United States Department of the Interior

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Cons. # 2-22-00-I-136

Memorandum

To: Area Manager, Bureau of Reclamation, Albuquerque Area Office

From: Field Supervisor, New Mexico Ecological Services Office, Albuquerque, New Mexico

Subject: Biological Assessment of the 1999-2000 Winter Operations of Sumner Dam on Threatened, Endangered, and Proposed Species of the Pecos River Basin.

This is in response to the January 11, 2000, memorandum transmitting the biological assessment (BA) to the U. S. Fish and Wildlife Service (Service) for the Bureau of Reclamation's (Bureau) proposed Pecos River winter water operations of Sumner Dam in DeBaca County, New Mexico. The winter water operations period includes the 4-month period from November 1, 1999 through February 29, 2000.

In the BA for Sumner Dam winter water operations, the Bureau determined that the operations would have "no effect" on the following proposed and listed species: interior least tern (*Sterna antillarum*); mountain plover (*Charadrius montanus*) [proposed threatened]; Mexican spotted owl (*Strix occidentalis lucida*); black-footed ferret (*Mustela nigripes*); gypsum wild-buckwheat (*Eriogonum gypsophilum*); Kuenzler hedgehog cactus (*Echinocereus fendleri var. kuenzleri*); and Lee Pincushion cactus (*Coryphantha sneedii var. leei*). In addition, the Bureau determined that the dam operations "may affect, but is not likely to adversely affect" the bald eagle (*Haliaeetus leucocephlus*), Pecos bluntnose shiner (*Notropis simus pecosensis*), Pecos gambusia (*Gambusia nobilis*), Pecos pupfish (*Cyprinodon pecosensis*) [proposed endangered], and Pecos sunflower (*Helianthus paradoxus*). The BR also determined the proposed action will not "destroy or adversely modify" the critical habitat of the Pecos bluntnose shiner. The proposed rule to list the Pecos pupfish and endangered was withdrawn on March 17, 2000 primarily due to a conservation agreement that will remove most of the threats to the species (U. S. Fish and Wildlife Service 2000).

Description of the Action Area

The area of interest and concern is known as the Carlsbad Project Area (Project Area) and is located within the Pecos River basin of southeastern New Mexico (Figure 1). The Project Area includes the reach of the Pecos River from Santa Rosa Lake Reservoir downstream to Brantley Dam. Within this area, the river has a drainage area of approximately 65,984 square kilometers (25,470 square miles; 65968 square kilometers) and traverses approximately 200 miles (321 kilometers). It flows through alternating narrow canyons and slightly wider valleys in the reach from Santa Rosa Dam to Sumner Reservoir. Below Fort Sumner to near Roswell, new Mexico, it flows through a wide flood plain and is characterized by having a predominantly sand substrate and braided channel. Within this reach, springs and irrigation return flows maintain water flow in the river during times when no water is being released from Sumner Dam. 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.

Description of the Proposed Action

The Bureau proposes to operate Sumner Dam in the winter of 1999-2000 in a manner that will improve habitat conditions for the Pecos bluntnose shiner. During the months of November and December 1999 and January and February 2000, the Bureau proposes to implement a winter operations plan on the Pecos River that would bypass a part of inflows from Sumner Dam to maintain an objective of 35 cubic feet per second (cfs) flow at the Acme Gauge located 106 miles downstream from Sumner Dam on the Pecos River.

The method of operation proposed by the Bureau is similar to the 1999-2000 winter water operations and is summarized below.

> The objective flow will be 35 cfs at the Acme gage. The Bureau will manage water releases from Sumner Dam to obtain the objective flow. Given the low flow travel time to Acme of about 10 days (7 to 8 days for 30 cfs and 10 to 12 days for 5 cfs), the bypass flow will remain unchanged for 12 days. If the flows at Acme after the 12-day period are consistently below the desired objective flow, then the bypass flow at Sumner Dam will be increased as long as bypass flows are available. In winter, bypass flows are generally available. The bypass of inflow will again remain unchanged for another 12-day period and the flows at Acme checked to see if they are meeting the objective flow. If the objective flow at Acme has not been achieved, and is either higher or lower, the appropriate change in the bypass of inflow will be made either up or down to meet the objective flow. In the possible event that climatic conditions in the basin change significantly (e.g., rainfall runoff), the Bureau will evaluate current conditions and will change bypass flows if it is determined that natural runoff in the basin is sufficient to provide the flows needed to maintain the objective flow at Acme.

