INTERIM

PROGRAMMATIC BIOLOGICAL ASSESSMENT

OF PROPOSED PECOS RIVER OPERATIONS

ON THE LISTED SPECIES OF

THE PECOS RIVER BASIN

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U.S. Department of the Interior
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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTERIM PROGRAMMATIC BIOLOGICAL ASSESSMENT OF PROPOSED PECOS RIVER OPERATIONS ON THE LISTED SPECIES OF THE PECOS RIVER BASIN

1. INTRODUCTION

This Interim Programmatic Biological Assessment (IPBA) analyzes the potential effects of the Bureaus of Reclamation's (Reclamation) summer and winter interim water operations plans on eleven federally listed species within the Pecos River basin.

These eleven species live in or near the project area and may be affected by either the summer and/or the winter Interim Operations as proposed by Reclamation. Distribution and life requirements are discussed, as well as an analysis of the effects of both the summer and the winter operations on each species. An Effects Determination is made on those species being effected by the interim operations (refer to table 1 for summary listing).

The purpose of this interim BA is to consult with the Service over both the winter and the summer interim operations of Reclamation's discretionary activities that could affect listed species in the Pecos River throughout the remainder of the NEPA process (estimated completion date is July 2003). Hence, the proposed action would be implemented annually for the next few years. However, during this interim period, if any new information or finding point 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 and operated by Reclamation for the benefit of CID. Construction on this dam was completed in 1989 (U.S. Army Corps of Engineers, 1991 and 1995).

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 consultation resulted in an MOU which provided the framework for a 5-year research program and established biannual meetings for MOU parties (Reclamation, CID, the Service, and 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.

An extension of the original MOU was signed in February 1997 which included the New Mexico Office of the State Engineer (OSE) as signatory and extended the MOU relationships another three years.

During this period Reclamation reinitiated consultation over it's interim operations. Initial contact with the Service was made in October 1998 and in November 1998, a BA was submitted assessing the affects of the winter operation on the Pecos bluntnose shiner. A BO was issued during the same month

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), (Figure 1).

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 downsteam 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 maintain 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 of 20 cfs 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 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 Memorandum of Understanding (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 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 been made. As part of the NEPA process, Reclamation plans to consult with the Service over long-term operations. In the interim, Reclamation is consulting over a short-term Interim Programmatic Water Operations Plan.

5. DESCRIPTION OF THE PROPOSED ACTION

The proposed Interim Operations will address both summer and winter plans for operating Sumner Dam. These plans are similar to previous plans submitted for the 1999 Irrigation Operation season and the 1998-1999 and 1999-2000 Winter Operation season.

5.1 Summer Irrigation Operations Plan

The proposed Pecos River Irrigation season operations plan was developed to manage water operations on the Pecos River for the period of March 1st through October 31st. This plan is proposed to accommodate the needs of 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, Reclamation is consulting on those aspects of the operations with respect to which Reclamation has discretionary authority that

might affect a threatened or endangered species. The proposed action includes the following operating characteristics:

A) Bypassing inflows when available based on total inflow above Lake Sumner as determined by OSE;
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 2000 to a maximum of 65 days;
D) Restricting the time between consecutive block releases from Sumner to a minimum of 14 days;
E) when possible, Provide a ramp down on the tail end of block releases from Sumner, to include one day at 750 cfs, one day at 500 cfs, and two days at 250 cfs;
F) and Target one consecutive 7-week period between June 1, 2000 and August 31, 2000 during which no block releases from Sumner will be made.

Throughout the calendar year, Reclamation will continue to support population monitoring efforts conducted by the Service so that the status of the species can continue to be tracked.

5.2 Winter Operations Plan

During the months of November through February, Reclamation proposes to implement a Pecos River winter operations plan that will store portions of the available inflows to Sumner Reservoir and target an objective average flow of 35 cfs at the Acme gage. If storing a portion of the available inflow hinders Reclamation's ability to provide and average 35 cfs at Acme, then Reclamation will use its full discretionary authority and not store any inflows. When the flow objective of 35 cfs at Acme is being fulfilled entirely by baseflows, Reclamation will not act to bypass any inflows. The portion of the inflow that is not stored by Sumner Dam are known as bypass flows. Storage of these bypassed flows, in whatever quantity is realized following transport losses, would occur at Brantley Reservoir.

In no case will the bypass flows exceed the natural inflow to Sumner Reservoir as measured at the Pecos River near Puerto de Luna (PDL) gage that is operated by US Geological Survey (USGS). The PDL gage is used to determine what water is available for bypass flows for winter operations.

For the period after construction of Santa Rosa Dam (1980 to 1998), the average flow from November 1 to February 15 at PDL was 85 cfs. The minimum flow for this period was 65 cfs. The minimum flow for the period of record (1938 to 1998) at PDL gage was 40 cfs which occurred on February 1, 1951. We do not anticipate the need to bypass more than this minimum amount during the winter operations period to target the objective 35 cfs average at the Acme gage.

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

The objective average flow at Acme for this plan of operations is 35 cfs, with an overall range fluctuating between 20 and 40 cfs. Approximate travel time to Acme, with flows in this range, is approximately 10 to 12 days. Typically Reclamation will wait a minimum of 12 days between changes in bypass rates of flow at Sumner Dam, in order to allow adequate time for the gage at Acme to stabilize after bypassed inflows were adjusted at Sumner Dam. If flows at Acme are below the objective after this 12 day period, then the bypass from Sumner Dam will be increased by 5 cfs. If flows at Acme are above the target flows after this 12 day period, then the bypass from Sumner will be reduced by 5 cfs. We do not expect bypass flows through Sumner Dam to exceed 35 cfs.

When climatic conditions significantly change in the basin, Reclamation will evaluate the current conditions and change bypass flows if we determine that the natural runoff will be sufficient to provide flows needed to maintain or exceed the objective flow at Acme.

6. SPECIES DESCRIPTION

The effects of the proposed action on eleven listed species will be analyzed in this biological assessment. The eleven species include: Bald Eagle (*Haliaeetus leucocephalus*), Interior Least Tern (*Sterna antillarum*), Pecos bluntnose shiner (*Notropis simus pecosensis*), Pecos Gambusia (*Gambusia nobilis*), Pecos Sunflower (*Helianthus paradoxus*), Mountain Plover (*Charadrius montanus*), Mexican Spotted Owl (*Strix occidentalis lucida*), Black-footed Ferret (*Mustela nigripes*), Gypsum wild-buckwheat (*Eriogonum gypsophilum*), Kuenzler hedgehog cactus (*Echinocereus fendlerivar. kuenzleri*), and Lee's pincushion cactus (*Coryphantha sneedii var. leei*).

6.1 Bald Eagle

6.1.1 Distribution and Abundance

On a seasonal basis, the bald eagle is located throughout the conterminous United States. The bald eagle was listed under the Endangered Species Act (Public Law 93-205) on March 11, 1967.

