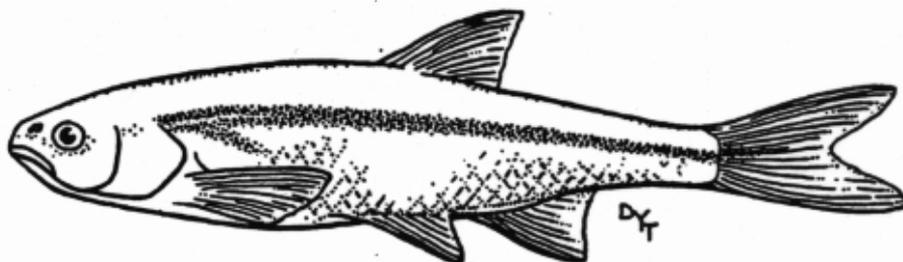


PECOS BLUNTNOSE SHINER RECOVERY PLAN



**Fishery Resources
Dexter, New Mexico**

September 1992

PECOS BLUNTNOSE SHINER

RECOVERY PLAN

Prepared by The Rio Grande Recovery Team

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SEP 30 1992

DISCLAIMER

Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect listed species. Plans are published by the U.S. Fish and Wildlife Service, sometimes prepared with the assistance of recovery teams, contractors, State agencies, and others. Objectives will be attained and any necessary funds made available subject to budgetary and other constraints affecting the parties involved, as well as the need to address other priorities. Recovery Plans do not necessarily represent the views nor official positions or approval of any individuals or agencies involved in the plan formulation, other than the U.S. Fish and Wildlife Service. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and completion of recovery tasks.

LITERATURE CITATIONS

Literature citation should read as follows:

U.S. Fish and Wildlife Service. 1992. Pecos Bluntnose Shiner Recovery Plan. U.S. Fish and Wildlife Service, Region 2, Albuquerque, New Mexico. 57 pp.

Additional copies may be purchased from:

Fish and Wildlife Reference Service:
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814
301/492-6403 or 1-800-582-3421

The fee for the plan varies depending on the number of pages.

EXECUTIVE SUMMARY

Current Status:

The species is listed as threatened. Historically, this species occurred throughout the Pecos River system in New Mexico and Texas. The species has decreased drastically in abundance and range. It is now restricted to two Pecos river segments, totaling some 100 miles, in New Mexico.

Habitat Requirements and Limiting Factors:

The Pecos bluntnose shiner occurs only in permanent flowing waters of the Pecos River. Impoundments, manipulated water flows, contaminants, and introduced species are major threats to this species survival.

Recovery Objective: Stabilization.

Recovery Criteria: Maintain viable populations throughout the 100 miles of habitat where the species still occurs.

Actions Needed:

1. Monitor existing populations.
2. Maintain and enhance existing populations.
3. Reintroduce fish into historic habitats.
4. Enforce statutes that protect existing populations and their habitats.
5. Develop and implement public information program.

Costs (\$000):

<u>Year</u>	<u>Need 1</u>	<u>Need 2</u>	<u>Need 3</u>	<u>Need 4</u>	<u>Need 5</u>	<u>Total</u>
1993	22.5	216.0	30.0	13.0	13.0	294.5
1994	22.5	364.0	30.0	13.0	10.0	439.5
1995	22.5	310.0	35.0	13.0	8.0	388.5
1996	22.5	156.0	25.0	13.0	7.5	224.0
1997	22.5	97.0	25.0	15.0	7.5	167.0
1998	22.5	85.0	20.0	15.0	7.5	150.0
1999	22.5	85.0	20.0	15.0	7.5	150.0
2000	22.5	85.0	20.0	15.0	7.5	150.0
2001	22.5	85.0	20.0	15.0	7.5	150.0
2002	22.5	85.0	20.0	15.0	7.5	150.0

Total Cost
to Stabilize: 225.0 1,568.0 245.0 142.0 83.5 2,263.5

Date of Stabilization: If stabilization has been achieved, delisting objectives will be determined in 2002.

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PECOS BLUNTNOSE SHINER RECOVERY PLAN

PART I

Introduction

The Pecos bluntnose shiner (Notropis simus pecosensis) is one of two subspecies of Notropis simus (Cope). The other subspecies, the Rio Grande bluntnose shiner, N. s. simus, is presumed extinct (Chernoff et al. 1982, Miller et al. 1989, Bestgen and Platania 1990). The Pecos bluntnose shiner is restricted to the Pecos River of New Mexico (Hatch et al. 1985) and is federally listed as threatened (U.S. Fish and Wildlife Service 1987). Critical habitat for this subspecies includes two sections of the Pecos River in New Mexico. The first section begins approximately 10 miles (16 km) south of Fort Sumner, DeBaca County, and extends approximately 64 miles (103 km) downstream into Chaves County. The second section is between Hagerman and Artesia in Chaves and Eddy counties and is approximately 37 miles (60 km) long, (U.S. Fish and Wildlife Service 1987). The subspecies is also protected as endangered under Chapter 68 of the Texas Parks and Wildlife Code and is listed as endangered by the Texas Organization for Endangered Species (Anonymous 1987). It is listed as endangered (Group 2), by the New Mexico Department of Game and Fish (N.M. State Game Commission, Reg. No. 624 and amendments). The Pecos bluntnose shiner is considered endangered by the American Fisheries Society (Williams et al. 1989).

Phylogeny and Nomenclature

Notropis simus was first described as Alburnellus simus by Cope (in Cope and Yarrow 1875), based upon a series of specimens obtained from the Rio Grande near San Ildefonso, New Mexico. Jordan and Gilbert (1883) assigned the species to the genus Cliola, but Evermann and Kendall (1894) placed it in Notropis. Koster (1957) believed a similar, undescribed species occupied the Pecos River in New Mexico. Chernoff et al. (1982) described the Pecos form as a new subspecies, Notropis simus pecosensis, and distinguished it from the nominate subspecies, N. g. simus, the Rio Grande form. Several workers (Hubbs 1957; Koster 1957; Hubbs and Echelle 1972; Miller 1976) have considered Notropis orca (the phantom shiner), which inhabited the lower Rio Grande in New Mexico, Texas, and Mexico, a synonym of N. simus. However, Chernoff et al. (1982) demonstrated that Notropis orca is a valid species.

Description

Notropis simus pecosensis is a moderate-sized shiner separable from co-occurring shiners by its robust body, blunt and rounded snout, and large, slightly subterminal mouth that usually extends even with the pupil. The eye is relatively small and the caudal peduncle comparatively deep (Sublette et al. 1990). Pharyngeal dentition is usually 2,4-4,2 (Chernoff et al. 1982); anal fin rays number 8-10, with a mode of 9; and lateral-line scales number 33-38. Based upon a 1990 collection (S.P. Platania, University of New Mexico, personal communication) the Pecos bluntnose shiner may attain a total length (TL) of 90 mm (63 mm standard length [SL]). The species is pallid gray to greenish-brown dorsally and

whitish ventrally. A wide, silvery lateral stripe (dusky in preserved specimens) extends from the pectoral girdle to the caudal base. Pelvic and anal fins lack pigmentation, dorsal and pectoral fins have small black flecks along rays, and the caudal fin is variably pigmented (Chernoff et al., 1982).

Distribution

Historic Distribution

The Pecos bluntnose shiner inhabited the mainstream Pecos River from Santa Rosa downstream to the vicinity of Carlsbad, New Mexico (Hatch et al., 1985) (Fig. 1). This subspecies has not been recorded in the Texas portion of the Pecos River.

Collection records attest to the historic abundance of the species. For example, one collection (UNM 1388) made in 1939 from the Pecos River near Fort Sumner contained 1,482 bluntnose shiners. Hatch et al. (1985) sampled the same area in 1981 and collected only four bluntnose shiners.

Current Distribution and Status

Currently the Pecos bluntnose shiner survives in the Pecos River below Lake Sumner downstream to the upper end of, and seasonally in, Brantley Reservoir (Fig. 2). Within this river reach, abundance of the species is uneven (Brooks et al. 1991). The largest populations occur in seepage areas of the river upstream from the U.S. Highway 70 crossing to Fort Sumner and, to a lesser extent, in the reach between Hagerman and Artesia. The Pecos bluntnose shiner is now much less common than it once was. The

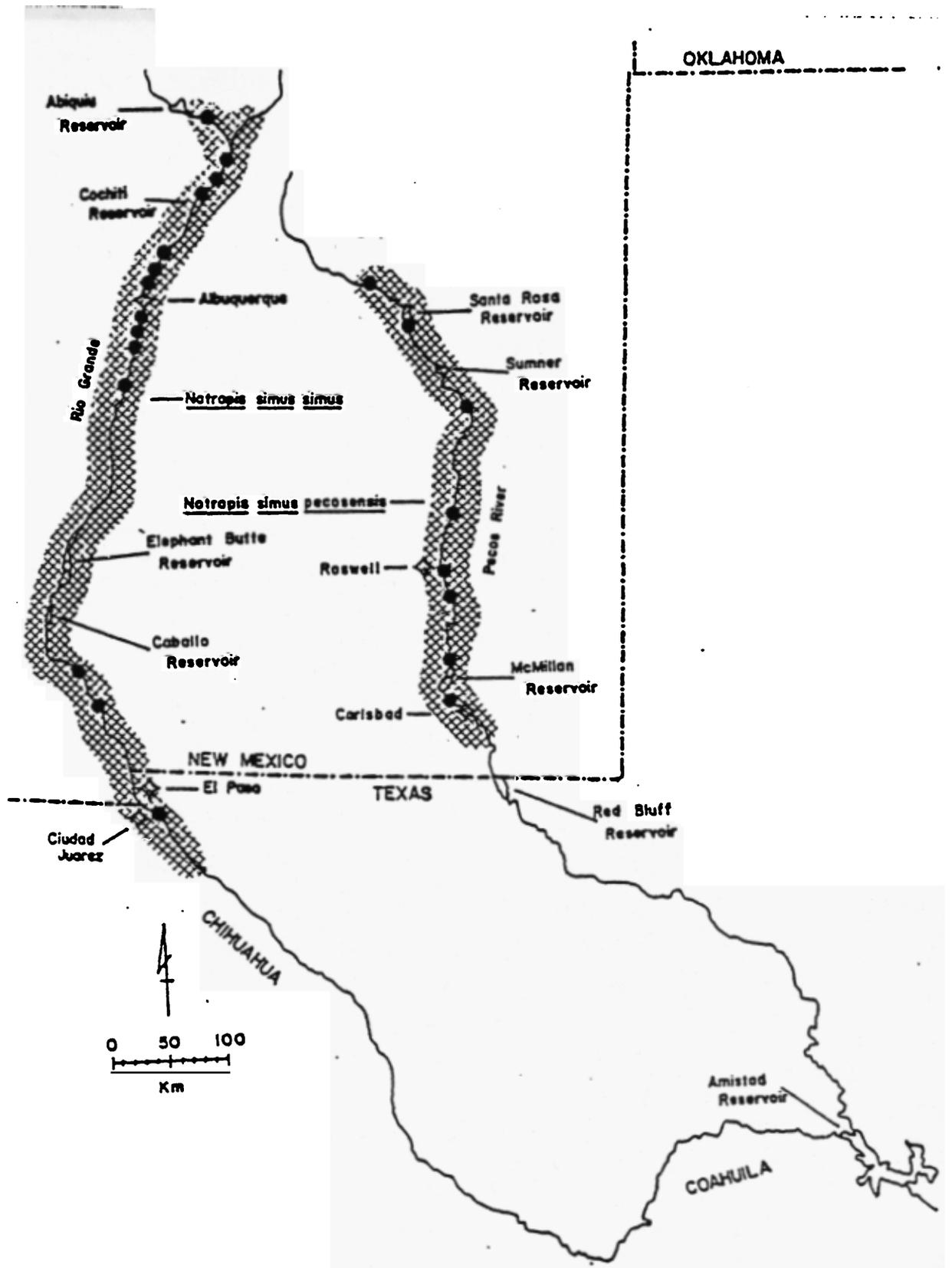


Fig. 1. Historic distribution of the bluntnose shiner, *Notropis simus*. Solid circles are historic collection sites and cross-hatched areas indicate verified and probable range. Presumably, the species once inhabited the Rio Grande and Pecos River downstream to their confluence