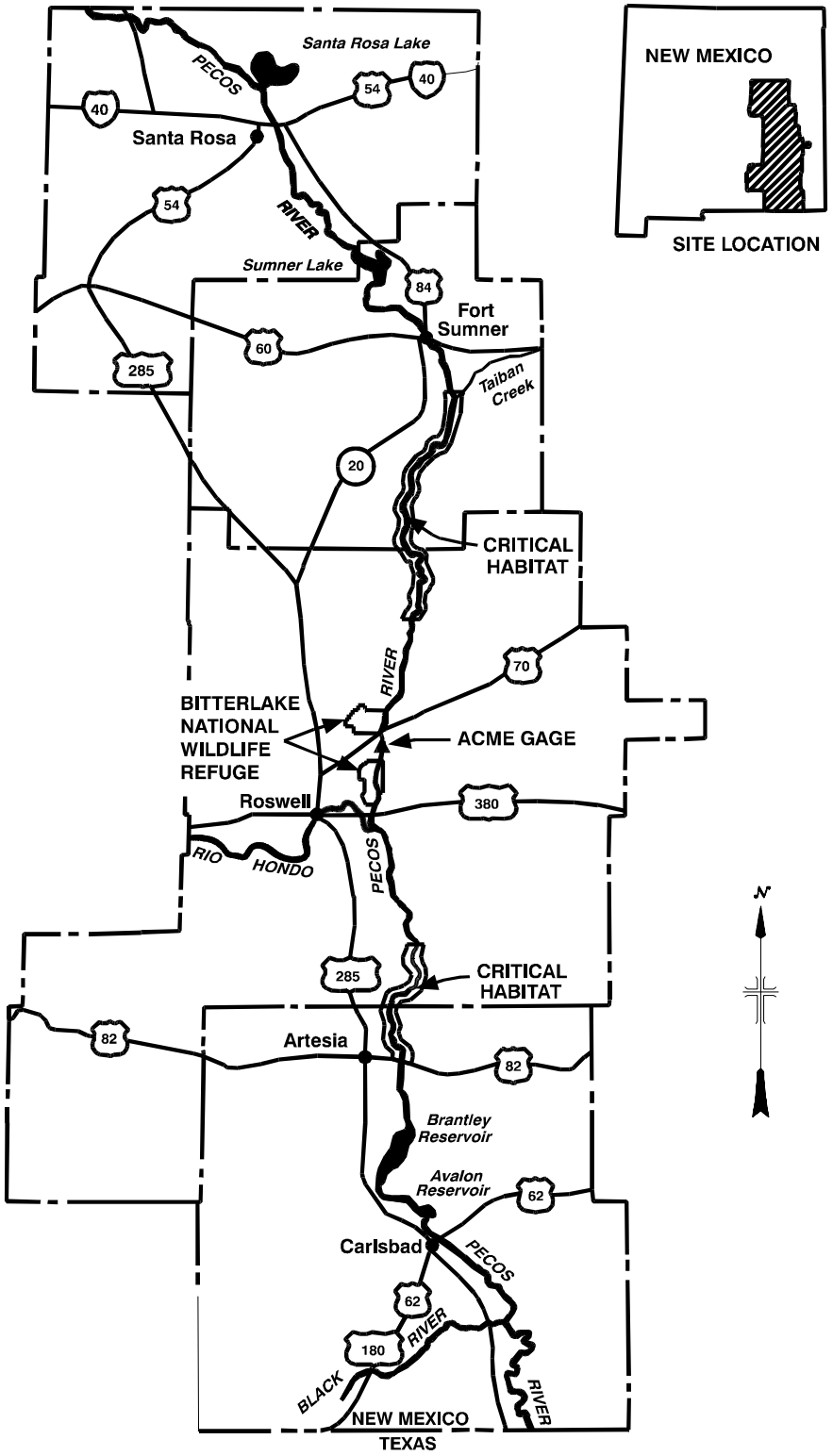
NEW MEXICO
SITE LOCATION
Santa Rosa Lake
PECOS
RIVER
Santa Rosa
40
54
Sumner Lake
84
Fort
Sumner
60
285
Taiban
Creek
20
CRITICAL
HABITAT
70
BITTERLAKE
NATIONAL
WILDLIFE
REFUGE
ACME GAGE
Roswell
380
RIO
HONDO
PECOS
285
CRITICAL
HABITAT
82
Artesia
82
Brantley
Reservoir
Avalon
Reservoir
62
Carlsbad
PECOS
62
180
RIVER
BLACK
RIVER
NEW MEXICO
TEXAS
N

Figure 1.