In the Southwestern United States, wintering bald eagles from the northern United States and Canada arrive in October and November, depending on climatic conditions, and normally migrate north by March and April (Ohmart and Sell 1980). In New Mexico, bald eagles winter from the northern border of the state southward to the basins of the Gila, Rio Grande, Pecos and Canadian rivers.

From December 1989 through March 1990, the Corps undertook an aerial survey of the upper Pecos River system, in the vicinity of Santa Rosa Lake, to identify overwintering bald eagle habitat. Ground observations by Corps personnel at Santa Rosa Lake were also recorded in the aerial survey summary. Survey results indicate both adult and sub-adult bald eagles use Santa Rosa Lake between December and March. NMDGF aerial surveys (1982-1990), from the

headwaters of the Pecos River to the vicinity of Fort Sumner, New Mexico, show a upward trend in overwintering populations over the past 8 years and comprise an average of 11.3% of the New Mexico bald eagle winter total.

6.1.2 Life Requisites

Wintering bald eagles in New Mexico are associated with unfrozen lacustrine, riverine, and riparian habitats. Distribution appears dependent on prey density, suitable perch and roost sites, weather conditions, and lack of human disturbance (Ohmart and Sell 1980).

Bald eagle numbers fluctuate considerably during sequential winters due to weather conditions and prey availability at the wintering site as well as weather conditions further north.

Bald eagles are opportunistic feeders, and their diet varies regionally in the southwest. Important food items include warmwater fish species, particularly common carp (Cyprinus carpio) and channel catfish (Ictalurus punctatus), waterfowl, carrion, and smaller mammals. The construction of mainstem dams has had a major influence on eagle distribution as the birds take advantage of newly created food sources at impoundments.

6.2 Interior Least Tern

6.2.1 Distribution and Abundance

The interior least tern was listed under the Endangered Species Act as a threatened species on May 28, 1985. New Mexico is located on the extreme southern and western periphery of the interior least tern's historic range. The first recorded sightings of interior least tern in New Mexico occurred in 1949 on the Bitter Lake National Wildlife Refuge (BLNWR), located northeast of Roswell, New Mexico (Jungleman 1988). This refuge was established adjacent to the Pecos River in 1939. A small population of least terns has utilized this area for the past 51 years; the number of terns sighted at BLNWR during peak abundance fluctuates annually, with 60 sighted on September 5, 1961 and no birds sighted for several years. The average number of interior least terns sighted at the LBNWR on the peak use day and number of nests during the period of record indicates tern populations have remained low and production of young terns has been minimal. While most of the past research has centered in and around Roswell, New Mexico, other sightings have been documented near Las Crusces, New Mexico (1980), in the Rio Grande Basin, White Sands (1981), Holloman Lake near Alamogordo (1980/1982), Bottomless Lakes State Park, and Wade's Bog (prior to 1973). There are no additional sightings in the Pecos River Basin.

6.2.2 Life Requisites

Interior least terns may utilize areas within the Pecos River basin for both nesting and feeding. Throughout the interior least tern's range the nesting period starts in mid-June and may last through August.

Interior least terns typically nest in colonies. There are two factors required for successful interior least tern nesting. Nesting sites, the first factor, normally occur on broad, unvegetated sand bars. The nest is scraped in sand and/or gravel and is normally unlined. Two to four eggs (usually three) are laid in the nest, and incubation takes 20-22 days. The peak of hatching is generally during the first week of July. Chicks leave the nest after 1 to 2 days and are full-fledged at 2 to 3 weeks. There is a great deal of variability between the maximum nesting densities in tern colonies throughout its range. In recent years, least tern preferred nesting habitat in the Roswell area has been salt flats. This is probably due to the fact that salt flats are one of the few habitats with substrates that lack vegetation. The disadvantage of salt flats nesting habitat is the inability of precipitation to infiltrate the clay/silt soils, causing flooding of nest sites during rain events.

The second factor for successful interior least tern nesting is the adequacy of the food base. The primary food source of the interior least tern consists of non-spiny rayed fish less than 9.9 cm (3.9 in) in length and with a body depth diameter less than 1.5 cm (.0.6 in) (US Fish & Wildlife Service, 1988). The food base for interior least tern chicks consists of fish less than 1.5 cm (0.6 in) in length. The type of fishery associated with providing an adequate food base for both adult and young-of-the-year appears to be common in the Pecos River.

6.3 Pecos Bluntnose Shiner

6.3.1 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 (Figure 1). 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 a federally threatened by the U.S. Fish and Wildlife Service on February 20, 1987. The bluntnose 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). Though some of the habitat utilized by the shiner between Sumner Dam, NM and Brantley Dam, NM is not designated as critical habitat (Acme is located roughly 25 miles downstream of critical habitat), it nonetheless serves as important habitat and supports high numbers of the species.

From Sumner Dam downsteam for 106 miles to the near Acme gage site (Acme), the channel is generally wide, sandy and unstable. Shifts occur in the bed structure as flows fluctuate through these habitats. 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 Pecos bluntnose shiner were 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 overall 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).

6.3.2 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.

6.4 Pecos Gambusia

6.4.1 Distribution and Abundance

The Pecos Gambusia was listed as endangered under the Endangered Species Conservation Act of 1969, on October 13, 1970. No critical habitat has been designated. The Pecos Gambusia is endemic to the Pecos River basin. It once occurred in the Pecos River system from just below Ft. Sumner, New Mexico downstream to Fort Stockton, Texas, including small tributaries of the

Pecos River and isolated springs with outflows.

At present, their habitat has been greatly diminished. Pecos Gambusia have been restricted to ponded habitats, heads and runs of springs, and gypsum sink holes associated with aquatic vegetation located on Bitter Lake National Wildlife Refuge (NWR). Most of these habitats are spring fed with constant temperatures. They can also be found in these type habitats at Blue Spring and Salt Creek Wilderness Area in New Mexico, as well as being introduced to artificial pools at the Living Desert State Park just West of Carlsbad, New Mexico. There are 12 known populations of Pecos Gambusia located within the vicinity of Roswell, New Mexico. Sublette, et. al. (1990), shows no mainstem populations of Pecos Gambusia presently existing in the Pecos River basin throughout New Mexico. In Texas, they can be found in several spring areas near Balmorhea and in the Leon Creek drainage near Fort Stockton.

They are frequently abundant where found in these locations. In 1975, the population at Blue Spring was estimated at just less than one million and the population at Bitter Lake NWR was estimated to be between 26,000 - 29,000.

Conditions that limit or reduce these populations are introduced non-native fish species that are predators or compete for space and food, as well as species that are congeneric competitors. The introduction of the western mosquitofish (*G. affinis*), used as a biological mosquito control, into Pecos Gambusia habitats, is such a competitor and has contributed to the failure of some of these populations. Pecos Gambusia exhibited lower fecundity rates than western mosquitofish. When these two species occurred sympatrically, Pecos Gambusia survival was reduced. Where habitats were large enough to accommodate both species, such as at Blue Spring, hybrids do exist, but the diversity of habitat offers a partial isolation preventing the complete mixing of both species.