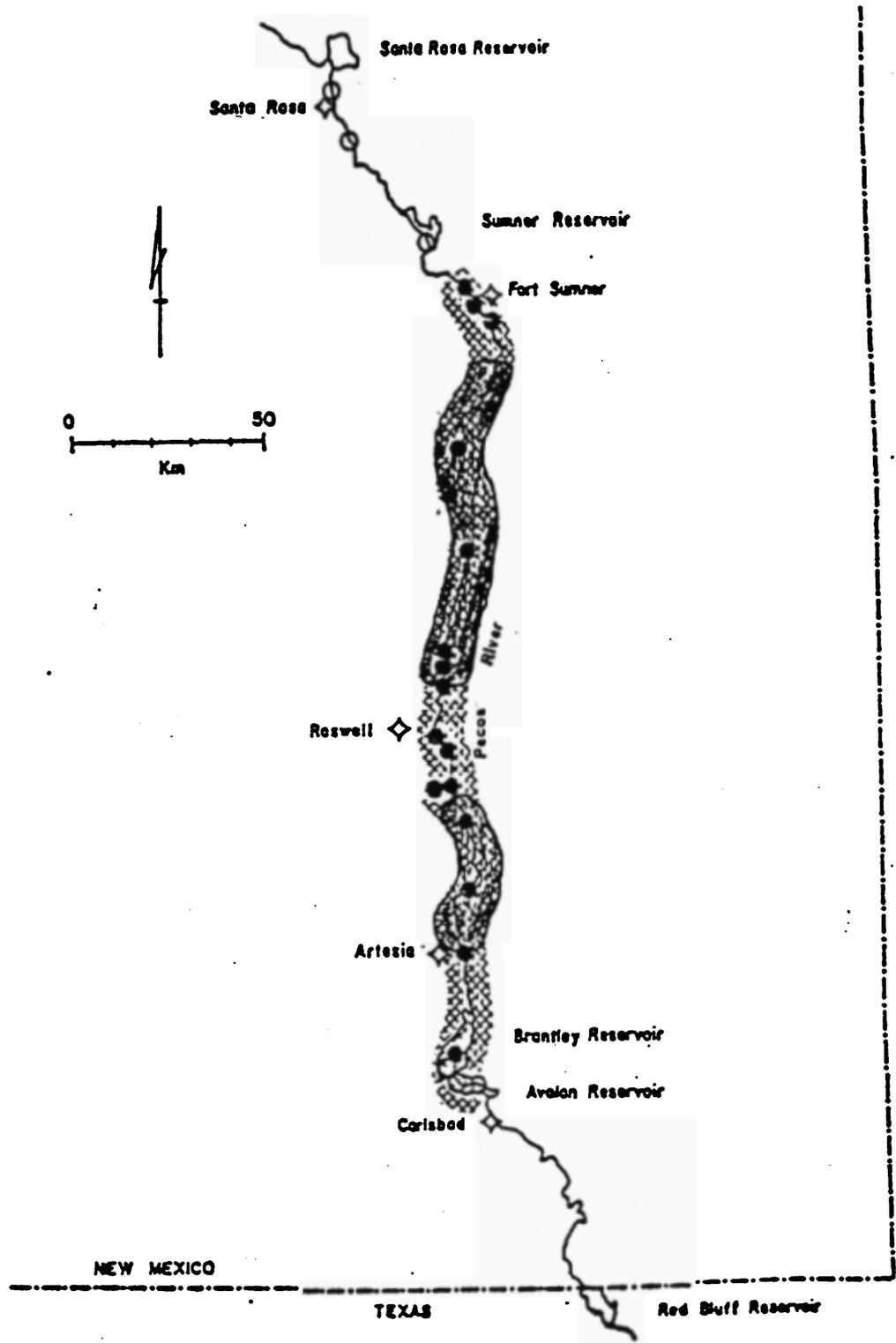


Fig. 2. Current distribution of the Pecos bluntnose shiner, Notropis simus pecosensis. Open circles indicate historic collection sites and solid circles indicate extant populations. Shaded areas designate critical habitat.

largest collection reported by Hatch et al. (1985) contained only 76 individuals. Collections made in 1986 at five historic sites contained a total of 131 Pecos bluntnose shiners (Platania, pers. comm.). Additional collections of N. s. pecosensis have been made systematically during monitoring surveys downstream of the U.S. 70 bridge, 1986-1991. These sites include the U.S. 70 highway crossing (52 - 1987, 35 - 1988, 74 - 1989, 142 - 1990, 169 - 1991) and Lake Arthur Falls (288 - 1986, 58 - 1987, 85 - 1989, 31 - 1990, 14 - 1991) (J.E. Brooks, U.S. Fish and Wildlife Service, pers. comm.).

Brooks et al. (1991) summarized all known historic collection data and compared them with more recent collections made during 1986-1990. N. s. pecosensis was collected from all previously known localities downstream of Fort Sumner, plus eight additional locations not previously sampled. Brooks et al. (1991) found that N. s. pecosensis numerically comprised 3.7 percent of the total number of all shiners collected (five species) from the Pecos River during 1990, compared to 22.4 percent for all collections prior to 1980 (four species). In the river reach between Fort Sumner and Roswell, all size and age classes of Pecos bluntnose shiner were collected. Downstream of Roswell, only young-of-year and juvenile Pecos bluntnose shiner were collected from all habitats sampled. Successive seasonal sampling in the lower reach of the Pecos River following summer runoff yield dwindling numbers of young Pecos bluntnose shiner (J.E. Brooks, unpublished field notes). Apparently, summer rainstorm events tend to displace young Pecos bluntnose shiner from the upper Pecos River into habitats downstream of Roswell (Brooks et al. 1991).

Reasons for Decline

Very little is known of the specific reasons for the decline of the Pecos bluntnose shiner. Nevertheless, it is apparent that the decline is due mainly, if not exclusively, to modification of Pecos bluntnose shiner environments. Such modifications include the physical alteration of Pecos bluntnose shiner habitat and the introduction and establishment of non-native fish species. This is part of a general pattern of decline in small, short-lived fishes that are native to the large riverine waters of the Southwest (Miller 1961).

The reasons for the decline (or extirpation) of the Pecos bluntnose shiner vary among the areas. Hatch et al. (1985) presented information that indicated stream desiccation to be the main reason for the decline of the Pecos bluntnose shiner in the Pecos River. The species occurred primarily in areas of perennial flow. Habitats in the main stream channel from several stream kilometers above the U.S. 70 bridge downstream to the Rio Hondo confluence are routinely reduced to intermittent pools during summer months (Brooks et al. 1991). Bestgen et al. (1989) discussed the recent introduction and spread of the Arkansas River shiner (Notropis girardi) in the Pecos River. Establishment of the nonnative N. girardi, presumably due to stream habitat alterations caused by reservoir storage and release operations, may impact N. s. pecosensis throughout its occupied range. It is likely that other physical habitat modifications, pollution, and nonnative predators/competitors also have contributed to the decline of the species in the Pecos River drainage (Brooks et al. 1991).

Ecology

Hatch et al. (1985) provided the only published information available on the general biology of the Pecos bluntnose shiner. Their study found that the species occupied most major habitats within the river, but was most common in the main channel. It was typically found in low-velocity water, 17 to 41 cm deep, over sand substrate.

Precise information on the reproductive biology of this species is lacking. Based upon recent data (Hatch et al. 1985; K.R. Bestgen and S.P. Platania, pers. comm.), Pecos bluntnose shiner spawning is probably initiated in spring and continues through early autumn. Hatch et al. (1985) reported an Age II female contained 1,049 mature or maturing ova. Bestgen and Platania (1990) analyzed reproductive data from 10 museum specimens of Rio Grande bluntnose shiner and determined a spawning season beginning in mid-June to mid-July and continuing for 4-6 weeks. Seven Age II and three Age III females contained an average of 1,883 and 2,721 ova, respectively.

In the wild, Pecos bluntnose shiner may survive 3 years, but most individuals in a population are Age I or less. Most growth is attained by the end of the first year (Age 0). Hatch et al. (1985) reported that Age 0 bluntnose shiners attained lengths to 32.5 mm (SL), Age I to 45.0 mm (SL), and Age II to 56.5 mm (SL).

Pecos bluntnose shiner food and feeding habitats have not been investigated, but the species probably feeds on small aquatic macroinvertebrates, as do many other shiners (Starrett 1951; Griswold

1963). The gut is simple with two flexures, and the peritoneum is silvery (Chernoff et al. 1982). These attributes are common among shiners that eat small aquatic macroinvertebrates.

A total of 23 species of fish were collected within the current range of the Pecos bluntnose shiner by Hatch et al. (1985). Only the plains minnow (Hybognathus placitus), speckled chub (Macrhybopsis aestivalis), Rio Grande shiner (Notropis iemezanus), red shiner (Cyprinella lutrensis), and Arkansas River shiner (N. girardi) were frequently found in association with the bluntnose shiner. Bestgen et al. (1989) and Brooks et al. (1991) collected similar species and numbers, with the most notable exception being the Arkansas River shiner (N. girardi) being collected in relatively large numbers throughout the current range of the Pecos bluntnose shiner.

Major Threats

Loss of permanent flow and degradation of river reaches having permanent flow are the primary known threats to the Pecos bluntnose shiner (Hatch et al. 1985, Brooks et al. 1991). Other factors, such as predation by and competition with introduced fishes and reduced water quality may also have adverse impacts upon surviving Pecos bluntnose shiner populations. But, the paucity of direct information makes consideration of such threats speculative. There is considerable evidence, however, that native fishes of the Southwestern United States are scarce in the presence of abundant numbers of introduced fishes (Williams et al. 1985).

Hatch et al. (1985) encountered the Pecos bluntnose shiner most commonly in two areas of permanent flow in the Pecos River which were considered to be maintained by groundwater seepage. In these reaches of permanent flow (Fig. 2), all age groups were present except in the lower reach where Age II adults were not collected. Brooks et al. (1991) also found Pecos bluntnose shiner in both reaches but in drastically reduced numbers downstream of Roswell. Elsewhere in the historic range of the subspecies, the river is intermittent or otherwise modified, and the shiner is uncommon or absent. The few individuals present in intermittent reaches are probably immigrants from the permanently flowing reaches. Permanent river flows, therefore, appear to be critical to Pecos bluntnose shiner survival.