During the operation, flows at all key river gauges will be monitored using the Corps' real-time Pecos report of the U.S. Geologic Survey's website of key Pecos gauges. The gauges of critical importance are Sumner Dam outflow, Taiban, and Acme. The Bureau used adaptive management of the inflow bypasses based on experience gained during winter water operations from 1998-1999. The Dunlap gage is located in the middle of the upper critical habitat of the bluntnose shiner, which is about 53 miles downstream of Sumner Dam and the same distance upstream of the Acme gage. This gage provides valuable information concerning river flows in the upper critical habitat reach (Figure 1). In winter 1998-1999, the monthly average flows at the Dunlap gage were 80 cfs in November, 40 cfs in December, 38 cfs in January, and 31 cfs in February. The average flow for the 4 months winter period was 47 cfs. Sumner Dam bypass flows were increased in winter 1998-1999 and the average river flow at the Acme gage was 147 cfs in November, 51 cfs in December, 42 cfs in December, 37 cfs in February, and averaged 70 cfs for the winter period. The average flows exceeded the 35 cfs objective at both gages during this period with the exception of 31 cfs average at Dunlap in February, 1999. The Acme flow was 37 cfs in February, 1999.

The supplemental bypass releases in the last two winters has significantly improved quantity and quality of the Pecos bluntnose shiner winter habitat. Historically, water releases from Sumner Dam were stopped after the irrigation season ended October 31, and resumed in March each year. The river flows downstream of Sumner Dam during this period had only naturally occurring baselows from downstream, which frequently resulted a very low baseflow conditions. In addition, the Bureau recognized a steady decrease in flows at the Acme gage throughout the 1998-1999 winter. To compensate for a projected flow reduction in winter 1999-2000, the Bureau increased the Sumner Dam bypasses (maximum of 32 cfs in February) this winter to maintain the 35 cfs flow objective.

Effects Analysis

Affected Species

Bald Eagle

Direct, Indirect, and Cumulative Effects

The mid-winter annual surveys conducted from 1990 to 1994 by the New Mexico Department of Game and Fish showed that the number of wintering bald eagles in New Mexico had steadily increased and averaged 430 birds each year. The U.S. Army Corps of Engineers conducted winter aerial surveys from December 1989 through March 1990 and determined that both adult and sub-adult bald eagles use Santa Rosa Lake. The New Mexico Department of Game and Fish aerial surveys (1982-1990), from the headwaters of the Pecos River to the vicinity of Fort Sumner, show an upward trend in overwintering populations over the past eight years. Based on this information, it appears unlikely that Sumner winter water operations will "adversely affect" the bald eagle, since the numbers bald eagles have been increasing. Furthermore, the action will not increase the

cumulative effects to the species.

Pecos Sunflower

Direct, Indirect, and Cumulative Effects

In New Mexico, the Pecos sunflower 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. The sites within the Pecos River Basin are at the Bitter Lake National Wildlife Refuge northeast of Roswell and the Dexter National Fish Hatchery near Dexter, New Mexico (U. S. Fish and Wildlife Service 1999). Both these populations of Pecos sunflowers are presently being managed and protected by the U.S. Fish and Wildlife Service. The Bitter Lake National Wildlife Refuge has a large population of Pecos sunflowers in a 40 acre (16 hectare) area (Charles McDonald, U.S. Fish and Wildlife Service, pers. comm. 2000). The Dexter National Fish Hatchery site is about 5 acres (2 hectares) and has less than 100 plants (Charles McDonald, U.S. Fish and Wildlife Service, pers. comm. 2000). Both sites are located near springs and are located several hundred yards from the Pecos River. Therefore, Pecos River winter water operations is very unlikely to adversely affect the Pecos Sunflower.

