Scientific Name: *Notropis stramineus*
Common Name: Sand shiner
BISON No.: 010440

Legal Status:

- Arizona, Species of Special Concern
- ESA, Endangered
- ESA, Proposed Endangered
- ESA, Proposed Threatened
- ESA, Threatened
- New Mexico-WCA, Endangered
- New Mexico-WCA, Threatened
- USFS-Region 3, Sensitive
- None

Distribution:

- Endemic to Arizona
- Endemic to Arizona and New Mexico
- Endemic to New Mexico
- Not Restricted to Arizona or New Mexico
- Northern Limit of Range
- Southern Limit of Range
- Western Limit of Range
- Eastern Limit of Range
- Very Local

Major River Drainages:

- Dry Cimmaron River
- Canadian River
- Southern High Plains
- Pecos River
- Estancia Basin
- Tularosa Basin
- Salt Basin
- Rio Grande
- Rio Mimbres
- Zuni River
- Gila River
- Rio Yaqui Basin
- Wilcox Playa
- Rio Magdalena Basin
- Rio Sonoita Basin
- Little Colorado River
- Mainstream Colorado River
- Virgin River Basin
- Hualapai Lake
- Bill Williams Basin

Status/Trends/Threats (narrative):

No federal or state listings. State NM: Provides limited protection.
The Pecos River in New Mexico continues to support sand shiner (Platania and Altenbach 1998).
The sand shiner is native to the Pecos, Canadian, and Dry Cimmaron drainages where the status of populations is stable (Sublette et al 1990).
Threatened fishes in these river systems are subjected to water temperatures, flow regimes, and general physiochemical conditions characterized as harsh and fluctuating (Matthews 1987). The precipitous decline in Pecos River is partially as a consequence of water management practices (Platania and Altenbach 1998).

Distribution (narrative)**:**

The sand shiner is found in north central North America, east from the Rocky Mountains to the Appalachians, south from Saskatchewan and Manitoba to approximately the 35th parallel, and it is also known from drainages south from Edwards Plateau in Texas, along with the Rio Grande in the Big Bend Region (Sublette et al 1990). The sand shiner is found in Gulf slope drainages in Texas (Trinity River to Rio Grande drainages) northwest of Mississippi River (excluding Louisiana and Arkansas) into the upper Mississippi Valley (including Missouri River basin), and lower Great Lakes east into upper Ohio River basin (Lee et al 1981). The sand shiner has only been collected once in Arizona, in 1955 in Navajo County (Minckley 1973).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative)**:**

Total reproductive period extends from May or June through August with variation in time of spawning depending upon latitude with the peak time of activity in July and August (Lee et al 1981, Sublette et al 1990). Peak spawning occurred in August when waters levels were low and water temperatures were high 27- 37^{o} C (Summerfelt and Minckley 1969, Platania and Altenbach 1998). Spawning in the hot-dry portion of the summer, water temperature, 21-37 C, apparently enhances the survival of the young (Summerfelt and Minckley 1969). Summerfelt and Minckley (1969) suggested that summer spawning at high temperatures might be an adaptation to enhance survival of sand shiner fry in Great Plains rivers because spring is characterized by drastic water level fluctuation and flood-type conditions.

The spawning behavior and demersal, adhesive eggs of the sand shiner suggest that spawning by this species is probably not correlated with flow spikes (Platania and Altenbach 1998). The sand shiner is a broadcast spawner that lays demersal adhesive eggs (Platania and Altenbach (1998). Spawned eggs rapidly settled in the interstices of the gravel substratum of the aquarium and failed to become buoyant (Platania and Altenbach 1998). In the wild eggs are laid in shallow water over a sandy substrate (Sublette et al 1990).

Platania and Altenbach (1998) in their laboratory studies observed a female sand shiner being chased by a male and witnessed the broadcast of eggs but did not see the actual spawning event or note any post-spawning male-female interactions.

Habitat (narrative)**:**

The sand shiner is irregularly distributed, and occupies streams of diverse sizes, from small spring discharges to largest rivers, but found only rarely in upland areas (Lee et al 1981). The sand shiner inhabits a wide variety of habitats in medium to large streams and rivers, seeking areas deeper than 20 cm, with little or no aquatic vegetation, and moderate to slow current (Sublette et al 1990). The sand shiner avoids habitats with acid or highly alkaline conditions

(Sublette et al 1990). The sand shiner is characterized by clear water flowing over gravel-rubble substrate (Platania and Altenbach 1998).
Key Habitat Components: shallow waters over sand substrates.