The operation of Sumner Dam has significantly altered flow regimes in the upper Pecos River (U.S.G.S., 1913-1991). During the period 1913-1935, prior to dam operations, the average number of days per year when flows were measured at less than 1 cubic feet per second (cfs) at the U.S.G.S. stream gage below Sumner Dam was zero. For the period after dam operation began, 1937-1990, measured flows less than 1 cfs occurred an average of 55.2 days per year. Although intermittent conditions in downstream reaches occurred historically, they were exacerbated greatly following construction and operation of dams on the Pecos River.

Pecos River flows from Roswell to Brantley Reservoir are impacted by a suite of factors. Although dam and reservoir operations affect flows in this reach, groundwater and river pumping and the proliferation of the nonnative salt cedar (Tamarix pentandra) have altered river flow also. Brooks et al. (1991) identified the reduction, by nearly half, of surface

flows measured near Artesia during pre-Summer Dam conditions and after. This reduction in flows was presumably due primarily to groundwater pumping of the Roswell Artesian Basin (Fiedler and Nye, 1933; Havenor, 1968). The initiation of metering water wells and enforcing water rights allocations by the State of New Mexico in the early 1960's was successful in slowing the declining water table (Glen Brimm, State Engineers Office, Roswell, pers. comm.). Direct pumping from the Pecos River for agricultural use diverts water downstream of Roswell. However, volumes pumped have not exceeded evaporative and bank losses during reservoir retention (U.S.G.S. data). Channel losses during instream transport has been estimated for specific reaches of the Pecos River by the New Mexico Interstate Stream Commission and factor into scheduling of water releases. Control of salt cedar by mechanical removal along the Pecos River was evaluated by Welder (1988) and determined to be inconsequential to surface flow in the adjacent channel. The efficacy of removing salt cedar to increase surface flows is the current focus of privately initiated water conservation efforts.

Water quality contamination has been identified for the Pecos River (Schmitt and Brumbaugh, 1990; Schmitt et al., 1990) and associated habitats (O'Brien, 1990 a,b). Those evaluations identified the elevation of dissolved heavy metals and the occurrence of organochlorine chemicals, common constituents and levels associated with agricultural water uses. Exploration and development of oil and gas reserves within the Pecos River Basin may also affect water quality and pose water quality problems. White (1991) summarized the negative effects of petroleum chemicals on the environment. Recent efforts have been initiated by the New Mexico Environment Department, Environmental Protection Agency, and Fish and

Wildlife Service to evaluate the extent of petro- and agri-chemical pollution in the Pecos River. In addition, reduced flows from upstream reaches result in higher salinities downstream of Roswell that may affect fish distribution (U.S.G.S. data; Brooks et al., 1991). During high flow periods (>500 cfs), salinities are reduced to low levels but increase once reservoir releases are halted.

Non-native fish species likely compete with and prey upon various life stages of N. g. pecosensis. However, potential impacts have not been quantified. Bestgen et al. (1989) documented the introduction and expansion of N. girardi. He also discussed the relevance of the establishment of the non-native H. placitus and noted the disappearance of H. amarus in the Pecos River after these introduction of these two species of fish. It is likely that habitat changes caused by various man-related activities favor non-native species over native fishes such as N. g. pecosensis. Also, the State of New Mexico has established non-native sport fisheries in all Pecos River reservoirs. The long-term impacts of introduced predators such as walleye (Stizostedion vitreum) and white bass (Morone chrysops) are unknown. The New Mexico Department of Game and Fish is currently evaluating implications of non-native fisheries management, both live baitfish and sportfish, on the conservation of N. g. pecosensis.

N. g. pecosensis habitat has been lost due to impoundments. In the wild, the species does not survive long in lentic environments. Monthly collections (May - October) from newly formed Brantley Reservoir, downstream of the now breached McMillan Dam, during its initial filling in 1989, revealed the presence of bluntnose shiner in fish collections through July. Subsequent collections in the reservoir proper did not

yield any bluntnose shiner (J.E. Brooks, pers. comm.). Correspondingly, in riverine habitats, the species is relatively uncommon in pools (Hatch 1982; Hatch et al. 1985). Data presented by Hatch et al. (1985) and Brooks et al. (1991) indicated Pecos bluntnose shiner are not a regular inhabitant of the Pecos River in stream reaches immediately below dams. Reservoir tailwaters commonly disrupt native fish assemblages (Edwards 1978). Dams and reservoirs also serve as barriers to Pecos bluntnose shiner dispersal. Hatch et al. (1985) did not find the species upstream of Sumner Reservoir nor downstream of McMillan Reservoir. Recent surveys confirm Hatch's findings for the river upstream of Sumner Reservoir, but Pecos bluntnose shiner were collected downstream of the McMillan Dam site (Brooks et al. 1991).

Conservation Efforts to Date

In 1980, an effort was initiated to hold and rear Pecos bluntnose shiner at the Dexter National Hatchery and Technology Center. Ten adult shiners were seined from the Pecos River at U.S. 380 highway crossing on October 24, 1980. These fish were placed into a pond for overwinter holding and subsequently moved to an artificial stream the following spring. All fish died without successful voluntary reproduction and/or recruitment in either environment.

Mitigation for Brantley Dam on the Pecos River included providing a minimum 20 cfs continuous flow below the dam and an outflow channel to provide suitable Pecos bluntnose shiner habitat (USBR 1982). Reports of the Pecos bluntnose shiner in this area were believed by Hatch et al. (1985) to represent "baitbucket" introductions. Post-dam closure

collections during 1989 and 1990 in the mitigation channel and at downstream locations indicate bluntnose shiner do not occur in this reach (Brooks et al. 1991).

A report by Brooks et al. (1991) provided the basis for a biological assessment by the U.S. Bureau of Reclamation (U.S. Department of Interior 1991) and a biological opinion (U.S. Fish and Wildlife Service 1991) on Pecos River reservoir operations. The biological assessment and biological opinion determined there was sufficient justification to find reservoir operations culpable in the decline of Pecos bluntnose shiner. In particular, it was noted that reservoir operations significantly impacted riverine habitats above Roswell while a suite of man-caused activities, including ground-water pumping and pollution, altered downstream reaches. Subsequently, the Carlsbad Irrigation District, New Mexico Department of Game and Fish, U.S. Bureau of Reclamation, and U.S. Fish and Wildlife Service signed a Memorandum of Understanding (MOU) to cooperate in the study and management of Pecos River resources. Under the guidelines of the MOU, a 5-year plan was developed to guide study activities. The objectives of this study are to identify the dynamics and interrelationships of the fish community, riverine habitats, flows, and reservoir operations.

The New Mexico Department of Game and Fish has been instrumental in promoting regulation of commercial bait harvesting from the Pecos River (Schmitt 1976). Presently, commercial harvest of bait minnows from areas where Pecos bluntnose shiners occur is prohibited.

PART II

Recovery

Objective: The goal of this recovery plan is to outline measures that must be taken to secure survival of Pecos bluntnose shiner in its current range. In addition, efforts should be made to reestablish the species in areas of historic occupancy. Delisting can be considered only when continued survival of Pecos bluntnose shiner is assured.

Step-down Outline:

1. Maintain and enhance existing Pecos bluntnose shiner populations and their habitat.
 - 1.1. Determine biological requirements.
 - 1.11. Determine time, location, duration of spawning, fecundity, and early life history.
 - 1.12. Determine age and growth.
 - 1.13. Determine food habits and relate them to food availability and habitat use patterns.
 - 1.14. Determine seasonal and annual population dynamics

of Pecos bluntnose shiner and associated fishes.

- 1.15. Determine present distribution by conducting thorough inventories of areas where species historically occurred.
 - 1.16. Monitor existing populations and associated aquatic habitats.
- 1.2. Determine habitat requirements and flow/habitat relationships.
- 1.21. Determine ontogenic seasonal and geographic patterns of macrohabitat use.
 - 1.22. Determine extent of available habitat.
 - 1.23. Determine effects of reservoir-controlled and natural flow events on habitat availability.
- 1.3. Determine relationship between current distribution and human modification of the Pecos River.
- 1.31. Determine distributional and abundance patterns in relation to impoundments.
 - 1.32. Determine influence of pollutants upon distribution and abundance patterns.

- 1.33. Determine effects of non-native fish species interactions on distribution and abundance.
 - 1.34. Identify other modifications that influence Pecos bluntnose shiner distribution and abundance.
 - 1.4. Develop management strategies for protection and enhancement of existing habitat.
 - 1.41. Protect populations and habitat through acquisition of water rights and/or conservation easements.
2. Reintroduce Pecos bluntnose shiner into suitable habitat within its historic range.
 - 2.1. Develop a Pecos bluntnose shiner broodstock at an appropriate fish culture/research facility for a refugium population and to provide fish for research and reintroduction.
 - 2.11. Develop propagation, rearing, and broodstock maintenance methods that ensure species integrity.
 - 2.2. Identify and evaluate areas for potential reintroduction.
 - 2.3. Reintroduce into suitable areas and monitor stocked populations.
3. Disseminate information about Pecos bluntnose shiner.

- 3.1. Develop an information brochure.
- 3.2. Utilize Arizona/New Mexico American Fisheries Society Chapter video tape on native southwestern fishes.
- 3.3. Develop a media (video, slide) program.
- 3.4. Whenever possible, take advantage of local opportunities to explain to the public the plight of the shiner and efforts being made for its recovery.
4. Enforce State and Federal laws protecting bluntnose shiner and its habitat.
 - 4.1. Provide Section 7 consultation under the ESA and enforce State and Federal laws and regulations pertaining to take and habitat modification.
 - 4.2. Continue prohibition of commercial minnow harvest in designated reaches of the Pecos River.
 - 4.21. Determine effectiveness and need for continued prohibition of commercial minnow harvest from designated reaches of the Pecos River.

Narrative Outline

The goal of this recovery plan is to outline measures that must be taken to ensure survival of the Pecos bluntnose shiner in the wild and provide habitat essential for its recovery. This goal will be realized when sufficient protection is provided to ensure appropriate flows and water quality are maintained in designated critical habitat, and when additional populations of the shiner are established in suitable areas of historic occupancy. Delisting can occur only when shiner range and abundance have reached a level that localized perturbations do not jeopardize the species' continued survival.

Prime Objective: To provide adequate protection to the Pecos bluntnose shiner and its habitat to ensure survival of wild populations in their native habitat.

1. Maintain and enhance existing Pecos bluntnose shiner populations.

The Pecos bluntnose shiner survives mainly in two sections of the Pecos River, New Mexico. Perpetuation of the species in the wild depends upon a thorough knowledge of this minnow's life history and ecology, of which relatively little is known.