Pecos Gambusia

Direct, Indirect, and Cumulative Effects

The Pecos gambusia is endemic to the Pecos River basin in southeastern New Mexico and western Texas; and historically it occurred at least as far north as Fort Sumner and as far south as Fort Stockton, Texas (Hubbs and Springer 1957). The Pecos gambusia no longer occurs in the Pecos River and the last specimen from the river was collected 9 miles (15 km) SSE of Fort Sumner in 1955 (Echelle *et al.* 1985). The species is now restricted to four widely separated areas in the Pecos River drainage of southeastern New Mexico and west Texas: 1) springs and sinkholes in the Bitter Lake National Wildlife Refuge near Roswell, Chaves Co., New Mexico; 2) Blue Spring near Whites City, Eddy Co., New Mexico; 3) a series of associated springs in Toyah Creek drainage, Balmorhea vicinity, Reeves and Jeff Davis Cos., Texas; and 4) the Leon Creek drainage near Fort Stockton, Pecos Co., Texas (Echelle and Echelle 1980; Echelle *et al.* 1985). Pecos gambusia may be abundant in some locations. In 1975, the population at Blue Spring was estimated at 900,000 and at Bitter Lake National Wildlife Refuge was between 26,000 - 29,000 (Bednarz 1979). Since the Pecos gambusia has not been collected in the Pecos River since 1955, it is very unlikely that the water operations of Sumner Dam will adversely affect or increase cumulative effects to this fish species.

Pecos Pupfish

Status

Federally Proposed Endangered: January 30, 1998
Withdrawal of Proposed Rule to List as Endangered: March 17, 2000

Direct, Indirect, and Cumulative Effects

The historical range of the Pecos pupfish included the Pecos River and nearby sinkholes, saline springs, and creeks from Bitter Lake National Wildlife Refuge and Bottomless Lakes State Park near Roswell, New Mexico, downstream 404 miles to the mouth of Independence Creek, southeast of Sheffield, Texas (Wilde and Echelle 1992; Hoagstrom and Brooks 1999). The Pecos pupfish occurs in several types of habitats, from saline springs and gypsum sinkholes to desert streams with highly fluctuating conditions; but it is most abundant in highly saline waters (Echelle and Echelle, 1980).

Genetically pure populations of Pecos pupfish are now restricted to the Pecos River from Brantley Reservoir upstream to Salt Creek on Bitter Lake National Wildlife Refuge (Hoagstrom and Brooks 1999). In Texas, the Pecos pupfish is found only in Salt Creek, Culberson and Reeves Counties (Hoagstrom and Brooks 1999). Pecos pupfish are occasionally collected in the Pecos River near the Bitter Lake National Wildlife Refuge, but are uncommonly found downstream (Chris Hoagstrom, U.S. Fish and Wildlife Service, pers. com. 2000). The Pecos pupfish is now uncommon in the Pecos River and prefers lentic (standing water) habitats. Therefore, it is unlikely that winter water operations will adversely affect the Pecos pupfish.

Pecos Bluntnose Shiner

Direct, Indirect, and Cumulative Effects

Historically, the Pecos bluntnose shiner inhabited the mainstem Pecos River from Santa Rosa, New Mexico, downstream to the vicinity of Carlsbad, New Mexico (Figure 1) (Hatch 1982; Platania 1995; Propst 1999). The currently occupied range of the species lies wholly within the delineated Carlsbad Project Area for the proposed action (Hoagstrom 1999a, b). Since 1989, the Pecos bluntnose shiner population has remained stable; and the Pecos River downstream of Sumner Dam has not been intermittent since 1991 (Hoagstrom 1999b).

The upstream reaches have been found to provide shallow, low velocity habitat for young-of-year fish. These reaches also maintain such habitat at high (bankfull) discharge, providing refugia from swift, deep water. However, periods of low discharge or intermittency were found to eliminate much of the habitat used by adult Pecos bluntnose shiner (Hoagstrom *et al.* 1995). Adults are most common in habitat with somewhat greater depth and velocity than young-of-year shiners. Downstream, the narrowing of the river channel has resulted in the loss of most of the habitat typically occupied by Pecos bluntnose shiner, particularly at 'bankfull' discharge.

