the period of March 1, 2001 through October 31, 2001. This plan is proposed to avoid jeopardizing the shiner, to ensure its conservation, and to assist in recovery of the species. The plan describes the shape and duration of delivery releases, timing between releases, ramp downs from peak discharges, inflows which are bypassed, and monitoring efforts.

Pursuant to the requirements of the Endangered Species Act and implementing regulations, Reclamation is consulting over those aspects of the operations in which there is discretionary Federal involvement or control. The proposed action includes the following operating characteristics:

A) Bypassing natural inflows to Lake Sumner when available (based on total inflow above Lake Sumner as determined by OSE) and necessary to meet downstream targets of 35 cfs at the Pecos River Near Acme Gage (Acme);

B) Restricting the duration of block releases[1] from Sumner to a maximum of 15 days;
C) Restricting the cumulative duration of block releases from Sumner in calendar year 2001 to a maximum of 65 days;
D) Targeting a minimum of 14 days between consecutive block releases from Sumner;
E) When possible, providing a ramp down on the tail end of block releases from Sumner;
F) Targeting one, seven consecutive week period between June 1, 2001 and August 31, 2001 during which no block releases from Sumner will be made.

Throughout the calendar year, Reclamation will continue to support population monitoring efforts so that the status of the species can continue to be tracked. Reclamation will initiate weekly hydrology/water operations conference calls. These will include all signatories to the MOU.

Reclamation also plans to lease water in the basin to make up additional net depletions to the water supply caused by these bypass operations. In fiscal year 2001, Reclamation will lease approximately 2,000 acre-feet of river pumpers water rights, approximately 350 acre-feet of Hagerman Canal water rights, and approximately 500 acre-feet of groundwater rights. The leasing of the groundwater rights is located along the Pecos River between above Acme Gage and the Gasline habitat site. By not pumping these wells, the water losses observed in the past through this reach may be reduced. If additional funding becomes available, Reclamation would pursue additional water leases.

In fiscal year 2000, Reclamation leased approximately 1,800 acre-feet of water rights from river pumpers. Additionally, as a result of mediation in federal district court, Reclamation entered into an emergency forbearance program with FSID through which Reclamation paid for crops foregone as a result of reduced water use by participating FSID members. The Service provided additional funding in October 2000 to increase the number of irrigators participating in the forbearance program. The forbearance program resulted in some additional flow in the river below the FSID return canal. However, due to the drought, these additional flows were not adequate in bringing the Acme flow up to the target level. The flow at Acme remained between 5 and 15 cfs when precipitation events were not present.

FSID currently operates and maintains a diversion dam by contract with the Bureau of Reclamation. Through this facility, FSID diverts up to 100 cfs for delivery to irrigators within the District. Reclamation does not have the permitted water rights associated with these diversions. The FSID-Reclamation contract provides, however, that Reclamation may, with six months' written notice to FSID, operate and maintain the diversion dam itself. On June 29, 2000, Reclamation sent FSID a letter describing its ownership interest in the diversion dam and provided notice that Reclamation may "take over" the diversion facility, in the event that cooperative efforts failed.

Since then, Reclamation and FSID participated in mediation in federal district court along with

[1] The duration of a block release is defined as the number of days at peak discharge.

plaintiff environmental groups and other Pecos River stakeholders. Through collaborative efforts, FSID and Reclamation last year implemented the aforementioned forbearance program and both parties have expressed a commitment to future collaborative efforts that may be undertaken. In light of the ongoing collaborative processes, Reclamation does not intend to implement the operation and maintenance notice at this time. Instead, Reclamation proposes to allow FSID to continue to operate the facility in compliance with state and federal law.

6. SPECIES DESCRIPTION

Originally, there were eleven federally listed species identified in the Project area: the Bald Eagle (*Haliaeetus leucocephalus*), the Interior Least Tern (*Sterna antillarum*), the shiner, the Pecos Gambusia (*Gambusia nobilis*), the Pecos Sunflower (*Helianthus paradoxus*), the Mountain Plover (*Charadrius montanus*), the Mexican Spotted Owl (*Strix occidentalis lucida*), the Black-footed Ferret (*Mustela nigripes*), the Gypsum wild-buckwheat (*Eriogonum gypsophilum*), the Kuenzler hedgehog cactus (*Echinocereus fendlerivar. kuenzleri*), and the Lee's pincushion cactus (*Coryphantha sneedii var. leei*). The Service, Albuquerque Ecological Services Office, concluded in May 2000 that all but one of the above species, the Pecos bluntnose shiner, were determined to not be affected by the irrigation season operations; therefore, only the effects of the irrigation operations on the shiner will be analyzed in this BA.

Life Requisites

Since 1992, a great deal of data has been collected on the life history of the Pecos bluntnose shiner. Hatch (1982) collected the species most frequently in the main stream channel, but the species has been collected in all representative habitat types of the Pecos River (J.E. Brooks, personal communication). Physical habitat utilized by Pecos bluntnose shiner included sand substrate, low current velocity, and water depths of 17 to 41 cm (7 to 16 in), (Hatch, 1982). Temporal or seasonal shifts in physical habitat utilization are unknown.