1.1. Determine biological requirements

1.1.1. Determine timing, location, and duration of spawning, number of young produced, and early life history.

The reproductive biology of the Pecos bluntnose shiner is poorly known. Some data indicates the spawning season is prolonged, but the influence of such factors as photoperiod, water temperature, discharge levels, flow regime, and turbidity are unknown. Specific spawning sites should be ascertained. Relative reproductive contributions by age class is unknown. It is not known if negative interactions occur between Pecos bluntnose shiner and associated species during the spawning season. The effects of various instream structures and watershed modifications upon Pecos bluntnose shiner reproductive success are not known. Diagnostic features separating Pecos bluntnose shiner larvae from those of associated species should be determined. Information on larval drift ecology of Pecos bluntnose shiner is needed.

1.12. Determine age and growth.

Some data exist on age and growth of Pecos bluntnose shiner but these were compiled from study of specimens obtained from September 23, 1981, to February 1, 1982 (Hatch et al. 1985). A thorough documentation of age and growth in both major populations is needed. In addition, the effects of flow regimes, instream modifications, food availability, and competition upon growth and survival are required.

1.13. Determine food habits and relate to availability and habitat use patterns.

Food habits investigations for the Pecos bluntnose shiner have not been conducted. These data are necessary to evaluate potential competition, relate habitat preferences to preferred foods, determine seasonal food shifts, and develop strategies to protect forage bases.

1.14. Determine seasonal and annual population dynamics of Pecos bluntnose shiner and associated fishes.

Studies should be conducted to determine Pecos bluntnose shiner population dynamics in relation to populations of other fish in the Pecos River. A better understanding of these relationships would permit development of more effective management strategies for recovery.

1.15. Determine present distribution by conducting thorough inventories of areas of historic occurrence.

The present data base concerning distribution and abundance for Pecos bluntnose shiner should be expanded by conducting a thorough inventory of all reaches of the Pecos River where the fish was known to occur historically. This inventory should be conducted during low flows to maximize collecting efficiency.

1.16. Monitor existing populations and associated aquatic habitats.

Previous studies have identified areas of known occurrence for Pecos bluntnose shiner. Those areas should be monitored for long-term status evaluations. Standardized monitoring procedures should be developed and implemented. It is anticipated systematic seining of all habitats located at specific monitoring sites on an annual basis will be the primary method of monitoring. Also included in monitoring will be an annual evaluation of habitat conditions including quantification of available habitats at monitoring sites. Population status and trends and habitat availability over time will be the focus of data analysis.

1.2. Determine habitat requirements and flow/habitat relationships.

1.21. Determine ontogenetic seasonal and geographic patterns of macrohabitat use.

There is some evidence that the species shifts habitats as it matures (Hatch et al. 1985). Macrohabitat use and preference studies should be conducted to describe depth, velocity, substrate, chemistry, and temperature preferences of life history stages. It is not known if seasonal shifts occur in Pecos bluntnose shiner macrohabitat use and preference. Movement to water of different depths and velocities from one season to the next may be important behavioral/physiological adaptation for survival in highly

variable systems. Over the range of a species, some differences in patterns of macrohabitat use might be expected. Description of such patterns is integral to developing appropriate management strategies.

1.22. Determine extent of available habitat.

In addition to description of patterns of macrohabitat use, it is necessary to relate habitat use to habitat availability. When defined, these data will permit some definition of macrohabitat preference of the Pecos bluntnose shiner.

1.23. Determine effects of reservoir-controlled and natural flow events on habitat availability.

Previous studies have implicated reservoir operations on the Pecos River as negatively impacting quantity and quality of water transported to downstream reaches. Historic operations have been to store water in reservoirs until requests by agricultural users necessitate a release designed to deliver a specified quantity of water within a minimal time frame. Once delivery is complete, water released through the dam is discontinued.

Downstream reaches are frequently dewatered or severely diminished. Natural high flow events caused by local rainstorm activity also affect channel conditions. Studies

have been initiated and should be completed to identify channel morphology response, including habitat availability, to various flow types and sizes.

1.3. Determine relationship between current distributional patterns and human modification of the Pecos River.

1.31. Determine distributional and abundance patterns in relation to impoundments.

It is not known to what extent regulated flows affect distribution and abundance of Pecos bluntnose shiner. Investigation of the relationship between distribution and abundance patterns and regulated flows may demonstrate that modification of water-release schedules will enhance the status of the Pecos bluntnose shiner.

1.32. Determine the influence of pollutants upon distribution and abundance patterns.

Point sources of pollution (irrigation return, feedlot runoff, municipal waste, and petrochemical discharges) may have detrimental effects upon Pecos bluntnose shiner. However, the level of effect of any pollutant generally is unknown. In order to provide protective measures for Pecos bluntnose shiner, determination of adverse affects of particular pollutants is required.

1.33. Determine effects of nonnative fish species interactions on distribution and abundance.

Altered habitats that occur at and upstream and downstream of manmade reservoirs usually result in establishment of non-native fish species. Reservoirs provide suitable habitats for non-native piscivores that, if displaced, may prey upon native fishes in riverine habitats. Cyprinid species, non-native to the Pecos River, also may prey upon or compete with native species for various resources. Studies have been initiated and should be completed to determine the relationships between native and non-native specie distribution, biology, and response to natural and altered flow regimes.

1.34. Identify other modifications that influence distribution and abundance.

Groundwater pumping in the Roswell Artesian Basin has been regulated since the early 1960's and has been identified as a negative impact to surface river flows. In addition, several water users pump from the Pecos River for irrigation purposes. Invasion of the nonnative plant, salt cedar, has been implicated, by preliminary data, in the decline of surface and ground waters along the Pecos River. The relationship between groundwater hydrology and surface flows should be determined. The total volume of water pumped from the river is small and is currently the focus

of State of New Mexico actions. Salt cedar control projects have been identified and are being pursued by private interests.

1.4. Develop management strategies for protection and enhancement of existing habitat.

Management strategies will require integration and synthesis of data gathered in the above activities. Unless protection and enhancement of existing habitat are accomplished, stabilization of surviving populations and increased range and abundance of the species cannot be achieved.

1.41. Protect populations and habitat through acquisition of water rights and/or conservation measures.

Studies indicate free-flowing water is preferred by the Pecos bluntnose shiner. Given the various demands upon a limited resource, provision for instream water of reasonable quantity and quality is basic to the species' survival.

2. Reintroduce Pecos bluntnose shiner into suitable habitat within its historic range.

2.1. Develop a Pecos bluntnose shiner broodstock at an appropriate fish culture/research facility for refugium, research and reintroduitory purposes.

To ensure species survival and maximize probability of successful reestablishment of Pecos bluntnose shiner populations, it is necessary to have a large number of fish available. The best way to achieve this task is to develop a captive broodstock. Removal of wild stock from the Pecos River to a fish cultural facility will be necessary.

Once a broodstock has been established and propagation techniques developed, it will be possible to maintain species genetic integrity and survival, provide material for various studies, and reintroduce the Pecos bluntnose shiner to areas historically occupied.

2.11. Develop propagation, rearing, and brood stock maintenance methods that ensure species integrity.

Reproductive biology of the Pecos bluntnose shiner in the wild should be the focus of culture methodology development. Eggs are known to hatch quickly and spawning appears to coincide with summer rainstorm-caused flow events. Methods should address timing, habitat conditions, and hatching rate. Studies of food habits should direct development of culture diet. Brood/refugium stock size and spawning methods should minimize loss of genetic material.

2.2. Identify and evaluate areas for potential reintroduction.

Stream reaches devoid of Pecos bluntnose shiner, but which seem to contain requisite habitat, should be considered for reestablishment of Pecos bluntnose shiner. Such areas may require specific management such as removal of exotic predators to ensure survival of stocked populations.

2.3. Reintroduce into suitable areas and monitor stocked populations.

Once fish have been stocked, a systematic monitoring program must be initiated. The purpose of this program would be to monitor condition of the fish, determine patterns of their dispersal, and identify physical and biological factors that affect them.

3. Disseminate information about bluntnose shiner.

Public awareness of the recovery effort for the Pecos bluntnose shiner and basin-wide water-use issues should be encouraged. The best way to achieve this is through an information and education program.

3.1. Develop an information brochure.

An information brochure should be produced and distributed to various groups and individuals. Production of the brochure could be done by the U.S. Fish and Wildlife Service, New Mexico

Game and Fish Department, or a professional public relations firm.

3.2. Utilize Arizona/New Mexico American Fisheries Society Chapter video tape on native southwestern fishes.

The Arizona/New Mexico Chapter of the American Fisheries Society has produced a video tape entitled Endangered Fishes of the Southwest. This video provides an overview of various factors that adversely affect native fishes in the Southwest. Use of this video as an educational tool should be encouraged.

3.3. Develop a media (video, slide) program on Pecos bluntnose shiner.

A brief video or slide program concerning Pecos bluntnose shiner should be produced and made available to various groups including schools. This video should be general enough in scope to be of interest to elementary school children.

3.4. Whenever possible, take advantage of local opportunities to explain the plight of the shiner and efforts being made for its recovery.

Recovery efforts for the species can be greatly enhanced if supported by the public and especially local residents. They should understand that the fish is part of their natural heritage and as such should be recovered so that it can continue

to be a part of the native fish fauna of the Pecos River.

4. Enforce State and Federal laws protecting Pecos bluntnose shiner and its habitat.

4.1. Provide Section 7 consultation under the ESA and enforce State and Federal laws and regulations pertaining to take and habitat modification.

4.2. Continue prohibition of commercial minnow harvest in designated reaches of the Pecos River.

Currently, minnow harvest is prohibited by State law in the Pecos River over most of the area designated as critical habitat.

4.21. Determine effectiveness and need for continued prohibition of commercial minnow harvest from designated reaches of the river.

A study should be conducted to determine if the continued prohibition of commercial minnow harvest from the Pecos River is effective in preventing negative impacts to the Pecos bluntnose shiner population.

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GENERAL CATEGORIES FOR IMPLEMENTATION SCHEDULES

Definition of Priorities

- 1 = An action that must be taken to prevent extinction or to prevent the species from declining irreversibly.
- 2 = An action that must be taken to prevent a significant decline in species population/habitat quality, or some other significant negative impact short of extinction.
- 3 = All other actions necessary to provide for full recovery of the species.