6.4.2 Life Requisites

The Pecos Gambusia belongs to the family of live-bearers. Females give birth to their young alive and average about 38 embryos per reproductive period. Pecos Gambusia are small, not reaching more than 60 mm in length and having a lower protruding jaw which causes the mouth to be up-turned (described as superior). As a result the species feeds at the surface or in the upper portion of the water column. It is a carnivore and is also an opportunistic feeder. It will eat any small insect, aquatic or terrestrial. Its preferred prey are mosquito larvae and water boatman larvae.

The Pecos Gambusia live in conditions of shallow, alkaline waters with aquatic vegetation for cover. The species has a limited thermal range. Reported temperature tolerances for a Texas population ranged between 21-30 C. Its upper temperature limit can go as high as 39 C. Pecos Gambusia are intolerant to cold temperatures for long periods. This is a factor which limits the distribution of New Mexico populations. The species can tolerate high salinities but is also intolerant of total hardness above 5,000 milligrams/liter $CaCO_2$, conditions which sometimes exist in various sinkholes. Critical habitat has not been established for the Pecos gambusia.

6.5 Pecos Sunflower

6.5.1 Distribution and Abundance

The Pecos sunflower is a an endangered species of sunflower listed in April of 1998. In New Mexico, it is found in several locations across the state: three sites in Chaves County, one site in Valencia County, one site in Guadalupe County, and one site in Cibola County, New Mexico. The sites within the Pecos River Basin which might be affected by the winter operations activities are at the Bitter Lake NWR northeast of Roswell and the Dexter National Fish Hatchery near Dexter, New Mexico. Both these populations of Pecos sunflowers are presently being managed by the U.S. Fish and Wildlife Service.

Most of these sites are limited to less than 2 hectares (5 acres) of wetland habitats. The refuge manages a large population of Pecos sunflowers over the perimeter of a 300 hectare area. The area is a series of six spring-fed impoundments. During the winter these impoundments are kept full and drained in the spring to mimic a natural hydrograph. The sunflowers thrive in these conditions.

At the Dexter National Fish Hatchery a small site exists. This site has less than 100 plants. The plants appeared after saltcedar was removed in a wetland area.

Critical habitat was not established for the Pecos sunflower for the reasons listed in 50 CFR § 424.12(a) (1) and (2) (U.S. Fish and Wildlife Service, 1998d).

6.5.2 Life Requisites

The Pecos sunflower is an annual member of the sunflower family. It grows in soils that are permanently saturated. They are most common is desert wetland areas such as cienegas which are associated with springs, but can also be found along stream margins and margins of impoundments. It grows in saline soils. For the seeds to germinate, however, they require soils where high water tables have reduced salinities near the soil's surface. Pecos sunflowers have narrower leaves than the common sunflower, fewer hairs on the stems and leaves, slightly smaller flower heads, and flower later in the year, from September to November.

6.6 Mountain Plover

The mountain plover is generally found in upland areas of the Eastern and Great Plains. It breeds in dry, open shortgrass prairie habitats and is mostly a migrant throughout New Mexico. It does not require open water habitats and is rarely found near water (U.S. Fish and Wildlife Service, 1999a). Critical habitat has not been established for the mountain plover.

6.7 Mexican Spotted Owl

The Mexican spotted owl is a resident of the Guadalupe Mountains near the New Mexico border more than 100 miles from the project area. They have been seen as far North as Carlsbad National Park, but are not a part of the Pecos River Basin. These owls are very habitat-specific

(Finch, 1992), preferring forested mountainous terrain. Critical habitat has been established, but there is no critical habitat listed within the project area and is not applicable to the effects finding.

6.8 Black-footed Ferret

Black-footed Ferrets were at one time identified as common in New Mexico, but are thought not to have survived. If they have survived, the most likely location is in the northwestern part of the state (Findley, et al., 1975). Reported sightings of Black-footed Ferrets have come from all parts of the state except the most southern areas, from Mogollon Plateau east to the Pecos Valley. It is believed that some of these sightings may have been the bridled subspecies of the long-tailed weasel (*Mustela frenata neomexicana*).

They are mostly associated with prairie dog communities, which are rare in New Mexico. There are no recent records of Black-footed Ferrets in the Pecos River Basin. There is no critical habitat associated with this listing.

6.9 Gypsum wild-buckwheat

The Gypsum wild-buckwheat has been recorded in one location within the water operations project area of the Pecos River Basin (Hildebrandt and Ohmart, 1982; Martin and Hutchins, 1980). It was found on some rocky hillsides near Seven Rivers, New Mexico, but not within in the riparian areas. The soil structure restricts it from growing in sandy or loamy conditions. There is no critical habitat associated with this listed species.

6.10 Kuenzler hedgehog cactus

The Kuenzler hedgehog cactus is known to be in both Chavez and Eddy Counties, but it is not likely to be seen growing within floodplain areas due to its xerophytic nature. It requires well-drained sandy or gravelly soils of plains or upland slopes, generally 6,000 to 8,000 feet in elevation. Critical habitat has not been established for this listed species(Martin and Hutchins, 1980). To date, there are no resource inventory reports that show this cactus growing within the operations area.

6.11 Lee's pincushion cactus

The Lee's pincushion cactus is another cactus similar in nature to the Kuenzler hedgehog cactus, but is found mostly in the Guadalupe Mountains to the south. In New Mexico it grows on rocky slopes or limestone ledges above the 4,000 foot elevation(Martin and Hutchins, 1980). Critical habitat has not been established for this listed species. There have been no findings of this cactus within the riparian areas of the Pecos River Basin.

7. ANALYSIS OF THE EFFECTS OF THE PROPOSED ACTION

In accordance with the ESA, Section 7 consultation regulations, the proposed actions of both the summer and the winter Pecos River interim operations requiring preparation of this biological assessment is similar to the previous actions identified in the 1999 (Summer) Irrigation Operation plan and the 1999-2000 Winter Operation plan. The proposed action involves similar impacts to the same species located in the same geographic areas and that no new species have been listed or proposed.

This assessment does however, address the full range of proposed, threatened, and endangered species known to occur in or near the Pecos River basin area. Not all species listed will be identified as being affected by this Interim Operations proposal. This assessment has been supplemented with relevant changes in information and the latest scientific data regarding the possible impacts of the operations to these species.

The following listed species were determined not to be affected by either the summer or winter operations plans: the Pecos gambusia, the Interior least tern, the mountain plover, the Mexican spotted owl, the black-footed ferret, the Pecos sunflower, gypsum wild-buckwheat, the Kuenzler hedgehog cactus, and the lee's pincushion cactus.

7.1 Species not affected by Interim Operations

7.1.1 Pecos Gambusia

The Pecos Gambusia have been collected in the mainstem of the Pecos River in backwaters, eddies, and pooled habitat within the Bitter Lake NWR, as well as Blue Spring and Salt Creek Wilderness Area. Gambusia was transplanted in both the Bitter Lake NWR and the Salt Creek Wilderness Areas. Since Gambusia require slow moving water and stable temperatures, the Pecos River offers extremely limited habitat.