Pecos bluntnose shiner are apparently prolonged spawners, beginning in early summer and ending by October (Sublette et al. 1990), although Bestgen and Platania (1987), analyzing historic collections of *N. s. simus*, from the Rio Grande, reported a much reduced period of spawning for the Rio Grande form; length frequency data of age 0 and age 1 fish indicate a four to six week spawning period from mid-June to early July. Examination of flow events during the early summer period indicated spawning occurring during the descending waters of spring runoff (Bestgen and Platania, 1987). Fecundity studies for the Pecos form have not been done, however, Bestgen and Platania, (1987), reported age 2 and age 3 female Rio Grande bluntnose shiner to produce 1,298-2,831 eggs and 2,331-3,090 eggs, respectively. Newly hatched Pecos bluntnose shiner larvae drift downstream in post spawning flows for at least 3-4 days. Dudley and Platania (1999) have concluded that the larvae "...do not have sufficient mobility to move out of the main channel flows..." during these first few days after hatching.

Rio Grande bluntnose shiner achieve a maximum length of approximately 70 mm (3 in) Standard Length and maximum of age 3 (Chernoff et al., 1982; Bestgen and Platania, 1987). Hatch (1982)

found Pecos bluntnose shiners growing to a maximum length of 56.5 mm (2 in) Standard Length with a maximum longevity of age 2. Recent collections (S. P. Platania, personal communication) indicated the Pecos form achieves a similar maximum length and longevity as the Rio Grande form. Collections made during 1990 by Brooks et al. (1991) indicate that all age classes (age 0-3) were present within the upper Critical Habitat reach, while only age 0 and age 1 were collected in the lower Critical Habitat reach.

Little is known of Pecos bluntnose shiner food habitats. *N. simus* exhibit an S-shaped gut, indicating a carnivorous-omnivorous diet (Sublette et al. 1990). Bestgen and Platania (1987) examined digestive tracts of Rio Grande bluntnose shiner and found a mostly omnivorous diet, including food items of detritus, filamentous algae, terrestrial plant material, and aquatic and terrestrial insects. Pecos bluntnose shiner are also omnivorous (Bestgen and Platania 1987). Temporal and/or seasonal shifts in food habitats are unknown.

Distribution and Abundance

Brooks et al. (1991) reviewed historic and recent surveys of fish communities in the Pecos River. These surveys included collections from Sumner Dam downstream to the Brantley Reservoir inflow. Historically the species occurred throughout the Pecos River in both New Mexico and Texas, but its range is now restricted to a 225-mile section of the river, between Sumner Reservoir and Brantley Reservoir, New Mexico. Intensive surveys that Brooks et al. (1991) summarized form the basis for current knowledge of Pecos bluntnose shiner distribution and abundance.

The Pecos bluntnose shiner was listed as a New Mexico State threatened species on May 11, 1984 and as a federally threatened by the U.S. Fish and Wildlife Service on February 20, 1987. The shiner was first collected by Cope and Yarrow, at San Ildefonso, Santa Fe County, New Mexico in 1876 (Sublette et. al., 1990). Confusion regarding taxonomic status of *N. simus* was resolved when Chernoff et al. (1982) determined that two subspecies occurred, the Rio Grande and Pecos forms. The Rio Grande form is now extirpated (Bestgen and Platania, 1990).

Historic distribution and abundance of the Pecos subspecies are known; the Final Rule determining the Pecos bluntnose shiner is threatened indicates historic occupation of the Pecos River between the towns of Santa Rosa and Carlsbad, New Mexico (U.S. Fish and Wildlife Service, 1987). Collections subsequent to initial discovery have been sporadic and inconclusive, but indicate a reduced range for the Pecos bluntnose shiner, from below Sumner Dam to the Brantley Reservoir inflow (Hatch et al., 1985; Sublette et al., 1990; Brooks et al., 1991). Collections of Pecos bluntnose shiner during 1990 indicate a current range of 8 km (5 mi) below the town of Fort Sumner to Artesia (Brooks et al., 1991).

Critical habitat for this endemic subspecies was designated to include two sections of the Pecos River. The first section starts about 10 miles downstream of Ft. Sumner and extends approximately 64 miles further downstream. The second section starts near Hagerman, New Mexico and extends 37 miles downstream to the Highway 82 bridge, near Artesia, New Mexico (U.S. Fish and Wildlife, 1987). The channel downstream from Sumner Dam to Acme is

generally wide, sandy and unstable with a shifting bed structure. The channel becomes spread out and braided creating suitable habitat for the shiner. Though some of this habitat is not designated as critical habitat (Acme is located roughly 25 miles downstream of critical habitat), it nonetheless serves as important habitat for the shiner and supports high numbers of the species.

This stretch of river is also hydrologically characterized as a losing reach. Surface water is lost both through seepage and evaporation. Depending on the time of year, the amount of water moving down the channel and local weather conditions, water losses to this portion of the river can be as much as 50% by the time the water reaches Acme. From Acme downstream the river begins to gain water back to the surface and is called a gaining reach, however, the stream from this point slowly begins to narrow and deepen, losing the important features necessary for good shiner habitat.

Historic and recent riverine sampling to determine seasonal and annual status and distribution of the shiner was analyzed by Brooks et al. (1991) using a species guild approach, as described by Bain and Boltz (1989). Because of the complex diversity of the Pecos River fish community, comprised of over 25 species, actual abundance measures for trend analysis are difficult to analyze. The species guild analysis approach, in this case the shiner guild, allows for a simplified analysis with focus on trends within a certain species guild.

The historic trend in Pecos bluntnose shiner abundance within the shiner guild indicates a decline in abundance of this species (Brooks et al., 1991). Collections by Hatch (1982), when compared to shiner guild values of historic collections, indicate a guild that was no longer dominated by Pecos bluntnose shiner. Collections between 1986 and 1990 indicate a further decline in abundance and a reduction in range, although the species still exists within the designated Critical Habitat reaches (Brooks et al., 1991). Non-native species, including the plains minnow (*Hybognathus placitus*) and the Arkansas River shiner (*N. girardi*) (Sublette et. al., 1990), now comprise a large portion of the shiner guild, and may indicate interspecific competition as a factor in Pecos bluntnose shiner abundance and distribution reductions. These species apparently spawn during high flow events in the Pecos River, with eggs and larvae being distributed downstream to colonize new areas (Bestgen et al. 1989).