Information Gathering - I or R (research)

- | | |
|--------------------------|-------------------------------|
| 1. Population status | 7. Propagation |
| 2. Habitat status | 8. Migration |
| 3. Habitat requirements | 9. Predation |
| 4. Management techniques | 10. Competition |
| 5. Taxonomic studies | 11. Disease |
| 6. Demographic studies | 12. Environmental contaminant |

Management - M

1. Propagation
2. Reintroduction
3. Habitat maintenance
4. Predator & competitor control
5. Depredation control
6. Disease control
7. Other

Acquisition - A

1. Lease
2. Easement
3. Management agreement
4. Exchange
5. Withdrawal
6. Fee title
7. Other

Other O

1. Information and education
2. Law enforcement
3. Regulations
4. Administration

ABBREVIATIONS USED

NMGF - New Mexico Department of Game and Fish

USBR - U.S. Bureau of Reclamation

EPA - Environmental Protection Agency

SWR - State Water Resources

FWS - U.S. Fish and Wildlife Service

ES - Ecological Services

LE - Law Enforcement

PA - Public Affairs

FR - Fishery Resources

WR - Refuges

RE - Realty

PART III - IMPLEMENTATION SCHEDULE

GENERAL CATEGORY (1)	PLAN TASK (2)	TASK # (3)	PRIORITY # (4)	TASK DURATION (5)	RESPONSIBLE AGENCY FMS REGION (6)	OTHER PROGRAM (6a) (7)	FISCAL YEAR COSTS (Estimate)		COMMENTS (9)	
							FY92 (8)	FY94		
I-7	Investigate time, location, and duration of spawning, including fecundity	1.11	2	3 years	2	ES/FR	NMGF USBR	5,000	5,000	5,000
I-7	Determine age and growth	1.12	3	3 years	2	ES/FR	NMGF USBR	2,000	2,000	2,000
I-3	Determine food habitats and relate to habitat use	1.13	3	3 years	2	ES/FR	NMGF USBR	1,000	1,000	1,000
I-1	Determine seasonal and annual population dynamics	1.14	3	3 years	2	ES/FR	NMGF USBR	5,000	5,000	10,000
I-1	Determine present distribution	1.15	2	3 years	2	ES	NMGF USBR	5,000	7,500	7,500
I-1	Monitor populations and habitats	1.16	1	on-going	2	ES/FR	NMGF USBR	5,000	5,000	5,000
I-3	Determine ontogenic patterns of macro-habitat utilization	1.21	2	2 years	2	ES/FR	NMGF USBR	5,000	5,000	5,000
I-2	Determine extent of available habitat	1.22	2	2 years	2	ES/FR	NMGF USBR	5,000	5,000	5,000
1-1,2	Determine effects flow on habitat	1.23	1	3 years	2	ES/FR	NMGF	5,000	6,000	7,000
I-1	Determine distribution and abundance in relation to dams and reservoirs	1.31	1	3 years	2	ES/FR	NMGF USBR	2,500	3,000	5,000
I-2	Determine influence of pollutants upon distribution and abundance	1.32	1	3 years	2	ES/FR	NMGF EPA SWR	25,000	35,000	50,000
1-9,10	Determine effects of non-native species interactions	1.33	1	3 years	2	ES/FR	NMGF	3,000	5,000	7,000
I-2	Identify other modifications that influence distribution and abundance	1.34	2	3 years	2	ES/FR	NMGF USBR	5,000	5,000	5,000
A-1-7	Acquire water rights and/or conservation easements	1.41	2	ongoing	2	ES/RE	NMGF USBR	Unknown		

M-2	Re-establish in suitable areas of historic occurrence	2	3	ongoing	2	ES/FR	NMGF USBR	
M-1	Develop a brood stock	2.1	3	ongoing	2	FR	NMGF	
M-7	Identify and evaluate areas for potential reintroduction	2.2	2	1 years	2	ES/FR	NMGF USBR	5,000
M-2	Monitor reintroduced populations	2.3	3	ongoing	2	ES/FR	NMGF USBR	
O-1	Develop information brochure	3.1	3	1 year	2	ES/FR PA	NMGF	10,000
O-1	Utilize video programs to disseminate information	3.2	3	ongoing	2	ES/FR WR	NMGF	3,000 5,000
O-1	Develop a video or slide program	3.3	3	1 year	2	ES	NMGF	10,000
O-3	Provide Section 7 consultation and enforce state regulations	4.1	2	ongoing	2	ES		10,000 10,000 10,000
O-2	Continue prohibition of commercial minnow harvest in designated reaches of the river	4.2	3	ongoing	2	LE	NMGF	3,000 3,000 3,000

*Cost refer to USFWS expenditures only.

APPENDIX

Comments

Pecos Bluntnose Recovery Plan

Notice of opportunity for review and comment on the Pecos bluntnose shiner draft recovery plan was published in the Federal Register on July 9, 1992. The 60-day period for comments closed on September 8, 1992. Ten letters of comment were received; reproductions of each are provided below. All comments were considered fully. Responses were dealt with in two ways: first, editorial comments, corrections of factual errors, etc., were incorporated into the text of the plan; or second, comments concerning contents of the plan were addressed in specific responses. However, similar comments were grouped together and answered as one. Numbers occurring in the margins of the letters refer to the appropriate response or responses for that comment.

Enclosures

General comments on the Pecos bluntnose shiner Recovery Plan:

A prevalent philosophy of the Service during the recent Pecos River Endangered Species Act Section 7 consultation was that operation of Reclamation facilities was jeopardizing the continued existence of the Pecos bluntnose shiner. While Reclamation accepted the Reasonable and Prudent Alternative to avoid jeopardy to the species, committing Reclamation to a Memorandum of Understanding for a five year research effort, wording in the biological opinion clearly indicated 1989-type operations would result in a significant decrease in shiner numbers and reproductive success. Reclamation has committed to working with the Carlsbad Irrigation District to ensure 1989-type operations do not occur again. However, the biological opinion, and the Pecos bluntnose Shiner Recovery Plan, do not go far enough in detailing and equally balancing the potential and realized impacts of other basin activities to the Pecos bluntnose shiner, including but not limited to predaceous, non-native sport fish introductions, baitbucket introductions of potentially competitive Cyprinids and other genera, and water quality degradation from industrial and agricultural interests.

Initially in the Recovery Plan (pages 6 and 7) the decline of the species is attributed to both physical alteration of habitat, especially flow related disturbances, and introduction of non-native fish species. Pollution and predators/competition are also mentioned as factors contributing to the decline. In the Major Threats section, the flow related issue is stated as the primary known threat with all other threats being secondary. In fact, the non-native fish and predation/competition issue is not discussed in detail due to the paucity of information. We disagree with this statement regarding the paucity of information regarding threats from competition: Bestgen et al. (1989) reported on the elimination of the native *Hypognathus amarus* by introduced *H. placitus* in the Pecos River. This information makes it even more important to stress control of non-natives, not just management of water operations, in the Recovery Plan. The non-native fish issue is omitted entirely from the Recovery Section. All possible threats that were initially identified in the Reason for Decline Section should be discussed consistently throughout the report. Therefore, the Major Threats Section should include detailed discussions of non-native fish introductions, physical habitat modifications, pollution, and non-native predators/competitors. The recovery plan should address all issues completely instead of concentrating on specific issues. Your lack of emphasis on these important issues implies a lack of significance to any variable other than water operations and places the burden of responsibility almost entirely on Reclamation.

1 Spell-check the document. Numerous typos exist.

1 ~~*Notropis albus pecosensis*, *Notropis albus*, *N. s. albus*, and *N. s. pecosensis*~~ are used interchangeably through the document.

Specific comments on the Pecos bluntnose shiner Recovery Plan:

1. Executive Summary is very cryptic, needs to be expanded.
2. Page 4; Change McMillan Reservoir to Brantley Reservoir. Add roads

UC-773

Memorandum

To: Project Leader, Dexter Fishery Assistance Office, U.S. Fish and Wildlife Service, P.O. Box 370, Dexter NM 88230

From: Regional Director
Bureau of Reclamation

Subject: Review of Draft Pecos Bluntnose Shiner Recovery Plan
(Endangered Species)

Personnel from the Bureau of Reclamation (Reclamation) have been very active in recovery efforts for the Pecos bluntnose shiner. Reclamation activities to date have included membership on the Rio Grande Fishes Recovery Team (Team), funding and field support for 1990 and 1991 Pecos River research efforts, and funding, field support, and hydrologic modeling during the current five year Pecos bluntnose shiner research effort. Because Reclamation was not a member of the Team during initial drafting of the subject document, we have not had the opportunity to provide input. However, after careful review of the subject document by biologists in our Regional and Albuquerque Projects Offices, it is apparent that proposed recovery efforts will depend, on a large part, upon Reclamation funding and continued interest. Therefore, Reclamation is providing the U.S. Fish and Wildlife Service (Service) with comments on the subject document (enclosed) and anticipates response from your agency.

Reclamation supports the efforts of the Service in recovery of this species; we anticipate recovery activities will enhance our knowledge and understanding of Pecos bluntnose shiner ecology and biology. Enhanced understanding should result in a better working relationship with Reclamation, the Service, the State of New Mexico, water users, and private entities and help these groups to cooperatively work toward recovery of the species.

Please direct your response to this memorandum to Doug Young of our Regional Office at (801) 524-4144 and Jim Wilber of our Albuquerque Projects Office at (505) 766-3701.

bc: Projects Manager, Albuquerque NM
ALB-152 (w/enc)

WBR:DYoung:1w/09/03/92:(801)524-4144:PBSPLAN

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and towns that are referred to in the text to Figures 1 and 2.

1 3. Page 6; Should the statement "comprised 3.7% of the total number of all shiners collected (five species) during 1990" actually reference the 1986-1990 time period as mentioned earlier in the paragraph?

1 4. Page 6; Why are habitat conditions marginal downstream of Roswell? Discussion relative to this statement would support the distribution data presented earlier in the paragraph.

12 5. Page 6; Do reservoir releases, e.g., summer irrigation releases, in addition to "summer rainstorm events", displace young Pecos bluntnose shiner downstream into marginal habitats? Is current age-structure of Pecos bluntnose shiner in these areas of intermittent flow/marginal habitats similar to age structure of shiner from historic collections in these same areas or did drift from high flow events naturally result in different age structures?

1 6. Page 8; Red shiner and speckled chub genera names should be updated to current nomenclature.

1 7. Pages 8-9; A statement is made that Bestgen et al. and Brooks et al. collected similar species to Hatch et al. with the addition of the Arkansas River Shiner (*Notropis girardi*), however, it is stated in the same paragraph that Hatch et al. also caught the Arkansas River Shiner. The second reference to the scientific name of this species is unnecessary.

13 8. The discussion of permanent flows on page 9 needs to include historical hydrology data. The text states that the intermittent nature of certain reaches of the river results in the loss or displacement of the Pecos bluntnose shiner. No data is presented to show if this intermittency occurred historically. Section 1.16 on page 20 states that the Pecos River was historically subject to great fluctuations in flow. Does this mean that flow intermittency also occurred historically? If so, are permanent river flows critical throughout the entire Pecos River or only within specific reaches?

14 9. Discussion in the Major Threats Section on page 10 states that "reservoir tailwaters commonly disrupt native fish assemblages". Does this apply also to the Fort Summer Irrigation District diversion dam? The reach below this structure has been mentioned in meetings as a possible reintroduction site for the Pecos bluntnose shiner. Does the diversion dam and the tailwater environment below the facility preclude the expansion of the bluntnose shiner into this area?

29 10. It is mentioned on page 10 that the Pecos bluntnose shiner does not survive long in lentic environments, however, the Conservation Efforts to Date Section states that fish brought to the Dexter National Fish Hatchery were placed into a pond for overwintering. While these adult shiner survived overwinter in a lentic environment, they did not reproduce. Will artificial stream habitat be used year-round in future hatchery activities with the bluntnose shiner?

1 11. Page 10; The text "just below McMillan Reservoir" should be appended with "(now breached)" as in the last sentence of the paragraph.