When flows are considerably slower, Gambusia that find their way to the river can find some habitats there, but because of the extreme shallowness of the habitat, it is likely that they do not survive any freezing temperatures in the winter or possibly drying conditions in the summer. If they do survive the winter, high flows in the spring would flush them downstream to less suitable habitats and awaiting predators. The presence of these fish in the river are an indication that they came from off-river sites, such as connected springs and pools and are incidental to the Pecos River because of the flow conditions and lack of suitable habitats and temperatures.

It is likely that individuals of Pecos Gambusia that enter the river proper may not survive, but it is not likely to have affected the local populations from which they came nor will their primary habitats be destroyed or adversely modified. No evidence was available at the time of this assessment to show whether Pecos Gambusia were collected over the 1999-2000 winter period or the 1999 Irrigation (summer) period in the Pecos River.

7.1.2 Interior Least Tern

There have been very few areas where the Interior least tern (tern) is found in New Mexico. The primary area for terns is the Bitter Lake National Wildlife Refuge (NWR) just northeast of

Roswell. Based on the best information to date, the Bitter Lake NWR has the only known nesting colony in New Mexico (Montgomery, 2000). In New Mexico the tern is a spring/ summer resident. They do not reach their breeding sites till late April/early May and are usually gone by the end of September. It is highly unlikely that the tern was affected by the winter operations activities.

Data has been collected for the last 10 years on the tern at the Bitter Lake NWR (Table 2 below). The terns nest on the salt flats and forage on the artificial impoundments at the refuge. Terns have been reported off the refuge in the area surrounding, but not much is known of these individuals off-site nesting habitats.

Table 2. Least Terns at Bitter Lake National Wildlife Refuge (and adjacent areas), 1990 - 1999.

These data were obtained from the Bitter Lake National Wildlife Refuge Annual Narrative Reports, 1990 - 1999 and from observations by James B. Montgomery, Jr., Refuge Volunteer, 1996-1999.

year	adults observed	total nests: successful		chicks observe	number fledged	first and last dates observed
1990	8	3a	3	4	1	May 11 - Aug 31
1991	12	5	3	5	1	May 10 - Jul 19
1992	12	5	?	4	2	May 8 - Aug 1
1993	14	7	7	14	5	May 17 - Aug 20
1994	11	4	3	9	4	May 14 - Aug 13
1995	14	7	3	5	3	May 12 - Jul 30
1996	14	15	7	12	5	mid May - Sep 8
1997	14b	11c	2d	4	3	May 12 - Jul 25
1998	14	8	5	10	9e	May 8 - Aug 12
1999	14	13	1	1	1	mid May - Aug2
average	12.3	7.8	3.8	6.8	3.4	

a The 3 nests were on Roswell city property adjacent to refuge

b. Ten adults were on the refuge and 4 were north of the refuge on BLM land through June. Observations suggest that the latter 4 foraged occasionally on Bitter Lake on the refuge. Fourteen adults were observed on the refuge during the second week of July.

c. Two nests were observed on BLM land north of the refuge and 7 nests were on the refuge during June. Two short-lived nesting attempts were observed during July.

d. The fate of the 2 nests on the BLM land is unknown.

e. One of the 9 fledglings disappeared and is presumed to have died on the refuge.

Terns forage on small fish at or near the surface of relatively smooth water and during migration feed in quiet, shallow pools along the river's edge during possible low flows periods. It is suspected (unsubstantiated) that higher flows "...could affect their ability to catch food." (Montgomery, 2000).

7.1.3 Mountain Plover

The mountain plover and its habitat has not been affected by the winter operations activities and is not expected to be affected by the (summer) Irrigation Operations activities. The species does not require open water habitats and is rarely found near water (U.S. Fish and Wildlife Service, 1999a).

7.1.4 Mexican Spotted Owl

Mexican spotted owls are very habitat-specific (Finch, 1992), preferring forested mountainous terrain. The Mexican spotted owl has not been affected by the proposed winter operations activities and is not expected to be affected by the (summer) Irrigation operations activities.

7.1.5 Black-footed Ferret

Black-footed Ferrets are mostly associated with prairie dog communities, which are rare in New Mexico. There are no recent records of Black-footed Ferrets in the Pecos River Basin. It is highly unlikely that the proposed the winter operations activities had any effects on this species nor is the (summer) Irrigation operations activities expected to have any effects.

7.1.6 Pecos Sunflower

It is likely that individuals plants or small groups of plants could exist within the river corridor as a result of dispersion from these main sites. The proposed interim operations activities may have affected individual plants, but it is highly unlikely that these operations effect the local managed populations.

7.1.7 Gypsum wild-buckwheat

The Gypsum wild-buckwheat has been found on some rocky hillsides near Seven Rivers, New Mexico, but not within in the riparian areas (McDonald, personal communication). It is Reclamation's assessment that Gypsum wild-buckwheat was not affected by the proposed winter operations activities nor is it likely that the (summer) Irrigation operations activities will have any effect on this species.

7.1.8 Kuenzler hedgehog cactus

To date, no resource inventory reports on vegetation held by Reclamation show this cactus growing within the operations area. It is Reclamation's belief that the Kuenzler hedgehog cactus was not affected by the proposed winter operations activities nor is it likely that the (summer) Irrigation operations activities will have any effect on this species.

7.1.9 Lee's pincushion cactus

There have been no findings of this cactus within the riparian areas of the Pecos River Basin. It is Reclamation's belief that the Lee's pincushion cactus was not affected by the proposed winter operations activities nor is it likely that the (summer) Irrigation operations activities will have any effect on this species.

7.2 Summer Irrigation Operations

The following listed species were determined to be affected by the summer operations plans: the bald eagle and the Pecos bluntnose shiner.

7.2.1 Bald eagle

It is unclear whether previous operations have had any direct affects on bald eagles in the area. Though fish are an important part of the eagle's diet, it will feed on a wide variety of other species, such as small mammals and waterfowl when fish are not readily available. Surveys done as far back as 1982 (Hildebrandt and Ohmart) have shown that Bald Eagles were present, but appeared to be uncommon and listed as transients to this area. Bald Eagles are occasionally seen at Bitter Lake NWR and infrequently at the Bosque Grande.

Habitats may also be a deciding factor for this bird. Eagles generally nest on high rocky ledges or in tall trees which offers protection for their young. They require high perch sites, preferably near water. Most of this area is identified as a wide open, grasslands plains region. Rocky ledges near Bitter Lake NWR and the Bottomless Lakes State Park offer marginal habitat at best. Few trees along the Middle Pecos River Basin, aside from the cottonwood communities, offer good eagle habitat. Only a few cottonwood groves are known in this area, one grove at the Bosque Grande, about 25 miles northeast of Roswell and the other at Bosque Redondo just south of Fort Sumner.

In this case, Reclamation's proposed actions may not have a direct effect on the bald eagle. It is possible that in the situation when flows are low, large fish, preferable to the eagle's diets, may concentrate in clear pools offering a better feeding opportunity for those eagles.