Throughout the study years, information and data were gathered on the effects of varying river flows on aquatic habitat availability. Study areas were divided into five different reaches and monitoring continues throughout these reaches presently. In a letter to Reclamation, Chris Hoagstrom (2000) of the Service described the shiner population in four reaches from 1992 to 2000. Shiner populations remained low through 1993 in all four reaches. In 1994 populations began to rise in the lower two reaches and in subsequent years from 1994, began to increase in the upper two reaches till 1998. Populations in 1998 dropped to 1995 levels for the upper three listed reaches and remained steady till 2000 when a slight increase was again seen. Hoagstrom speculated that the high population density was not sustained in 1997 and 1998 because base flows were not supplemented and that "frequent reservoir releases caused downstream displacement." The variance in the population numbers in the upper three reaches does not

clearly indicate that unsupplemented base flows and frequent reservoir releases were the cause of the sudden population declines in 1998. Another conclusion would be that the pulse of the adult population reached its maximum longevity after two years. Further analysis to correctly identify the relationship between flows and populations is needed.

Cumulative effects of State and private actions in the project area

Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.

For several years, the New Mexico Interstate Stream Commission has leased water from the Carlsbad Irrigation District to augment state line deliveries. Since the water is indistinguishable from CID supply until below Brantley, Reclamation delivers it to Brantley as irrigation supply subject to the same restrictions.

Cumulative effects result from the activities of well pumpers. Well pumpers affect the river by lowering the groundwater aquifer. This is an indirect effect on surface water flows as the impacts of the pumping may be delayed over time. The State of New Mexico has been instrumental in purchasing and retiring these types of water rights. In 2001, Reclamation will also lease from a well pumper, further reducing this indirect impact.

Additional cumulative effects on the shiner result from the action of river pumpers. River pumpers directly affect the flow of the river by pumping water out of the channel, reducing downstream flows. This direct effect is magnified during low flow periods. Reclamation has leased water rights from six river pumpers and will not pump water from the river. This directly reduces the negative impact of river pumpers in the basin.

Other cumulative effects on the shiner result from the action of FSID. The FSID has no storage right, but does have direct flow rights through the Hope Decree and calls for and diverts water to which the district is entitled. The Hope Decree entitles FSID to divert up to 100 cfs for beneficial use. The entitlement is based on a calculation made by the OSE from flow data collected every two weeks throughout the irrigation season.

Water for the project is bypassed at Sumner Dam and travels 14 miles downstream to the FSID Diversion Dam where it is diverted into the FSID main canal. If there is not additional water being released or bypassed, the river proper may become dry at this location. The main canal is approximately 15 miles long and water is diverted into smaller lateral canals for the irrigators' use. The system also includes drain canals which collect seepage and runoff from the fields and carries these return flows back to the main canal. These return flows may be up to half of the diversion allocation.

During periods when a full entitlement is allocated, return flows from the system re-enter the Pecos River proper about one mile above the Taiban confluence. When dry periods occur and entitlements are not fully allocated, return water from the lateral canals, that would normally exit

the system, is pumped back up into the main canal system for reuse, utilizing as much of the existing allocation as possible. In this instance return flows are considerably reduced and result in very little water re-entering the river at the end of the main canal.

The cumulative effects along with the direct and indirect effects together may further exacerbate situations when dry periods start occurring, despite positive attempts to bypass all available inflows, purchase and lease water rights, or forbear crops to obtain extra water. Local weather conditions can often make a significant difference between intermittency or achieving a targeted flow.

7. ANALYSIS OF THE EFFECTS OF THE PROPOSED ACTION

In accordance with the ESA and interagency consultation regulations, the proposed actions of the Pecos River interim irrigation season operations requiring preparation of this biological assessment is similar to the previous actions identified in the 1999 and 2000 Irrigation Season Operation plans. The proposed action involves similar impacts to the Pecos bluntnose shiner and no new species have been listed or proposed within the area of operation. This analysis deals with the direct and indirect effects of the proposed action, together with the effects of the other activities that are interrelated or interdependent with the action. This assessment has been supplemented with relevant changes in information and the latest scientific data regarding the possible impacts of the operations to the Pecos bluntnose shiner.

Direct Effects

To analyze the proposed action, each operational characteristic has been assessed. Each characteristic has been proposed to provide benefits to the shiner while continuing to operate Sumner Dam to bypass inflows for the FSID and deliver water downstream for use by the CID. Despite the proposed modifications that will benefit the shiner, there are other adverse effects inherent to block releases from Sumner that cannot be completely avoided.

a) Bypassing natural inflows to Lake Sumner when available (based on total inflow above Lake Sumner as determined by OSE) and necessary to meet downstream targets of 35 cfs at the Pecos River Near Acme Gage (Acme)

Purpose: to provide a target flow for the shiner (within Reclamation authority)

If there are inflows available for Reclamation to manage[2], Reclamation will bypass all or a portion of those inflows as needed to target 35 cfs at Acme. The Pecos River Hydrology

[2]Reclamation can manage any inflows into Sumner in excess of what is called for and diverted by FSID based on FSID's direct flow right as calculated by the OSE. The maximum FSID diversion right is 100 cfs

Model estimated in the fall of 1998 that this operation would provide 35 cfs at the Acme gage at least 68% of the time and 25 cfs at least 89% of the time. Without this operation it was estimated that flows at Acme would exceed 35 cfs only 26% of the time and would exceed 25 cfs only 65% of the time. The actual quantities of inflows that were available for Reclamation to manage depended on the actual inflows that occurred and the call for water made by FSID. With or without the proposed bypass operation, flows at Acme were estimated to exceed 13 cfs 99% of the time.