2 12. The Conservation Efforts to Date Section on page 11 states that both

the biological assessment and the biological opinion "determined that there was sufficient justification to find reservoir operations culpable in the decline of the Pecos bluntnose shiner". This statement does not represent the text in either of the referenced documents. The biological assessment states that reservoir operations mimicking "conditions caused by the 1989 water operations" may affect the Pecos bluntnose shiner. Additionally, properly timed releases may actually benefit the species. The biological opinion determined that "Pecos River operations jeopardize the continued existence of the Pecos bluntnose shiner", but also stated that "a lack of basic life history information precludes making quantitative decisions regarding impacts the operations of Corps of Engineers and Bureau of Reclamation facilities are having upon the Pecos bluntnose shiner and it's critical habitat". Both documents emphasized the need for further research.

13 The final paragraph in the Conservation Efforts to Date Section (page 12) discusses the State's commercial bait harvesting regulations but does not discuss the State's sportfishery management in the Pecos watershed and additional non-native introductions.

3 14. Several research activities/needs that are components of the current 5-year work plan can be added to Part II recovery outline:

a. Determine the effects of habitat intermittency on species distribution, abundance, and interspecific longevity of resident fishes.

b. Quantify stream channel characteristics in the Pecos River at varying flows by use of aerial photography and videography.

c. Develop an operations model to evaluate the effects of various operational schedules on surface flows in aquatic habitat.

d. Establish a long term monitoring program.

e. Determine the effects of interactions with non-native fish species on the Pecos bluntnose shiner and associated native fish communities.

1 15. Part II, Narrative Outline (page 17) states that survival will be secured when "good flows and water quality occur in designated critical habitat". A complete recovery goal should address all impacts as identified in the Reasons for Decline Section, not just flow/water quality.

3 16. The need to study food availability is mentioned in Sections 1.12 and 1.13 of the Narrative Outline (pages 18 and 19). The Ecology Section of the report speculates that the Pecos bluntnose shiner probably feeds on small aquatic macroinvertebrates. No food availability studies, i.e., macroinvertebrate studies, are included in the recovery plan implementation schedule or the current 5-year work plan. How will this research need be satisfied?

1 17. A Section 1.23 should be added. This section would include discussion on the relationship of habitat availability and use to varying flow regimes and the related monitoring requirements.

1 18. The emphasis on negative effects from reservoir operations and lack

of instream flows in the narrative of the Pecos Bluntnose Shiner Recovery Plan is not supported by section 1.31 and its statement, "it is not known if or how regulated flows affect the distribution and abundance of Pecos bluntnose shiner."

- 1 19. Narrative Section 1.32 should be expanded to include the broader range of water quality and contaminants issues in addition to strictly point source pollution.
- 1 20. Section 2.1: Should the entire effort to develop a brood stock of Pecos bluntnose shiner be concentrated at Dexter National Fish Hatchery or should there be an additional facility as backup?
- 1 21. The issue of management of exotic predators at reintroduction sites, mentioned in Section 2.2, should be addressed at a basin-wide level.
- 1 22. The public awareness/education effort discussed in Section 3 should emphasize the Pecos bluntnose shiner, but should also have a community and watershed level focus. In some cases, the bluntnose shiner can be used as a vehicle to address a broader range of issues.
- 15 23. The implementation schedule (pages 35, 36) appears to be limited in scope relative to responsible agencies. The New Mexico Department of Game and Fish, the Bureau of Reclamation, and the Fish and Wildlife Service are involved in nearly all of the tasks. The recovery plan provides an excellent opportunity to initiate and/or increase the involvement of agencies such as the Corps of Engineers and the United States Geological Survey in Pecos River endangered species management and operations. Every effort should be taken to involve all appropriate agencies at this stage of the recovery process.
- 3 24. The costs presented in the implementation schedule appear extremely low relative to the current 5-year work plan budgets for similar tasks. Are the budgets presented in the implementation schedule and the 5-year work plan comparable?



United States Department of the Interior

Fish and Wildlife Service
Dexter Fishery Assistance Office
P.O. Box 370
Dexter, New Mexico 88230

AUG 16 1992

JUL 30 1992

Lewis Demick
1207 Pecan ave
Artesia, NM 88210

To: U.S.F.W.

Concerning the draft to the Pecos bluntnose shiner, I believe the U.S.F.W. should hold public hearings for the recovery plan. The hearings should be held in Chaves and Eddy County, where the people could be affected. County and City government should be notified! Your cooperation would be appreciated.

Thanks
Lewis Demick
State President
People for the West

MEMORANDUM

TO: AREA CONSERVATIONIST, SOIL CONSERVATION SERVICE, ROSWELL
FROM: PROJECT LEADER, DEXTER FISHERY ASSISTANCE OFFICE
SUBJECT: DRAFT PECOS BLUNTNOSE SHINER RECOVERY PLAN REVIEW
DATE: 16 JULY 1992

The draft recovery plan for the Pecos bluntnose shiner is attached for your review. Comments on the draft recovery plan must be received on or before 8 September 1992. Comments should be addressed to the Project Leader at the above address.

If additional information is required you may contact James Brooks at the above address or by telephone at 505/734-5226.

cc: Office of Endangered Species, ALB

Jim Brooks

Jim,
If you are worried about permanent river flow being critical to bluntnose shiner survival, then the work being done by several groups upstream to change vegetation and increase stream flow should be sought.

The acquisition of water rights may not increase stream flow, but if they do the State Agency program may also improve habitat. Existing populations are maintained by groundwater seepage into the sand aquifer on the west side of the arroyos on the Pecos bluntnose shiner soil should enhance their springs or seeps and their important habitat.

Good Luck
David Smith

SEP 12 1992

UNITED STATES DEPARTMENT OF AGRICULTURE
Agriculture Stabilization and Conservation Service
Eddy County ASCS
P.O. Box 278
Carlsbad, NH 08220

Phone: 505-887-3506

TO: Mr. James Brooks,
New Mexico Fishery Resources
United States Fish & Wildlife Service

FROM: Catherine M. Byrd, CED *omb* DATE: September 8, 1992
Eddy County ASCS Office

SUBJECT: Pecos Bluntnose Shiner Draft Recovery Plan

The Eddy County Committee has reviewed the requested critique provided by Woods Houghton, ES on the Pecos Bluntnose Shiner Draft Recovery Plan. We concur with information and concerns illustrated in Mr. Houghton's memo of August 17, 1992 (See Attached) and would like to add our support to addressing the listed issues.

The Eddy County Committee is concerned about the economic impact of the Draft Recovery Plan on the Eddy County Agriculture Industry.

TO: James Brooks
New Mexico Fishery Resources
United States Fish & Wildlife Service
Dexter, NH

FROM: Woods E. Houghton
Eddy County Agriculture Agent

DATE: August 17, 1992

SUBJ: Pecos Bluntnose Shiner Draft Recovery Plan

Due to the short response time since receiving a copy of this plan, we were unable to adequately research the literature citation used in it. We therefore, reserved the right to make additional comments as new findings and research may show.

Comment number:

1. After reviewing the complete plan there is one obvious item left out. The vegetative charge on the Pecos River has been drastic in the past 50 to 100 years. The replacement of native vegetation with Salt Cedar (*tamarix sp.*) is easily documentable. Vegetation may affect water in three principal ways: 1) It may intercept a portion of the rain or snow that falls and either temporarily or permanently keep it from reaching the ground or streams. 2) Vegetation plays a role in the relationship of water and soil effecting run off and erosion. 3) It uses water directly in the growth process. 4) Salt Cedar deposits salt from leafs lowering soil and water quality.

The replacement of native grasses, shrubs, and trees with a monoculture of Salt Cedar effects the total ecosystem. This change may reduce single cell organisms deposited or living in the water thereby effecting the food of the shiner. These changes also may effect shallow water areas where the shiner goes for cover to prevent predation. It is well documented by Bureau of Reclamation survey, USGS maps and Aerial photographs that the study invasion of salt cedar has eliminated may springs, marshes and lakes, on the Pecos system.

It is also well documented that Salt Cedar effect water quality and quantity. The transpiration rate of salt cedar is tremendous up to 16 acre feet per acre water use by vegetation may be sufficient to affect spring and stream flow to a marked degree. Thereby reducing or elimination of river flow. However, this has not been shown scientifically, but is has not been demonstrated that it does not.

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2. Numerous times pollution is mentioned as a factor in the population decline. Yet there are no references to water quality data. It is not proper to allow personal thought in this type of document.
3. On page 6, line 9 & 10, percentages are used 3.7%, 22.4% what were the actual numbers. Percentages can be and often are very misrepresentative.
4. The (PBNS) Shiner currently occupies the low water areas of the river. If the stream flow is increased is there the possibility that predator fish will have access to feed on the PBNS. How will this be monitored and prevented.
5. On page 7, line 12, 13, 14 it is stated that reservoir releases for agriculture use my adversely impact P.B.N.S. percentages while aiding N. girardi. These are of the same genus therefore, it is assumed that habitat requirement are similar how can this statement be defended.
6. On page 3 & 6, data cited for the U.S. 70 high way crossing the population sample more than doubled (52 - 1987), (169 - 1991) has any effort be done to determine why and how that can be enhanced? Conversely a decline has occurred at Lake Arthur falls has an effort to determine has been done so this can be prevented.
7. On page 10 under conservation efforts it is noted that the Dexter National Fish Hatchery all fish died. It is assumed that precautions will be made to determine why and preventative measures to prevent this from occurring again.
8. Personal communication with residence of Ft. Sumner indicate that bait harvesting is still occurring on a regular basis and has not been deterred by NMGSF. That a greater effort is necessary.
9. Under 1.41 while the idea of purchase of water rights is good. The state Engineers office should be consulted. It is our understanding that the State of New Mexico does not recognize in stream flow water rights. What water rights are to be targeted. Because personal property is involved it has a TIA in accordance with Executive order 12630 been completed. If so it should be attached.
10. Page 15 number 2. These reintroductions should be designated as experimental population under the Endangered Species act.
11. Page 16, number 4. Give legal citation.
12. Page 17. The goal is stated to ensure appropriate flows and water quality occur in designated established critical habitat. Yet on page 11, population stabilization is the goal. Recovery criteria: maintain vegetable populations throughout the 100 miles of habitat where the species still occurs. It is my understanding that a research project is currently underway to determine if or what water flows will have on the population numbers. How can it be pre-determined that water flow to be a goal when you have yet to document this in your research. The goal should be population stabilization and in current population ranges.
13. Page 19 1.14, should include predator fish.
14. What ever media, (video, brochures) should be factual and non-bias and reviewed by interested parties such as county commissioners, irrigation districts, soil & water conservation districts before used for general public.
15. Page 26, 4.1. The Fish & Wildlife service must comply with Endangered Species act Section 4. and publish all regulations in local newspapers. The Carlsbad Current Argus, and Artesia Daily Press; Also county Government must be notified and supplied with the proposed regulations.
16. The USFWS need to comply with Executive order 12630. An executive order mandating that all federal agencies assess the economic implications of their actions, rules, or regulations on private property, private property rights, and investment backed expectations. Any actions which effect current operations will have an effect either positive or negative to the water rights, and private lands, and economy of the people in New Mexico.
17. The Arkansas River Shiner *N. girardi* is a category 2 candidate for the Engangered species list. Yet there appears to be a conflict on management for these two species. Also how does management for the Pecos gambusia *Gambusia nobilis* fit in this recovery plan. A full EIS should be completed and attached to the recovery plan.