Indirectly, habitats for waterfowl affected by any type of low flows may not be in abundance, thereby reducing the numbers of prey birds in a given area. Bald Eagles can be displaced by such activity. However, in this region, drought conditions may also be a factor in determining numbers of prey birds which directly limits the number of eagles in a given area.

7.2.2 Pecos bluntnose shiner

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 effectively deliver water downstream for use by the Carlsbad Irrigation District. 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.

Direct and indirect effects were considered. 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. These activities are relevant to water users and the State of New Mexico, and could affect the political atmosphere of achieving benefits for the shiner.

The FSID has direct flow rights and calls for and diverts water to which the district is entitled. The State of New Mexico Interstate Stream Commission leases 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 as irrigation supply subject to the same restrictions.

a) Bypassing a portion of natural inflows from Sumner when available;

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 Model estimated 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 (Figure 2). The actual quantities of inflows that are available for Reclamation to manage will depend on the actual inflows that occur and the call for water made by FSID. With or without the proposed bypass operation, flows at Acme are estimated to exceed 13 cfs 99% of the time.

Actual data recorded for the 1998 and the 1999 irrigation seasons appeared to be better than the model predicted. In 1998, no bypasses occurred. During that period of time, 35 cfs was exceeded 73 % of the time; 30 cfs was exceeded 77 % of the time; and 26 cfs was exceeded 80 % of the time. During the 1999 irrigation season, bypasses did occur and flows were considerably better. Flows that exceeded 35 cfs occurred 87 % of the time. Flows exceeding 30 cfs resulted 92 % of the time and flows exceeding 26 cfs happened 96 % of the time.

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

[2]Reclamation can manage any inflows to Sumner in excess of what is called for and diverted by FSID based on FSID's direct flow right.

July, and during the first part of August (Figure 3). 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.

Throughout the study years, information and data were gathered on the effects of varying river flows on aquatic habitat availability and use by the shiner accumulated. Study areas were divided into five different reaches. In the 1995 Pecos River Investigations Annual Research Report it was noted that habitat preferred by the shiner increased when flows were increased to target between 20 and 40 cfs.

At a variety of Pecos Researcher's and MOU meetings, the Service's staff have provided data of shiner habitat needs and the relationship between discharge and availability of habitats (U.S. Fish and Wildlife Service, 1999b). As this information became more refined, the Service recommended that the target flow that adequately protects the shiner and its critical habitat be 35 cfs (preferred velocity), to be measured at the Acme gaging station. This has been clearly transmitted in letters received from the Service dated July 2, 1998 and November 10, 1998 (U.S. Fish and Wildlife Service, 1998b and 1998c) and most recently discussed in the Draft-Final Research Report from the U.S. Fish and Wildlife Service, *Status of Pecos River, NM Fish and Habitat with Emphasis on Sumner Dam Operation and Federally and State Threatened Pecos Bluntnose Shiner (Notropis simus pecosensis)*, June 3, 1999 (U.S. Fish and Wildlife Service, 1999b).

Reclamation will fully utilize its authority to manage available inflows to target 35 cfs at the Acme gage. If Reclamation does not implement this operation, flows will be lower.

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 into Brantley Reservoir. Block releases of 15 days duration likely transport eggs and protolarvae into Brantley Reservoir and may make it difficult for the species to achieve optimal longitudinal distribution. The number of individual shiner impacted by a block release is unquantifiable; however, data presented by the Service indicate that releases of 15 days duration are much preferable to longer releases and should not further adversely impact the species.

c) Restricting the cumulative duration of block releases from Sumner in calendar year 1999 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 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) Restricting the time between consecutive block releases from Sumner to a minimum of 14 days;

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

After a block release, shiner spawned are not physically able to maneuver out of the downstream current until 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 shiner 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 to include one day at 750 cfs, one day at 500 cfs, and two days at 250 cfs;

Purpose: to improve habitat conditions for the shiner

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.

f) Target one 7 consecutive week period between June 1, 1999 and August 31, 1999 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 shiner remain in the drift for 4 to 6 days and can be transported into Brantley Lake, and that the longitudinal distribution of shiner 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.

7.3 Winter Operations

The following listed species were determined to be affected by the winter operations plans: the bald eagle and the Pecos bluntnose shiner.

7.3.1 Bald Eagles

The effects of the winter operations are similar to the summer operations for bald eagle (see 7.2.1 Bald Eagle). It is also unclear whether the 1999-2000 winter operations has had any direct affects on overwintering Bald Eagles in the area, but because they are transients, it is likely that the eagles, that move into this area when food sources are plentiful, leave when food sources again become limiting.

7.3.2 Pecos Bluntnose Shiner

During the 1998-1999 winter operation period, flows at Acme exceeded 26 cfs, 98 % of the time; 30 cfs, 90 % of the time; and 35 cfs, 66 % of the time. The 1998-1999 winter operation was marred by two periods where flows dropped temporarily below 30 cfs. The first period was unexpected. Reclamation had previously increased the bypass to 25 cfs on December 19, 1998, (Figure 4) in anticipation of offsetting a gradual declining flow at Acme. The second drop was at the end of the season. Reclamation continued to increase bypasses till the hydrograph at Acme bottomed out around 25 cfs and started climbing back up.

In the 1999-2000 winter operations season, the number of days that flows exceeded 35 cfs at Acme were lower than in the 1998-1999 winter period. These flows occurred only 40 % of the time. There was a small change in the number of days that flows exceeded 30 cfs, occurring 88 % of the time, but there was no change in the number of days that flows exceeded 26 cfs, which was 98 % of the time.

The major difference between the two winter operations was that during the winter of 1998-

1999, there were three major spates which kept the flows at Acme from falling to quickly and kept bypassed inflows considerably lower. In the winter of 1999-2000, there was only one minor rain event around the middle of December 1999. This was a half-inch rainfall in the area of Ft Sumner and provided a momentary rise in the flows at Acme, but no significant relief from drying conditions (figure 5). The hiatus at the beginning of January 2000 was the result of an adjustment in the gaging equipment.

Figure 5 shows that Reclamation continued to increase bypassed inflows at Sumner Dam throughout the 1999-2000 winter period to almost 30 cfs to maintain the 35 cfs objective flow. The instantaneous flows at Acme appear to be variable in the last half of November 1999 when the final release of the irrigation season passed. Flows at Acme began to stabilize toward the middle part of December 1999, but required higher bypasses to maintain that stability. The average for both years combined was 53 % for flows exceeding 35 cfs; 89 % for flows exceeding 30 cfs; and 98% for flows exceeding 26 cfs.

It is possible that individuals of the species may have been directly affected by these lower flows, but the total impact is not known. An intensive monitoring effort was undertaken to detect these types of effects, but there is no evidence available from monitoring efforts to show how much the Pecos bluntnose shiner was affected at any period of low flows at the time this assessment was prepared.