Breeding Season:

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

Panel breeding season comments:

Aquatic Habitats:

Large Scale:

- Rivers
- Streams
- Springs
- Spring runs
- Lakes
- Ponds
- Sinkholes
- Cienegas
- Unknown
- Variable

Small Scale:

- Runs
- Riffles
- Pools
- Open Water
- Shorelines

Panel comments on aquatic habitats:

Important Habitat Features (Water characteristics):

Current

- Fast (> 75 cm/sec)
- Intermediate (10-75 cm/sec)
- Slow (< 10 cm/sec)
- None
- Unknown
- Variable

Gradient

- High gradient (>1%)
- Intermediate Gradient (0.25-1%)
- Low Gradient (<0.25%)
- None
- Unknown
- Variable

Water Depth

- Very Deep (> 1 m)
- Deep (0.25-1 m)
- Intermediate (0.1-0.25 m)
- Shallow (< 0.1 m)
- Unknown
- Variable

Panel comments on water characteristics:

Important Habitat Features (Water Chemistry)

Temperature (general)
- Cold Water (4-15°C)
- Cool Water (10-21°C)
- Warm Water (15-27°C)
- Unknown
- Variable

Turbidity
- High
- Intermediate
- Low
- Unknown
- Variable

Conductivity
- Very High (> 2000 µS/cm)
- High (750-2000 µS/cm)
- Intermediate (250-750 µS/cm)
- Low (< 250 µS/cm)
- Unknown
- Variable

Panel comments on water chemistry:

Important Habitat Features (Structural elements):

Substrate
- Bedrock
- Silt/Clay
- Detritus
- Sand
- Gravel
- Cobble
- Boulders
- Unknown
- Variable

Cover
- Rocks, boulders
- Undercut banks
- Woody debris
- Aquatic vegetation
- Rootwads
- Not important
- Overhanging vegetation
- Unknown
- Variable

Panel comments on structural elements:

Diet (narrative)**:**

Sand shiners are omnivorous fish, and large schools are frequently found feeding in shallow water (Koster 1957). This species is an opportunistic feeder primarily taking bottom particulate matter, as well as plant material and terrestrial and aquatic insects. (Sublette et al 1990)

Diet category (list):

- Planktivore
- Herbivore
- Insectivore
- Piscivore (Fish)
- Omnivore
- Detritivore

Grazing Effects (narrative):

The sand shiner will avoid unsheltered locations and clean, unstable sand substrate (Sublette et al 1990). Grazing will most likely have little impact on this species that occupies sand substrates in absences of vegetation.

Panel limiting habitat component relative to grazing and comments:
Panel assessment: Is this species a priority for selecting a grazing strategy? Throughout the species' distribution in New Mexico and Arizona YES NO UNKNOWN In key management area(s) YES NO UNKNOWN

Principle Mechanisms Through Which Grazing Impacts This Species (list):

May be Revised

- Alteration of bank structures
- Alteration of substrate
- Alteration of water regimes
- Altered stream channel characteristics
- Altered aquatic vegetation composition
- Altered bank vegetation structure
- Change in food availability
- Change in water temperature
- Change in water quality
- Habitat fragmentation
- Increased turbidity
- Other biotic factors
- Parasites or pathogens
- Population genetic structure loss
- Range improvements
- Trampling, scratching
- Unknown

Panel causal mechanisms comments:

Authors

- **Draft:** Magaña, H.A. and Rinne, J.N.
- **GP 2001:**
- **GP 2002:**
- **Revision:**

Bibliography:

Koster, W. J. 1957. Guide to the fishes of New Mexico. University of New Mexico Press, Albuquerque, New Mexico.

Lee, D. S., Gilbert C. R., Hocutt C. H., Jenkins R. E., Callister D. E., and Stauffer J. R. 1981. Atlas of North American Freshwater Fishes: North Carolina, North Carolina State Museum of Natural History, 1981, c1980.

Matthews, W.J. 1987. Geographic variation *Cyprinella lutrensis* (Pices: Cyprinidae) in the United States, with notes on *Cyprinella lepida*. Copeia 1979: 70-81.

Minckley, W. L. 1973. Fishes of Arizona. Arizona Game and Fish Department. Phoenix, Arizona. 293 pp.

Platania, S.P. and Altenbach, C.S. 1998. Reproductive strategies and egg types of seven Rio Grande Basin cyprinids. Copeia 3: 559-569.

Sublette, J. E., M. D. Hatch, and M. Sublette. 1990. The Fishes of New Mexico. University of New Mexico Press. Albuquerque. 393 pp.

Summerfelt R.C & Minckley C.O. 1969. Aspects of the Life History of the Sand Shiner, *Notropis stramineus* (Cope), in the Smokey Hill River, Kansas. Trans. Amer. Fish. Soc. 3: 444-453.