Bruce King



STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

Village Building
P.O. Box 25112
Santa Fe, N.M. 87504

DIRECTOR AND SECRETARY
TO THE COMMISSION
Bill Montoya

J.W. - H. ...
THOMAS P. ARVAS, O.D. VICE CHAIRMAN
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DAVID M. SALMAN
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NAVAJO DAM

SEP 10 1992

September 4, 1992

Mr. James E. Brooks
Project Leader, Dexter Fishery Assistance Office
U.S. Fish and Wildlife Service
P. O. Box 370
Dexter, New Mexico 88730

Dear Mr. Brooks:

Thank you for the opportunity to review the Pecos Bluntnose Shiner Recovery Plan. The enclosed copy of the plan has several comments/suggestions for your consideration. In addition, we believe some consideration should be given to restoring Pecos bluntnose shiner to the reach of the Pecos River between Santa Rosa and Fort Sumner. The species historically occurred in this reach and, although habitat has been modified by controlled water releases from Santa Rosa Reservoir, there is the possibility the species can be restored to this reach.

In several portions of the Stepdown outline, reference is made to Microhabitat studies. The preferable description for the studies suggested is probably Macrohabitat.

Recent work on the Pecos River indicates that the occurrence and abundance of Pecos bluntnose shiner may be related to seasonal and annual flow regimes. Therefore, we suggest adding a section (in 1.3) that calls for studies identifying the optimal (or a range) of seasonal and annual hydrographs for the species.

On page 20 (Section 1.1.6) under limiting factors only flows are discussed, but later, on page 22 (Section 1.3) other limiting factors are discussed. Such a separation of the discussion on limiting factors may cause some confusion. Therefore, we suggest reorganizing the limiting factors discussion to present all factors in one section.

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Mr. James E. Brooks -2- September 4, 1992

Given the problems that introduction of non-native fishes have caused and the potential for additional introductions, are more stringent regulations of bait fishing or bait minnow collecting needed in those sections of the Pecos River designated as critical habitat?

25

Overall, we believe the Pecos Bluntnose Shiner Recovery Plan provides a workable approach to elucidating the needs of the fish and determining strategies to conserve it.

Again, thank you for the opportunity to review the recovery plan. We look forward to continued cooperative efforts to conserve the Pecos bluntnose shiner.

Sincerely,

Bill Montoya
Director

BM/dlp/ap
Enc.

cc: Daniel H. Sutcliffe
Stephen E. Henry
David L. Propet

SEP 15 1992

CARLSBAD IRRIGATION DISTRICT

CO-OPERATING WITH DEPARTMENT OF THE INTERIOR
25,000 ACRES UNDER CULTIVATION
201 SOUTH CANAL STREET PHONE 955/885-3263
CARLSBAD, NEW MEXICO 88220

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SECRETARY-TREASURER
ASSESSOR-COLLECTOR

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September 8, 1992

James Brooks
Fish & Wildlife Service
P.O. Box 370
Dexter, NM 88230

Re: Pecos Bluntnose Shiner Draft Recovery Plan

Dear Mr. Brooks:

Due to the short response time since receiving a copy of this plan, we were unable to adequately research the literature citation used in it. We therefore, reserved the right to make additional comments as new findings and research may show.

General Comments:

The District feels that it is too early in the process to develop a recovery plan. The plan should be written near the end of the 5-year study. There should be more data available at that time, which would preclude having to make many of the assumptions that are currently in the draft plan. If for some reason the draft plan must be developed at this time it should remain in draft form and subject to amendments until the completion of the 5-year study. The final plan should be developed after the study is completed.

It also appears that the plan is written towards a predetermined solution (a permanent minimum flow). We feel the plan should remain more objective throughout the draft stages.

It appears that much of the effort towards the 5-year study and the recovery plan was initiated by the 1989 reservoir operations. All parties involved need to clearly understand that the 1989 operations were an aberration, required by the BOR to fill and test Brantley Dam and will never occur again.

Specific Comments:

1. In the plan there are a couple of influencing factors that have been left out.
 - (1) The vegetative change on the Pecos River has been drastic in the past 50 to 100 years. The replacement of native vegetation with Salt Cedar (tamarix sp.) is easily documentable. Vegetation may affect water in three principal ways: 1) it may intercept a portion of the rain or snow that falls and either temporarily or permanently keep it from reaching the

ground or streams. 2) Vegetation plays a role in the relationship of water and soil effecting run off and erosion. 3) It uses water directly in the growth process. 4) Salt Cedar deposits salt from leafs lowering soil and water quality.

(2) Neither the effects of underground pumping nor river pumping, were not addressed in the draft. 2. There appears to be considerable personal opinion or philosophy throughout the draft. These should be supported by data.

Please find enclosed comments from our legal counsel.

Sincerely,

CARLSBAD IRRIGATION DISTRICT

Tom W. Davis
Tom W. Davis, Manager

TWD/cj

Encl.

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RECEIVED SEP 11 1992

LAW OFFICES

HUBERT & HERNANDEZ, P.A.

STEPHEN A. HUBERT
STEVEN L. HERNANDEZ
NEVILLY J. BINGLEMAN
LEE E. PETERS
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P.O. BOX 100001 DALLAS TEXAS 75210
SUITE 9
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LOS ANGELES, NEW MEXICO 88004 2857
TELEPHONE (505) 582-5000

September 8, 1992

Tom Davis, Manager
CARLSBAD IRRIGATION DISTRICT
201 S. Canal
Carlsbad, NM 88220

RE: Comments on Draft Pecos Blunt Nose Shiner Recovery Plan

Dear Tom:

You have requested that I provide my comments on the proposed plan so that they can either be incorporated into other district comments or be sent up separately. The general tone of the recovery plan indicates that the study team has already arrived at a pre-determined end without the benefit of sufficient study. The fact that we are in a first year of a five year study period should dictate that the recovery plan be careful in the assumptions that it initially undertakes. It is clear from the draft that this is not the case. It was hard to understand how assumptions from two reports in the bibliography seemed to constitute the basis of the recovery plan. It then became quite evident to me that what had happened in this situation. The drafters of the recovery plan were relying upon their own 1991 study to substantiate their position. I have serious questions that two of the authors of the recovery plan rely upon their own literature can be considered objective.

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It has also come to my attention that in addition to this problem, the N.M. Game & Fish liaison on the project is married to one of the people on the Fish & Wildlife recover team. This is highly irregular and further complicates the problem of objectivity in so important a study. It is clear that the draft should be withdrawn and that the recovery team should be reformulated avoiding the obvious conflicts of interest that currently appear. Since the recovery plan is only in its first year of study, it would not be detrimental to the project to make these changes now instead of allowing these serious questions to hang throughout the study period as well as when the plan approaches it final stages.

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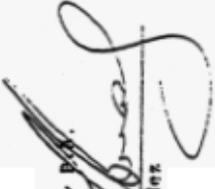
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During the board meeting of the Carlsbad Irrigation District held on August 11, 1992, the Bureau of Reclamation was making a presentation to the Board regarding the requested flows for the study period. When that presentation was opened up to questions for the audience, Woods Houghton, there on behalf of Jay Mobley, Commissioner for Eddy County, informed the Bureau of Reclamation representatives that they believed the Fish & Wildlife Service had failed to comply with Presidential Executive Order No. 12630. If indeed the Fish & Wildlife Service has failed to comply with the Presidential Order, then we would request that the entire draft be withdrawn until the appropriate procedures are correctly followed.

It is my opinion that until the conflict problems can be resolved any questioning of the underlying assumptions made in the draft report will merely be dispensed with without objective responses.

Sincerely,

HUBERT & HERNANDEZ, P.A.

Steven L. Hernandez

SLH/smt

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September 10, 1992

BATAAN MEMORIAL IIIHIDNKG, KKKMM 101
 STATE CAPITOL
 POST OFFICE BOX 15102
 SANTA FE, NEW MEXICO 87504-5102
 (505) 827-4100

Mr. James E. Brooks
 September 10, 1992
 Page 2

application before the State Engineer to change the place and purpose of use of the water right to offset any increased streamflow losses that may result from the modification of existing reservoir and river operations to protect the bluntnose shiner population and habitat. The Interstate Stream Commission has undertaken a program of acquiring water rights as part of an effort to reduce consumptive uses in the basin to assist the state in complying with the 1988 U.S. Supreme Court Decree. Any activity that would result in an increase in the depletion of stateline flows could impair the State's efforts to comply with the decree.

It is requested that the U.S. Fish and Wildlife Service sponsor a meeting in Roswell to discuss and receive additional comment on the Pecos Bluntnose Shiner Recovery Plan. This request is consistent with the public awareness goal described on page 24.

Please let me know if additional information would be helpful. Thank you for the opportunity to comment on this draft recovery plan.

Sincerely,

William J. Miller
 William J. Miller
 Interstate Stream Engineer

WJM:rav

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By letter dated July 21, 1992, you transmitted a copy of the draft Pecos Bluntnose Shiner Recovery Plan (Plan) for our review. The following comments are offered:

3 It is suggested that the Plan provide a more detailed description of the relationship between the Plan objective, the implementation schedule and annual work plans. The goal of the plan is to outline measures that must be taken to secure survival of the shiner. The plan should provide more information on how those measures, such as the management strategy in Section 1.4 (p.14) will be implemented.

1 Page 3, last complete sentence. The meaning of the word "consistently" as used in this sentence, is not clear. The number of fish collected range from 110 in 1987 to 288 in 1986. It is suggested that this sentence be rewritten to clarify the intent of the authors.

1 Page 10, second complete sentence. It is not clear how a lack of records of bluntnose shiner occurrences in reservoirs would lead to the conclusion that the fish do not survive long in lentic environments. The sentence should be rewritten to state that the bluntnose shiner occurrences, not records, are limited, if that is what is intended.

11 Page 15, Section 1.41 states that the acquisition of water rights could be required to protect the shiner populations and habitat. In a fully appropriated stream system such as the Pecos River, it would be appropriate for the U.S. Fish and Wildlife Service to consider acquiring water rights and making an

September 21, 1992

United States Department of the Interior
Fish and Wildlife Service
Dexter Fishery Assistance Office
P.O. Box 370
Dexter, New Mexico 88230

RE: Draft Recovery Plan
Pecos Bluntnose Shiner

ARCO Oil and Gas Company appreciates the opportunity to review and comment on the Draft Recovery Plan for the Pecos Bluntnose Shiner.

We have some questions regarding the draft that we feel need to be further explained.

22 Since it is believed that the Pecos Bluntnose Shiner's historic range and habitat was the entire New Mexico portion of the Pecos River, is the ultimate intent of the plan to reintroduce the shiner back into the entire river, the historic collection sites or any and all areas found to be suitable for reintroduction?

20 In the draft, the term petrochemical wastes was used when referring to possible pollution sources as a cause for the decline in the bluntnose shiner population. Is this term meant to include fluids and chemicals from oil and gas exploration and production operations?