Between Taiban Creek and Rio Hondo confluence the river bed is primarily shifting sand. This bed provides a variety of habitats for Pecos bluntnose shiner at all but very low flows, and 'bankfull' flows. Very low flows do not have sufficient energy to transport sand, and therefore do not construct and maintain in-channel habitat through erosion and deposition. In addition, low flows do not bury and uncover shiner forage (aquatic insects and other invertebrates). Periods with very low flow maintain only uniform, laminar habitat which is favorable for generalist fishes such as red shiner and western mosquitofish but inadequate for fluvial species such as Pecos bluntnose shiner.

Bankfull flows reduce and eliminate low velocity habitat which is important refuge for Pecos bluntnose shiner during high flow conditions. Although Pecos bluntnose shiner inhabit flowing waters, they are not typically found in the mainstream during high flows. If they are subjected to high flows for an extended period and are unable to rest in low velocity habitat, they are increasingly likely to be swept downstream (Hoagstrom *et al.*, 1995; Hoagstrom 1997; 1999a).

Downstream from Rio Hondo confluence the river channel narrows and deepens. There is very little habitat diversity at any flow within this reach (Hoagstrom 1999a). Shifting sand decreases in abundance in a downstream direction. Most of the dynamic habitat occurs on meander bends associated with large point sandbars. At high flows, there are very few low velocity, shallow habitats preferred by Pecos bluntnose shiner.

A Pecos bluntnose shiner population is persistent between Taiban Creek and Rio Hondo confluence. Juveniles are sometimes present in high abundance between Lake Arthur Falls and Brantley Reservoir, due to the downstream displacement of semi-buoyant eggs and drifting larvae (Hoagstrom *et al.* 1995; Hoagstrom 1997; 1999a; Platania and Altenbach 1998). Displacement increases as the period of bankfull flows increases. Lengthy releases, such as those of 1995, have dramatic impacts on Pecos bluntnose shiner distribution (Hoagstrom *et al.* 1995; Hoagstrom 1997; 1999a). Displaced Pecos bluntnose shiner exhibit little growth and presumably succumb to poor habitat quality in the downstream reaches.

Pecos bluntnose shiner are frequently collected in the middle reaches of the river between Sumner Dam and Brantley Reservoir. However, they are most abundant immediately upstream of Brantley Reservoir. In the upstream reaches, adult Pecos bluntnose shiner comprise the majority of the population. Downstream, young-of-year heavily outnumber adults, since most of the semi-buoyant eggs are transported downstream (Platania and Altenbach 1998). The duration of block releases from Sumner Dam adversely affect the longitudinal distribution of young-of-year Pecos bluntnose shiner (Platania and Altenbach 1998; Hoagstrom 1999a).

Sumner Dam has reduced the river base flow, reduction in sediment inflows from the upper basin, elimination of large floods, disruption of natural flow patterns and institution of a uniform hydrograph with maximum release of 1000 to 1400 ft^3/sec (irrigation block releases) (Hoagstrom *in litt.* 1999). Large, infrequent floods are important in maintaining channel width and controlling

vegetation encroachment. More frequent floods are critical in supporting riparian vegetation, recharging the alluvial aquifer, invigorating nutrient cycling, and connecting aquatic and terrestrial ecosystems. Base flows are important in maintaining the alluvial aquifer, constructing and maintaining in-channel habitat, sustaining nutrient cycling within the river channel, and supporting riparian vegetation. Sumner Dam also fragmented the Pecos River and the bluntnose shiner no longer occurs upstream of the dam.

Pecos bluntnose shiner and related mainstream cyprinids are adapted to exploit predictable features of Great Plains rivers. In sand bed streams, the presence of alluvial microhabitats within the river channel is available when the mean velocity is great enough that areas with "supercritical" velocity are present in relation to river bed features and the meandering channel. Supercritical velocities create turbulence which interacts with shifting sand substrate in constructing geomorphic features. In meandering river channels, these features repeat themselves in a regular frequency related to valley slope, discharge, sediment size, and meander/width ratio. Turbulence, erosion, and deposition which occur in relation to supercritial areas increase forage availability for stream inhabitants by pumping detritus through hyporheic sediments, the deposition of detritus often creates zones with relatively high primary productivity, and provides velocity refugia (plunges) within the main current where drifting food objects are readily captured.