Existing data by the Service shows that if flows drop to 26 cfs or lower, shiner habitat is reduced to nearly one-third of the habitat present at 35 cfs and almost a quarter of the velocities. Though this data was collected at the Gasline site, the Service utilized the data for "analysis of effect" at Acme in the "Biological Opinion on Proposed Winter Operations on the Pecos River, 1998-1999," (U.S. Fish and Wildlife Service, 1998a).

Though the Service's reference to a "...worst case scenario," (U.S. Fish and Wildlife Service, 1998c) is unlikely, prolonged flows lower than the objective flow, could have a notable impact on the shiner. Loss of habitat forces fish into remaining and often overcrowded habitats where predators, such as predatory fish (Larson and Propst, 1999) and external predators, like birds and fur bearing animals, can cause considerable damage to potential spawning populations of the shiner.

The spatial closeness of these fish in limited habitats can create stress on the members of the species. Stress can cause fish to become more susceptible to disease (Piper et. al., 1983), especially if temperatures begin to rise. Many fish diseases are temperature dependent and will occur when temperatures begin to rise in the spring. Though winter temperatures are often more stable, the overwintering stress of limited space could cause morbidity or even mortality to occur in the spring when temperatures begin to rise.

Cumulatively, these types of effects can have a significant impact on overwintering populations of shiners. However, Reclamation expects that managing these bypassed inflows for the benefit of the shiner can greatly reduce any harmful affects that would be otherwise created by lower

flows. Both weekly hydrological monitoring by Reclamation and regular, bi-weekly population monitoring by the Service will also serve to maintain consistent benefits to the bluntnose shiner.

8. EFFECT DETERMINATION

8.1 Interim Operations

8.1.1 Bald Eagles

Though the Bald eagle may not experience a direct effect, indirectly, the interim operations **may affect, but is not likely to adversely affect** the summer or the winter populations. Bald eagle have been identified as being transitory to the area and therefore the effects are discountable, being extremely unlikely that they would be adversely affected.

8.2 (Summer) Irrigation Operations

8.2.1 Pecos bluntnose shiner

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 **incidental take of the shiner**. 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 and when ramp downs from block releases are provided the habitat would be improved.

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.

8.3 Winter Operations

8.3.1 Pecos bluntnose shiner

Based on Reclamation's proposal to bypass inflows from Sumner Dam to achieve an objective flow of 35 cfs, the Interim Winter Operations **may affect, but is not likely to adversely affect the shiner**. In addition, as observed in the 1998-1999 and 1999-2000 Winter Operations, unforseen circumstances or acts of nature may lead to some unpredictable flow decreases. Adjustments in the rate of flow from Sumner Dam, based on real time data and following the Winter Operations Plan section, should reduce the affects of these flow decreases.

Reclamation's proposed winter operations are expected to result in an objective flow of 35 cfs at the Acme site. Based on existing data for reaches designated as critical habitat for the shiner, flows through these areas are not anticipated to be less than the objective flow. Every effort will be made to achieve the objective flow in a timely manner as outlined in the Sumner Dam Winter Operations and Bypass Flows section. Also, efforts to obtain additional real time data gages for the near Dunlap and Gasline sites are on ongoing. These gages are important decision making tools. Therefore, Reclamation's proposed Interim Operations will not adversely modify or destroy critical habitat.

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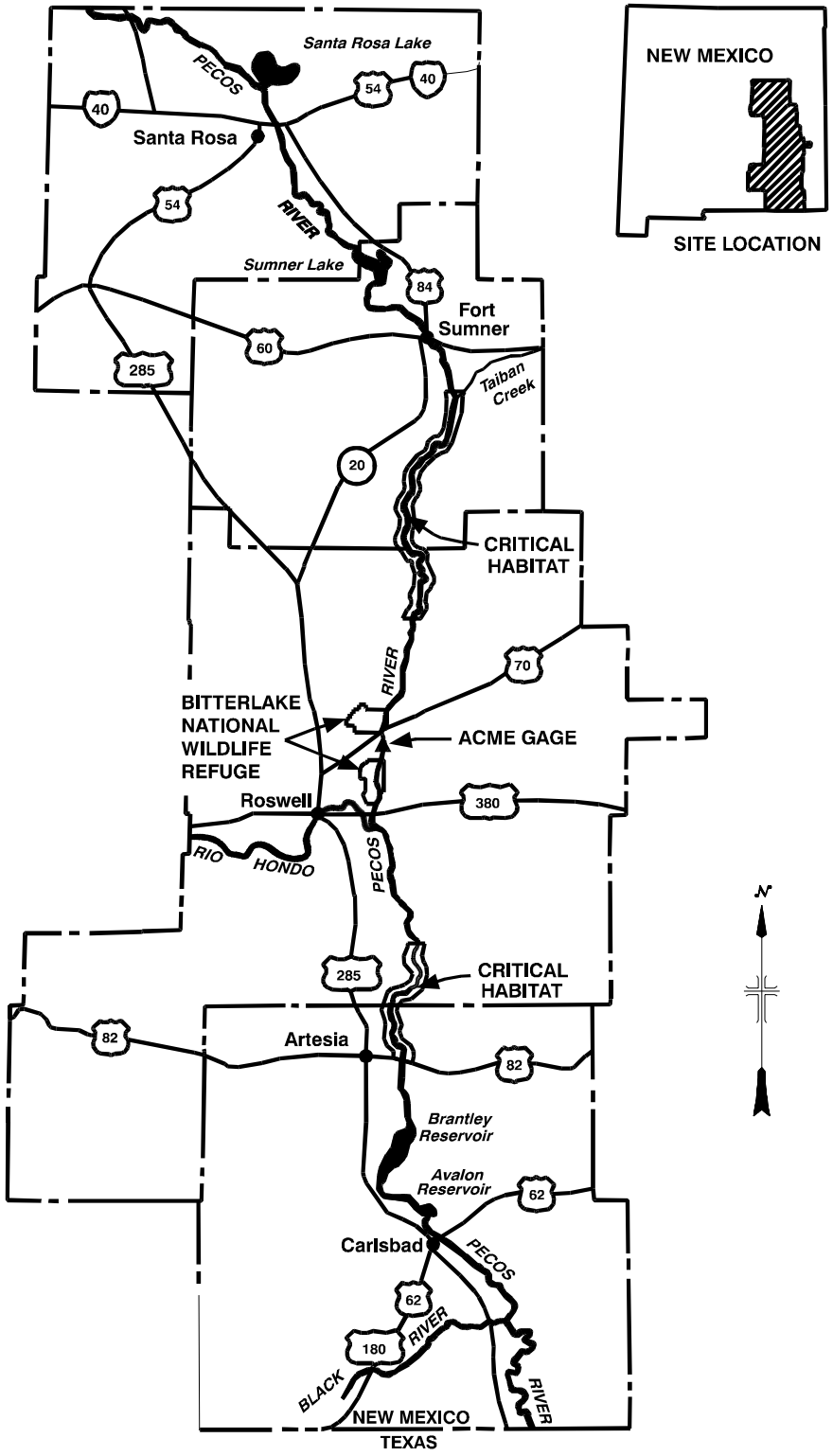
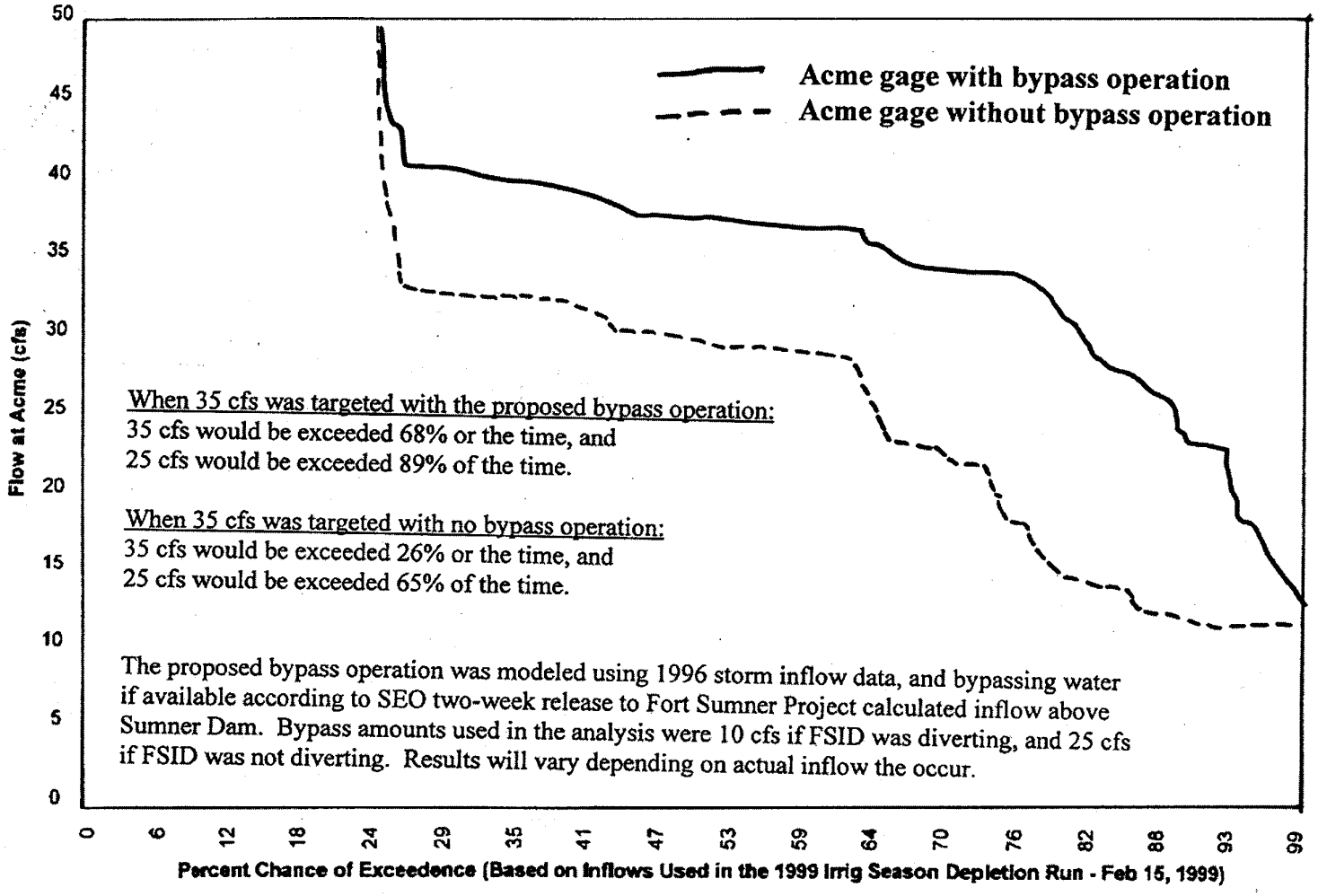