18 We feel a generalized action plan or statement should be made in the draft recovery plan regarding what will be done if a non-native species is determined to be a major reason for the demise of this fish.

6 In Parts II and III, Item 1.41 plans to acquire water rights and/or conservation easements to protect populations and habitat? We suggest that language be added to this item on what methods of acquisition will be used?

September 21, 1992
Page 2

Thank you for providing ARCO the opportunity to comment. We commend the Fish and Wildlife Department for your efforts in saving this threatened species. We look forward to reviewing the final recovery plan.

Sincerely,



Elizabeth S. Bush.
Regulatory and Compliance Coordinator

EB/AL/yt

cc: R&C Files
Central Files

RESPONSES TO COMMENTS

1. Comments incorporated in the plan.
2. The Notice of Opportunity for Public Review and Comment was published in the Federal Register and in local newspapers. The formal comment period extended from July 9 to September 8, 1992. Copies of the plan were provided expeditiously once requests for the draft recovery plan were received. A recovery plan is similar to a road map in that it delineates those actions the U.S. Fish and Wildlife Service (Service) believes necessary to recover the species. It does not obligate funds or personnel and is meant to be revised as new information becomes available. Revisions to the plan are appropriate at any time information becomes available that gives added insight and direction to the recovery of the species.
3. Section 4(f)(1) of the Endangered Species Act (Act) requires that a recovery plan be prepared for all federally-listed species unless such a plan would not promote conservation of the species. Currently, Service policy requires that a draft recovery plan be prepared within 1 year, and a final plan be completed within 2 1/2 years after the species is listed. The recovery plan is the umbrella under which more detailed implementation plans fall. It should not be confused with more detailed plans such as the 5-year study plan that pertains to a specific study of the hydrology and biological effects of reservoir operations on the Pecos River. Implementation plans are building blocks that support recovery, and thus, the recovery plan.
4. Extensive efforts were made to provide the public and all other interested parties an opportunity to comment on the draft recovery plan. Preparation of a recovery plan does not require preparation of a rule, nor that a public meeting be held. However, the Service desires all information that will enhance recovery of the Pecos bluntnose shiner. Comments, verbal or written, are always welcome and may be communicated to the Dexter Fisheries Resources Office, or U.S. Fish and Wildlife Service Regional Office, Division of Endangered Species Office, in Albuquerque, New Mexico.
5. Recovery of the Pecos bluntnose shiner is based on all information available that affects the well being of the species. It is not limited to any one set of factors that may have occurred in a given year.
6. A recovery plan is a document developed by, or for, the Service that sets forth goals, objectives, and tasks believed necessary to recover a federally-listed species or group of specie that occupy a given area. Recovery team members are appointed by the Service. The Service is solely responsible for the recovery plan once it is approved by the Director or Regional Director.

The Pecos bluntnose shiner recovery plan was prepared by the Rio Grande Fishes Recovery Team. Members of the recovery team appear on the signature page of the recovery plan. A recovery team is composed of a group of professionals who are recognized by their peers to be experts on the group of specie for which the recovery actions are planned. Because recovery team members are experts on the Pecos bluntnose shiner, much of the information available was prepared by team members. Therefore, it is essential that their published work be referenced. Non-Federal employees receive per diem and travel expenses from the Service. All salary expenses are borne by the team member's employer.

Recovery plans do not obligate, or otherwise commit funds or personnel; nor contain authority to acquire private property. Actions taken by the Service in preparing recovery plans must comply with guidelines provided by the Attorney General and Secretary of the Interior that implement Executive Order 12630. These guidelines do not require preparation of a Takings Implication Assessment when a recovery plan is prepared.

7. Section 4(f) of the Act requires that "The Secretary...provide public notice and opportunity for public review and comment" on each new or revised recovery plan. A Notice of Opportunity for Public Review and Comment was published in the Federal Register on July 9, 1992. Additionally, a news release was issued on July 29, and Public Notices were carried in three newspapers: Roswell Daily Record, Carlsbad Current-Argus, and DeBaca County News.

8. The New Mexico Department of Game and Fish actively enforces all laws that pertain to the harvest of bait fish in the Pecos River. Task 4.2 of the recovery plan addresses the continued prohibition of baitfish harvest. As with many laws, constant monitoring is not possible. Therefore, some illegal activity may go undetected.

9. The riparian plant fauna throughout much of the Pecos River basin has changed. It is recognized that these changes may have influenced the quality and quantity of stream flows within the Pecos River. A brief discussion has been added to the recovery plan (task 1.34) to address this concern. It should be noted that a U.S. Geological Survey report by Welder (1988) found no significant changes in the base flows of the Pecos River that could be attributed to vegetation removal.

10. The Arkansas River shiner is a category 1 species and a candidate for listing as threatened or endangered by the Federal Government. This fish is endemic to the Arkansas River drainage and, if listed, will be protected in those streams where it historically occurred; it will not be protected in the Pecos River system.

There is a recovery plan for the Pecos gambusia that sets forth actions required to recover this fish. Recovery objectives for the Pecos bluntnose shiner and Pecos gambusia are completely compatible. The development of a recovery plan is categorically excluded from National Environmental Policy Act requirements.

11. Designation of instream flows for fish would result in a non-consumptive water use. Thus, flows would continue downstream, unimpaired by fish occupancy. Instream water use by definition does not require the diversion of water from the stream and is not covered by existing legislation that governs water withdrawals from streams in the State of New Mexico.

Modification of reservoir releases should neither increase nor decrease the total amount of water that flows down the Pecos River. The Service believes there is sufficient flexibility in the water delivery system to provide stream flows necessary for the continued survival of the native fish fauna in the Pecos River system.

12. The term "reservoir release" has been added to the plan to clarify statements made concerning displacement of fish to downstream reaches. Large

(adult) Pecos bluntnose shiners have been either rare or nonexistent in fish collections taken from the Pecos River downstream from Roswell, New Mexico, since 1980.

13. A discussion has been added to the recovery plan supporting the theory that "post-Summer Dam" stream flows, downriver from Summer Reservoir, of 1 cubic foot per second or less, occur more frequently and are of longer duration than before Summer Dam was constructed. The impact of ground-water pumping, river pumping, salt cedar encroachment, etc., from the upper Pecos River remains relatively minor when compared to downstream reaches of the river below Roswell, New Mexico. Dams and impoundments have increased man's ability to manipulate the normal flows of the Pecos River. By so doing, maintenance of flows in specific river reaches is not possible without affecting upstream and downstream reaches. Thus, the issue of permanent flow must include the entire river channel between Summer Dam and Brantley Reservoir.

14. The tailwater area associated with the Fort Summer Irrigation Diversion Dam covers the entire channel and, depending upon flow, extends approximately 10 meters away from the dam. Because of size differences, it is not realistic to compare the diversion dam with that of Fort Summer Dam. Due to the relatively small size of the diversion dam, it is likely that tailwater impacts to downstream habitats are limited longitudinally. Pecos bluntnose shiner occur sporadically in the Fort Summer area of the Pecos River below the U.S. 60 bridge crossing and provision of dependable water flows below the diversion dam could enable the Pecos bluntnose shiner to expand upstream.

15. All Federal agencies and all actions involving the use of Federal funds must comply with section 7 of the Act. The Army Corps of Engineers (COE) project at Santa Rosa Dam pertains to the delivery of water to Summer Dam. Actions by the COE could affect the reintroduction of Pecos bluntnose shiner to historic habitat. Where appropriate, the COE has been added to the implementation schedule. Future revisions will be made to the plan as needed to incorporate other actions that impact the recovery of the Pecos bluntnose shiner.

16. Bestgen, K.R., S.P. Platania, J.E. Brooks, and D.L. Propst (1989) discuss the dispersal and life history of the Arkansas River shiner after its introduction into the Pecos River (see Literature Cited section). A treatise regarding the ecological requirements between the Pecos bluntnose shiner and Arkansas River shiner is covered in depth by these authors and noted in the recovery plan. For additional insight into the conflict between these two species of fish, the reader is directed to the referenced publication.

17. The Endangered Species Act of 1973 as amended (Act) specifies that an "experimental population" must be "...wholly separate geographically from non-experimental populations of the same species." [10(j)(2)]. Designation of experimental populations of Pecos bluntnose shiners in the Pecos River system is not permissible under the Act.

18. All fish species in the Pecos River that interact with the Pecos bluntnose shiner will be studied. The impact of competition and predation is discussed throughout the recovery plan and is an integral part of the recovery effort.

19. The Service recognizes that changes in riparian vegetation may have influenced the quality and quantity of surface water flows in the Pecos River. Task 1.34 has been added to the plan to further address this subject.

20. Two citations have been added to the Literature Cited section that support statements made in the recovery plan regarding water quality.

21. Habitats sampled at the U.S. 70 bridge crossing are primarily pools associated with bridge abutments. These collections were made following extended periods of zero water releases from Sumner Dam other than that water diverted by the Fort Sumner Irrigation District. The reach of the Pecos River upstream of the bridge crossing often dries or becomes intermittent during these periods. The 1991 fish collections followed such a period when surviving fish were concentrated in the few pools that remained.

22. One of the first steps to recovering a species is to stop the decline of the population(s). Once stabilized, the next step is to increase the species' abundance within its historic range. Stabilization of existing populations within a reduced range is rarely sufficient to recover the species.

23. Objective 3 is devoted to public participation. The Service welcomes input from all segments of the public in recovering the Pecos bluntnose shiner.

24. Task 2.2 calls for the identification and evaluation of areas for potential reintroduction. Reaches of the Pecos River between Santa Rosa and Fort Sumner is identified in the final plan as potential habitat for reintroduction of the Pecos bluntnose shiner.

25. Task 4.21 pertains to the evaluation of the efficacy of baitfish harvest prohibition to protect the Pecos bluntnose shiner. Completion of this task would support any proposed change in baitfish regulations that would enhance recovery of the Pecos bluntnose shiner.

26. Perhaps the only man-caused and federally authorized major water-use action on the Pecos River still to be reviewed for efficiency of purpose and environmental integrity is the operation of reservoirs for consumptive uses. Data used to correlate reservoir controlled releases with distribution and status of Pecos bluntnose shiner were taken from publications referenced in the Literature Cited section. A more extensive review of those publications suggests that flow is the single most important factor in maintaining preferred habitat, fish community structure, and reproductive success. The discussion of non-flow related impacts was expanded to more accurately reflect the suite of impacts that occur on the Pecos River downstream of Roswell, New Mexico.

27. The purpose of the executive summary is to provide a brief (1 page) overview of actions needed to recover the species. Detail desired from a review of the executive summary can be obtained from the body of the recovery plan.

28. Figure 1, page 4, refers to the historic distribution of the Pecos bluntnose shiner since its discovery. Thus, the name McMillan Reservoir is correct. Locations referred to in the text are detailed in Brooks et al. 1991 (see Literature Cited). To include all locations on the maps would not clarify the purpose for which the maps was intended.

29. Comparing survival of Pecos bluntnose shiner as a lone species in an earthen hatchery pond to its survival in an assumed reservoir environment containing several species is extremely problematic and of questionable value in any recovery activity. Task 2.11 has been added to clarify the role of captive holding and rearing actions to be pursued.