Actual data recorded for the 1999 irrigation seasons appeared to be equal or slightly better than the model predicted. In 1999, bypasses did occur, but were infrequent and small (figures 1 & 4) because of sufficient precipitation in the area. The 35 cfs flows at Acme were exceeded 80% of the time, 85% of the time for 30 cfs flows, and 91% of the time for 26 cfs flows. Flows were supplemented naturally throughout the season by many local rain events.

Again in 2000, bypasses were infrequent (figures 2 & 5), but inflows bypassed between releases were considerably higher due to extreme drying conditions. Flows for the 2000 irrigation season exceeded 35 cfs, 62 % of the time. Flows exceeding 30 cfs resulted 71% of the time and flows exceeding 26 cfs happened 80 % of the time. For the 1999-2000 year combined period, 35 cfs was exceeded 71 % of the time; 30 cfs was exceeded 78 % of the time; and 26 cfs was exceeded 85 % of the time (figure 3 & Table 1).

The 1999 irrigation season was unique. Rain events started occurring in April and continued throughout the season. Significant spates occurred at the end of April, the middle of June and July, and during the first part of August (Figure 1). These events kept flows high and provided enough water to delay block releases throughout the entire season. One 10 day block release was made in October 1999 to carry irrigators through the end of the irrigation period.

The 2000 irrigation season was also unique in that it was unusually dry. Jon Trotter, Sumner Dam, Dam Tender, compiled precipitation data collected at the Sumner Dam rain gauge. The 10-year average precipitation was calculated to be 15.7 inches per year. The 10-year range of annual precipitation accumulation was 9.4 inches (in 1995) and 22.4 inches (in 1999). The 10-year, end of August average precipitation accumulation was 12.2 inches.

In 2000, the end of August precipitation accumulation only reached 6.7 inches, approximately 50 % of the 10-year end of August average. At the end of September 2000, precipitation had reached a total of 7.0 inches. Precipitation picked up in October/November and the total for the year 2000 was approximately 13.23 inches. Without the water supply in storage at the onset of the 2000 irrigation season and the resulting five block releases, the average flows at Acme would have been substantially lower.

Beginning in the winter of 1998, Reclamation has managed for the bypass of inflows when inflows were available and needed. Reclamation has fully utilized its authority to manage

available inflows to target 35 cfs at the Acme gage. The environmental baseline is characterized by baseflows depleted by the cumulative effects of a number of non-Federal actions including groundwater pumping in the basin and the consumptive use of water by nonnative vegetation (salt cedar intrusion). If Reclamation does not continue to implement this operation, flows will more frequently be lower than the modeled predictions and could possibly result in intermittency or temporary stressful conditions to the shiner.

b) Restricting the duration of block releases from Sumner to a maximum of 15 days

Purpose: to improve the longitudinal distribution and population structure of the shiner

Spawning of the shiner is initiated by increased flows, such as rainstorm events or block releases. The peak spawning season for the shiner includes the summer months of June, July, and August. In some years there appears to be more spawning in June and in other years more spawning activity in July and August. Irrigation demand and thus the need for block releases is highest during the summer months.

Platania (1993) reported the reproductive biology of this shiner as well as four other plains fishes in the Pecos River. The shiner is a broadcast spawner which produces semi-buoyant, nonadhesive eggs. These eggs drift throughout the water column and depending on the water temperature hatch within 24-48 hours. The protolarvae continue to move with the currents for another three to four days before developing a swim bladder and being physically able to maneuver out of these currents.

Hoagstrom's (U.S. Fish and Wildlife Service, 1995) data revealed that in four of the five reaches sampled, the percent of shiners of size class zero (protolarvae and young-of-year) regressed the longer the block releases continued beyond 10 days. Reach 1, near the head of the release, showed the least possible regression over time, but Reaches 2, 3, and 4 became successively and increasingly more regressive over the same period of time. Reach 5, showed a significantly increasing percentage of shiners. This reach of river is just above Brantley Reservoir and has the least amount of habitat available to the Pecos bluntnose shiner.

Based on this information, it is likely that block releases of a duration longer than 4 to 6 days transport shiner protolarvae from Reach 5 into Brantley Reservoir. Block releases of 15 days duration or longer likely transport eggs and protolarvae from higher reaches into Brantley Reservoir and may make it difficult for the species to achieve optimal longitudinal distribution. Data presented by the Service at a Research meeting in April 1998 indicated that the duration of block releases were a problem and therefore recommended the maximum release be no longer than 15 days. The number of individual shiners impacted by a block release remains unquantifiable.

c) Restricting the cumulative duration of block releases from Sumner in calendar year 2001 to a maximum of 65 days

Purpose: to improve the longitudinal distribution and population structure of the shiner

As discussed above, the duration of individual block releases is an important factor for the distribution of shiner. For the same reasons, the total number of days of block releases per year is also an important factor. Years when the cumulative duration exceeded 65 days had negative consequences on the size class distribution which is not as pronounced during years when the total number of days was equal or less than 65.

d) Targeting a minimum of 14 days between consecutive block releases from Sumner

Purpose: to improve the longitudinal distribution and population structure of the shiner