Figure 1. Study area: Pecos River from Santa Rosa Reservoir to Texas border



Comparison of Exceedence Plots

Figure 2

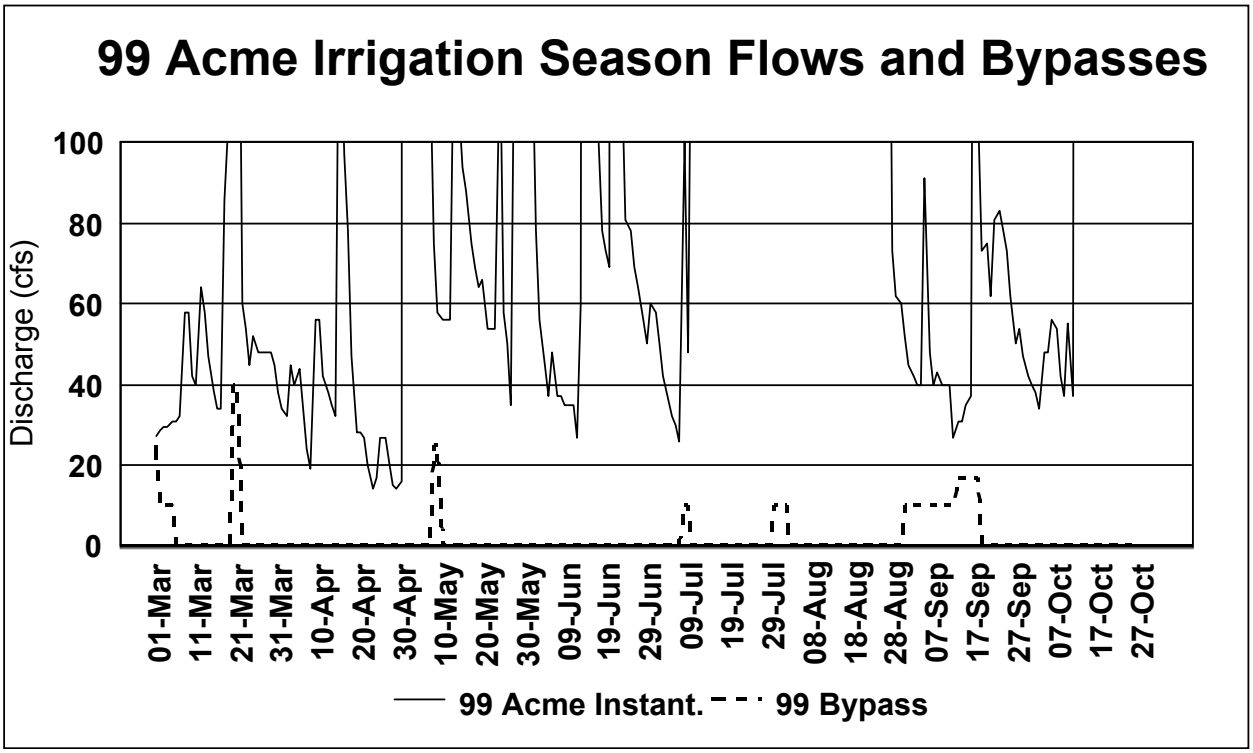


Figure 3. 1999 Irrigation Season Instantaneous Flow and Bypass data from USGS recorders