Supercritical base flows have an abiotic and biotic interaction with stream inhabitants. The construction and maintenance of in-channel habitat structure by erosion and deposition in supercritical areas creates the abiotic structure typically utilized by mainstream cyprinids. Plunges, debris pools, etc. provide optimal feeding locations within the mainstream. Erosion and deposition also maintain biotic processes. The pumping of detritus and nutrients through the hyporheic sediment fuels primary production. Erosion also uncovers invertebrates inhabiting hyporheic sediments, which are then re-deposited downstream where they are readily captured by fishes.

In other words, geomorphic maintenance by base flows with supercritical areas provide a key component of autochthonous production. This is highly relevant in light of the elimination of floods. Inputs of allochthonous material have likely declined exponentially. Terrestrial invertebrates can be an important food for drift feeding shiners and floodplain detritus is an important method for nutrient input. The loss of extensive terrestrial inputs places great emphasis on autochthonous production. This is why base flows are critical to Pecos bluntnose shiner survival.

Since 1991, and particularly in the last year, base flow in the 100-mile reach has persisted (no stream intermittency) and been enhanced by wet climatic conditions and base flow supplementation. The reason that 35 cfs is considered a "minimum" flow is that supercritical velocities are extremely rare or absent at lower discharge (Hoagstrom 1999a). Areas with supercritical velocities (turbulence) are uncommon even at 35 cfs. However, if discharge is 35 cfs at Acme, then it will typically be greater upstream (10-15 cfs at Dunlap) (data from Dunlap and Acme USGS gages, October 1994 to September 1995).

The Bureau's winter operations in 1999-2000 have provided significantly improved habitat conditions for the bluntnose shiner. Historically, flows from Sumner Dam would have been stopped after irrigation season, and baseflows would have been much lower. Winter flows in 1998-1999 with current operations were compared to winter (1987-1988) before supplemental flows were provided from Sumner Dam. The average flow at the Acme gage in winter 1987-1988 was 50 cfs in November, 23 cfs in December, 17 cfs in January, and 21 cfs in February, and averaged 28 cfs for the winter. In comparison in winter 1998-1999, the average flow at the Acme gage was 147 cfs in November, 51 cfs in December, 42 cfs in December, 37 cfs in February, and averaged 70 cfs for the winter period. Overall, this is a significant improvement (70 cfs vs. 28 cfs) in Pecos River base flows. In winter 1999-2000 operations, it appears that 35 cfs at Acme was attained over 90% of the winter period. This is an additional improvement over the winter of 1998-1999 when 35 cfs was attained 75%. The improved flows indicate that the adaptive management strategy of the Bureau for Sumner Dam is working very well to maintain and enhance bluntnose shiner habitat.

Currently, the Pecos bluntnose shiner population appears to be "stable" (Hoagstrom *in litt*. 1999). Base flow supplementation in winter In 1995-1996, 1998-1999 & 1999-2000 have certainly been a great benefit to bluntnose shiner and its critical habitat. In summary, the proposed action "may affect, but will not adversely affect" the Pecos bluntnose shiner and will not "destroy of adversely modify" its critical habitat.

Conclusion

Based on the nature and timing of the proposed project and potential impacts to the bald eagle, Pecos sunflower, Pecos gambusia, and Pecos bluntnose shiner are expected to be insignificant and discountable. The proposed action will benefit the Pecos bluntnose shiner and its critical habitat from past conditions. Therefore, the Service concurs with the Bureau's determination that this proposed action "may affect, but is not likely to adversely affect" the above species; and will not "destroy or adversely modify" the critical habitat of the Pecos bluntnose shiner.

Many listed species in the southwest depend on scarce riparian habitats for their survival; and protection of these rare and fragile ecosystems is an important consideration for endangered species protection and recovery. We greatly appreciate the close cooperation of the Bureau in protecting endangered species and their habitats. In future correspondence on this project, refer to consultation number 2-22-00-I-136. If we can be of further assistance, please contact Dennis Coleman of my staff at (505) 346-2525, extension 116.

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