After a block release, shiner larvae are not physically able to maneuver out of the downstream current for at least 4 to 6 days. By allowing a resting period of at least 14 days between releases, there is sufficient time for the young shiners to develop and seek habitats for protection during the next block release.

e) Providing a ramp down on the tail end of block releases from Sumner when possible

Purpose: to improve habitat conditions for the shiner and prolong flows in the channel between releases

A ramp down immediately following a block release may improve shiner habitat potential by improved distribution of sediment as flows subside. When storage conditions are amenable, the ramp down will be provided. Ramp downs will not be considered a part of the block release.

f) Target one, seven consecutive week period between June 1, 2001 and August 31, 2001 during which no block releases from Sumner will be made

Purpose: to improve reproductive success and increase population numbers

As noted above, research has shown that the peak spawning season occurs during the summer months, that spawning occurs on flow increases, that newly spawned shiners remain in the drift for 4 to 6 days and can be transported into Brantley Lake, and that the longitudinal distribution of shiners is affected by block releases.

Targeting a 7 week period during which no block releases are made would benefit the shiner. The 7 week respite would allow shiner spawned on the most recent block release to grow to sufficient size to seek preferred habitats. It also would provide an opportunity for natural flow spikes to induce spawning and a period of low flows to allow young shiner to develop.

Indirect Effects

Indirect effects are those effects that are caused by or will result from the proposed action and

are later in time, but are still reasonably certain to occur. There were no indirect effects identified.

Interrelated and Interdependent Actions

There were no interdependent activities identified that were not considered. Some interrelated activities were identified including a wide range of activities associated with Reclamation's acquisition of supplemental water to mitigate the effect of modified operations on water users. Reclamation's acquisition efforts may also increase flows in the lower critical habitat area and we are hopeful that a recent forbearance agreement with a rancher near the Acme gage may improve the in-stream conditions in that critical stretch of the river.

8. EFFECT DETERMINATION

Reclamation's proposed operation to bypass available inflows as needed to target 35 cfs will augment flows for the shiner. Reclamation's proposal to limit block releases to 15 days or less and to limit the cumulative duration within the calendar year to 65 days or less will minimize effects on the longitudinal distribution and population structure of the species. Reclamation's proposal to provide a minimum rest period of two weeks between block releases will allow young shiner to develop and seek preferred habitats. Reclamation's proposal to target a 7 week rest period during the summer spawning season will improve reproductive success of the species.

However, in addition to these positive attributes of Reclamation's proposed action, there are inherent negative aspects of block releases. It is probable that every block release made to deliver irrigation water from Sumner to Brantley transports shiner eggs and/or larvae into Brantley Lake where they do not survive. Because these individuals are delivered to Brantley Lake, Reclamation requests an **incidental take statement**. Although unquantifiable, the level of take would not be expected to jeopardize the continued existence of the species.

Reclamation's proposed action would at times augment low flows in the reaches of critical habitat. Ramp downs from block releases would improve habitat.

Although there are many aspects of the proposed action that will benefit the species and its critical habitat, the proposed action will also result in the loss of individuals. Therefore, the proposed action may adversely affect the Pecos bluntnose shiner, but will not destroy or adversely modify its critical habitat.