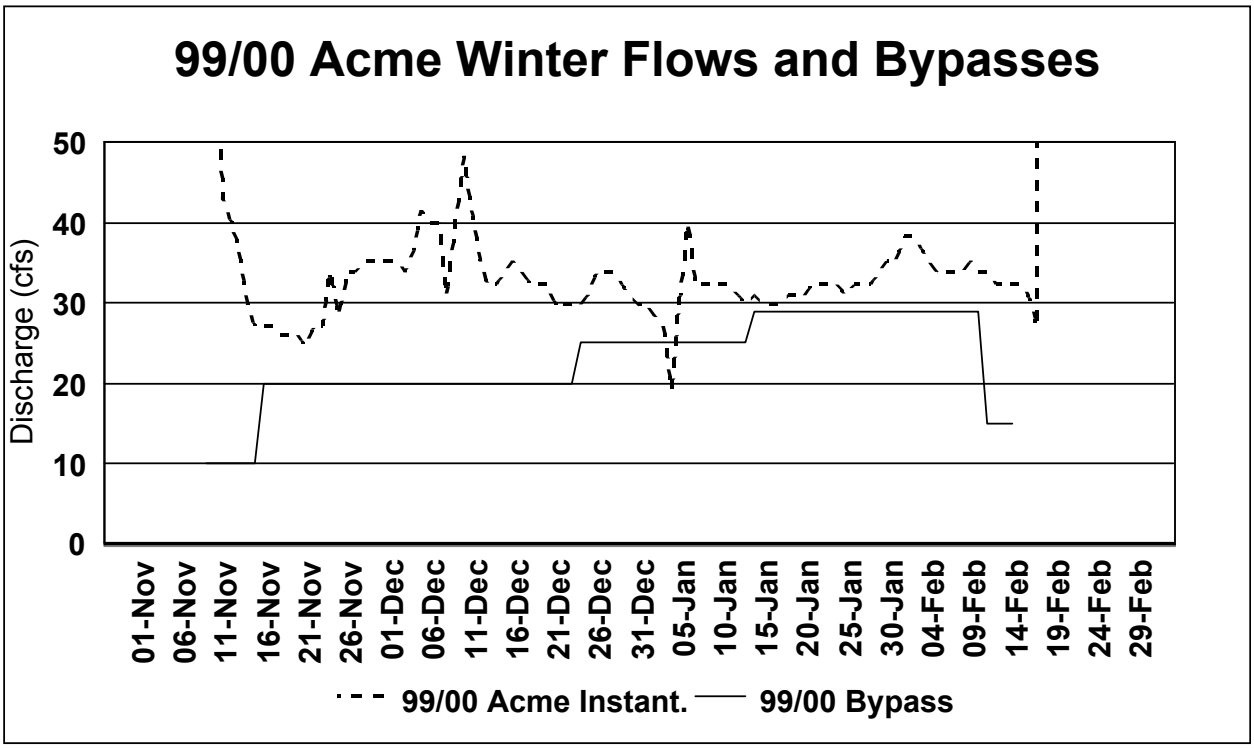


Figure 5. 1999-2000 Winter Instantaneous Flows and Bypass data from USGS recorders.

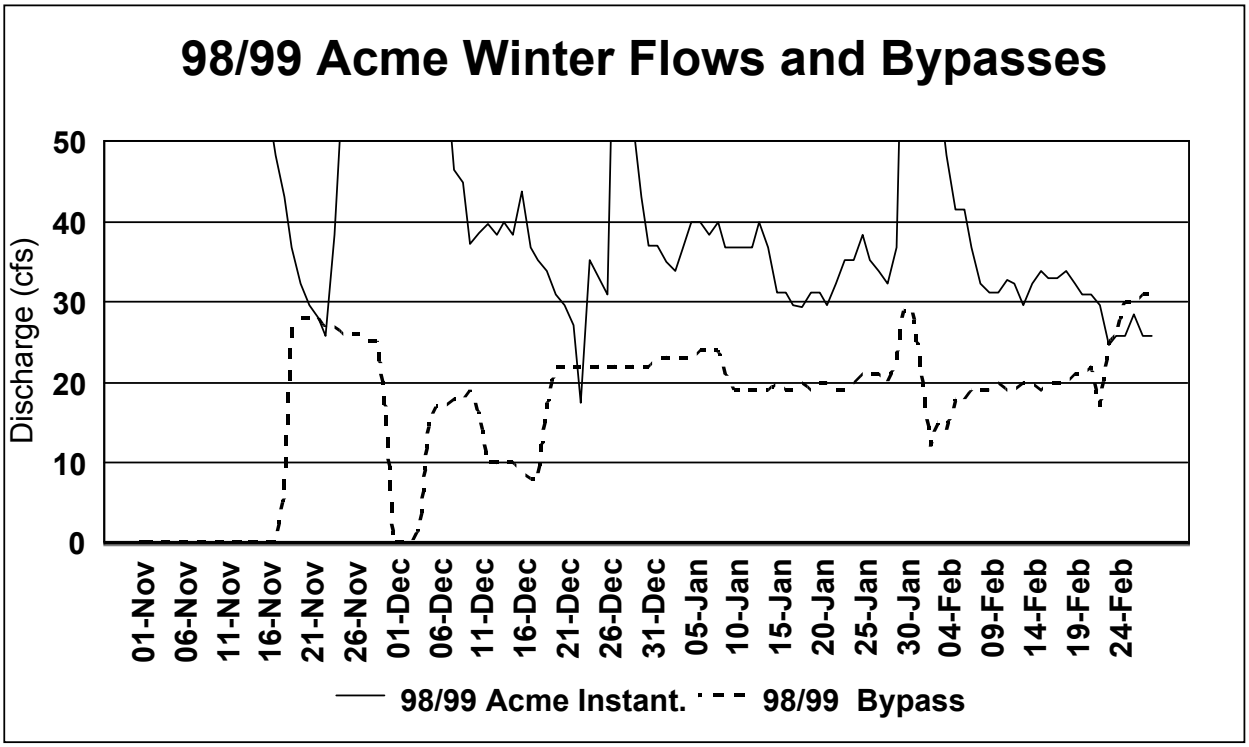


Figure 4. 1998-1999 Winter Instantaneous Flows and Bypasses from USGS recorders.

Table 1. Tabulated Summary of Effects Determination

Listed/Proposed Species	Effects Determination	Critical Habitat Effect Findings
Bald Eagle	May Affect, Not likely to adversely affect	N/A
Interior least tern	No Effect	N/A
Mountain plover	No Effect	N/A
Mexican spotted owl	No Effect	N/A
Pecos bluntnose shiner	May adversely affect	Will not destroy or adversely modify
Pecos gambusia	No Effect	N/A
Black-footed ferret	No Effect	N/A
Pecos sunflower	No Effect	N/A
Gypsum wild-buckwheat	No Effect	N/A
Kuenzler hedgehog cactus	No Effect	N/A
Lee's pincushion cactus	No Effect	N/A