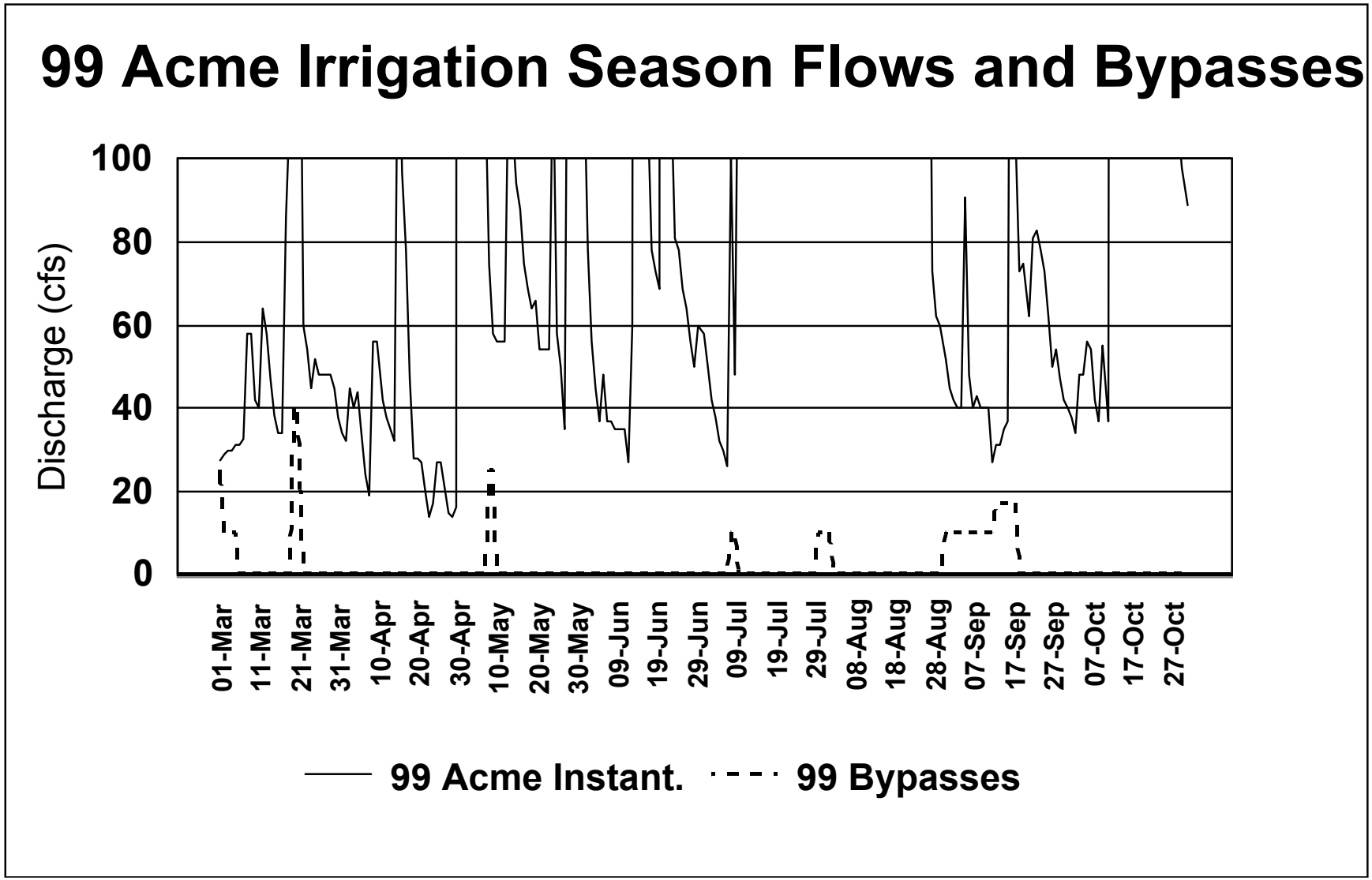

Figure 1 1999 Acme Irrigation Season Flows and Bypasses

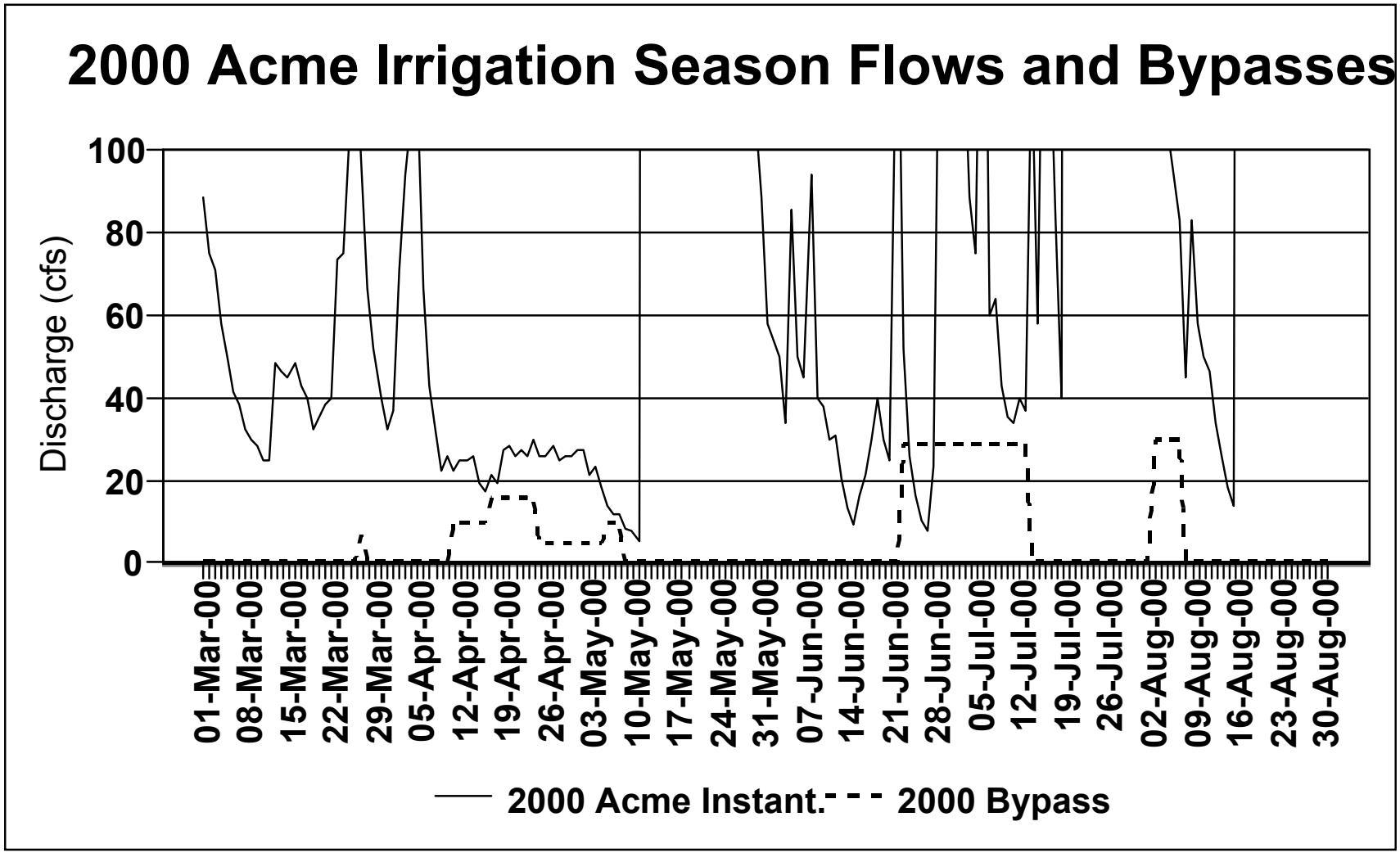

Figure 2 2000 Acme Irrigation Season Flows and Bypasses.

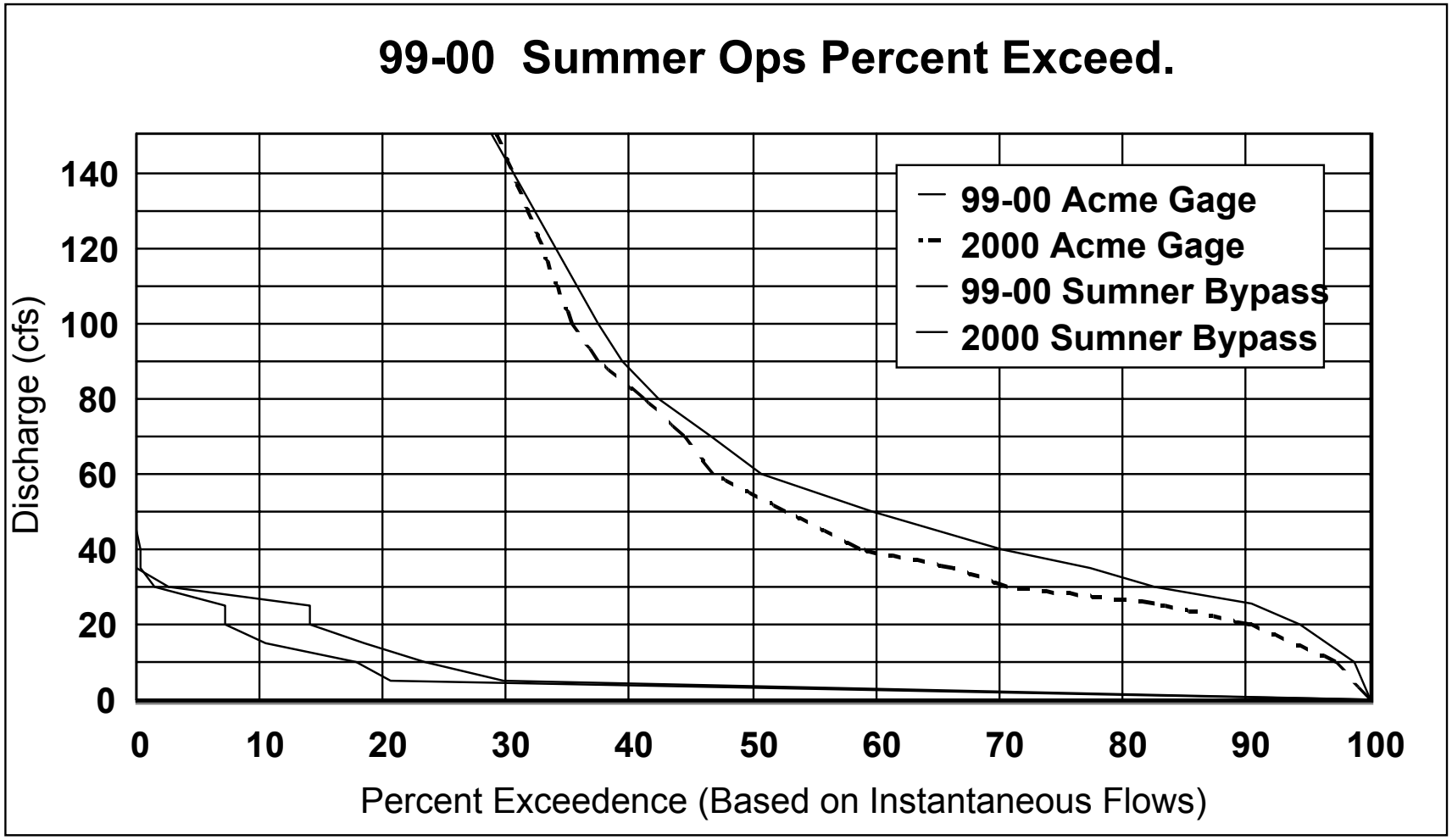

Figure 3 1999-2000 Summer Operations Percent Exceedence graph.

1999 and 2000 Summer Irrigation Season Pecos River near Acme Pecent Exceedence Values

Discharge (cfs)	0	5	10	15	20	26	30	35	40	45	50	75	100	200	300	500	1000	1500
1999 Irr. Sesaon	100%	100%	100%	99%	96%	91%	85%	80%	75%	71%	65%	51%	41%	21%	16%	11%	3%	1%
2000 Irr. Season	100%	95%	89%	86%	83%	80%	71%	62%	59%	56%	51%	38%	31%	23%	19%	18%	0%	0%
1999&2000 Combined	100%	98%	95%	93%	90%	85%	78%	71%	67%	63%	58%	45%	36%	22%	18%	14%	2%	0%

Table 1

UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - NEW MEXICO NWIS 02/02/2001

STATION NUMBER 08386000 **PECOS RIVER NEAR ACME**, NM STREAM SOURCE AGENCY USGS
LATITUDE 333210 LONGITUDE 1042234 DRAINAGE AREA 11380.00 DATUM 3507.00 STATE 35 COUNTY 005
PROVISIONAL DATA FROM DCP SUBJECT TO REVISION
DISCHARGE, CUBIC FEET PER SECOND, **CALENDAR YEAR JANUARY TO DECEMBER 1999**
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	50	91	24	36	4890	102	50 e22		55	24	100	27
2	47	79	27	37	3200	85	42 e18		48	20	108	26
3	43	60	27	42	881	67	35 e60		48	20	121	26
4	41	52	27	44 e705		54	29 e112		57	29	95	30
5	43	47	27	43 e545		49	24	196	69	30	71	34
6	48	46	26	32 e365		53	21	681	49	33	62	33
7	47	41	31	23	206 e50		26	1150	45	30	54	32
8	48	38	47	27	182 e47		69	1150	49	24	49	33
9	44	38	39	53 e165	e45		47	1170	40	19	45	44
10	44	37	35	49 e150	e42		203	1220	38	25	41	48
11	44	33	38	33 e140	e39		411	1250	36	102	37	41
12	44	33	55	31 e125		37	253	734	32	707	33	35
13	44	31	46	24	113	380	276	541	31	794	31	33
14	41	32	36	99	107	528	299	527	32	835	29	31
15	37	33	29	89	99	238	287	508	41	881	26	31
16	34	33	27	82	90	194	281	492	39	937	26	29
17	32	33	32	52	82	150	300	438	173	989	26	30
18	31	31	76	35	76	136	194	437	88	1080	25	29
19	31	31	106	26	76	132	143	401	78	993	24	32
20	30	30	125	29	74	143	138	718	68	479	24	31
21	30	29	139	21	69	477	127	684	63	377	24	30
22	34	25	83	15	81	167	123	422	79	279	26	31
23	35	24	56	12	71	128 e133		260	78	219	26	30
24	36	24	44	17	125	104 e130	e230		75	182	26	31
25	37	23	52	27	102	104 e128	e190		67	166	26	34
26	35	24	51	20	87	95 e127	e185		58	150	27	35
27	32	23	66	17	78	87 e125	e120		49	134	27	35
28	32	23	59	15	166	77 e80		85	52	118	28	35
29	36 ---		53	11	132	66 e50		74	45	102	28	34
30	64 ---		47	829	182	55 e25		66	41	92	27	33
31	74 ---		42 ---		131 ---	e17		59 ---		83 ---		31
TOTAL	1268	1044	1572	1870	13495	3931	4193	14200	1723	9953	1292	1014
MEAN	40.9	37.3	50.7	62.3	435	131	135	458	57.4	321	43.1	32.7
MAX	74	91	139	829	4890	528	411	1250	173	1080	121	48
MIN	30	23	24	11	69	37	17	18	31	19	24	26
AC-FT	2520	2070	3120	3710	26770	7800	8320	28170	3420	19740	2560	2010

Figure 4 U.S.G.S. Pecos River discharge for the Year 1999

UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - NEW MEXICO NWIS 02/02/2001

STATION NUMBER 08386000 **PECOS RIVER NEAR ACME**, NM STREAM SOURCE AGENCY USGS
LATITUDE 333210 LONGITUDE 1042234 DRAINAGE AREA 11380.00 DATUM 3507.00 STATE 35 COUNTY 005
PROVISIONAL DATA FROM DCP SUBJECT TO REVISION
DISCHARGE, CUBIC FEET PER SECOND, **CALENDAR YEAR JANUARY TO DECEMBER 2000**
DAILY MEAN VALUES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	31	34	128	31	32	61	271	862	135	5.4	123 e29	
2	30	35	124	60	31	56	175	537	99	3.7	101 e28	
3	29	35	107	81	26	54	101	269	79	2.8	91 e27	
4	27	33	95	89	28	44	75	164	65	2.4	89 e26	
5	29	32	81	91	20	39	62	144	55	2.6	83 e26	
6	34	33	73	65	16	49	90	142	46	2.7	76 e25	
7	31	32	63	44	13	34	52	142	42	3.9	77 e24	
8	33	32	60	31	9.6	55	47	110	37	7.8	72	24
9	31	33	56	28	7.4	31	37	82	32	15	69	23
10	30	32	50	29	6.1	29	33	65	28	27	67	23
11	30	30	49	28	4.3	25	32	57	22	37	66	23
12	29	30	48	30	892	26	37	53	19	51 e65		21
13	29	29	49	32	986	17	58	47	16	61	63	21
14	29	29	46	33	934	12	86	44	13	59 e60		22
15	28	30	45	25	919	12	118	41	11	57 e56		24
16	28	25	47	28	928	21	134	40	8.9	67 e53		22
17	29	425	41	29	876	17	100	685	7.3	107 e50		25
18	30	1050	34	29	869	34	61	811	5.9	91 e47		22
19	30	1190	31	29	882	53	36	725	4.8	77 e46		20
20	31	1210	32	29	923	26	774	765	3.8	74 e44		19
21	31	1240	34	26	905	128	847	815	3.4	74 e42		19
22	31	1290	37	28	859	103	903	844	2.2	72 e41		20
23	30	1310	61	26	851	40	952	871	2.4	105 e40		20
24	30	1240	78	31	848	23	879	940	3	884 e37		21
25	30	541	95	29	906	16	950	917	3.3	725 e35		22
26	29	326	117	29	513	11	987	900	6.5	356 e33		22
27	30	225	74	30	330 e12		884	852	6.7	271 e32		25
28	30	180	49	27	205 e24		840	518	7.4	247 e32		26
29	30	154	37	29	137 e90		889	396	8.4	246 e31		23
30	33	---	29	32	98	134	882	321	7	262 e30		22
31	33	---	23	---	74	---	874	234	---	231	---	30
TOTAL	935	10885	1893	1128	14128.4	1276	12266	13393	780	4227.3	1751	724
MEAN	30.2	375	61.1	37.6	456	42.5	396	432	26	136	58.4	23.4
MAX	34	1310	128	91	986	134	987	940	135	884	123	30
MIN	27	25	23	25	4.3	11	32	40	2.2	2.4	30	19
AC-FT	1850	21590	3750	2240	28020	2530	24330	26570	1550	8380	3470	1440

Figure 5 U.S.G.S. Pecos River discharge for the year 2000.

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