

Scientific Name: *Gila ditaenia*

Common Name: Sonora chub

BISON No.: 010616

Legal Status:

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

Distribution:

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

Major River Drainages:

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

Status/Trends/Threats (narrative):

Federal: Threatened, USFS: Sensitive, State AZ: Wildlife of concern (Threatened).

The Sonora chub was not known to science until 1945 (Rinne and Minckley 1970).

In periods of drought the Sonora chub is restricted to pools that are maintained by underflow in shaded areas against cut banks or canyon walls (Minckley 1973).

Distribution (narrative):

The *Gila* chubs, as a genus, are distributed throughout much of western North America and northern Mexico (Rinne and Minckley 1970). The Sonora chub scarcely enters the United States in a single stream that drains southward across the international boundary, but it is widespread in the small Rio Concepcion basin in Mexico (Minckley 1991). The Sonora chub is restricted in United States to Sycamore Canyon west of Nogales, Santa Cruz Co., AZ (Rinne and Minckley

1970, Minckley 1973, Lee et al 1981). Sonora chubs are found in the Rios Altar and Magdalena co-tributaries forming Rio de la Concepcion (= Rio Asuncion), which typically sinks into its sandy channel before reaching Gulf of California (Lee et al 1981). Sonora chubs are found in strikingly clear water of the Rio Magdalena (Branson et al 1960). In 1964 a tiny population of dwarfed individuals was discovered about 2 km north, in a seep that contained only a few liters of water (Minckley 1973). This serves to illustrate the tenacity of the Sonora chub, and its remarkable capability for maintaining populations in small habitats under severe environmental conditions (Minckley 1973).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative):

The Sonora chub spawns in early spring (February-April) on basis of young in collections and adults in reddened breeding coloration (Minckley 1973, Lee et al 1981).

Habitat (narrative):

The Sonora chub inhabits pools near cliffs, boulders, or other cover in the channel, and also headsprings and seeps (Lee et al 1981). It occupies erosive creeks, sometimes living under severe intermittent conditions in remnant pools under cliffs (Minckley 1991).

Key Habitat Components: pool and spring habitat

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 $\mu\text{S}/\text{cm}$)
- High (750-2000 $\mu\text{S}/\text{cm}$)
- Intermediate (250-750 $\mu\text{S}/\text{cm}$)
- Low (< 250 $\mu\text{S}/\text{cm}$)
- 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):

Foods of the Sonora chub in early summer are aquatic and terrestrial insects, and algae (Lee et al 1981). Foods of a few individuals of Sonora chubs from Arizona, taken in early summer, consisted of aquatic and terrestrial insects, and algae, in decreasing order of volume (Minckley 1973).

The Sonora chub seems more omnivorous than other chubs, feeding extensively on algae as well as invertebrates, and anything tends to be eaten when provisions are scarce (Rinne and Minckley 1970, Minckley 1991). All the chubs are principally carnivorous as adults, feeding upon aquatic invertebrates and sometimes other fishes, and smaller individuals often feed on aquatic plants, usually algae (Rinne and Minckley 1970).

Diet category (list):

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

Grazing Effects (narrative):

No specific information regarding Sonora chub and cattle grazing, however, occupation of pools during drought periods could be detrimental by stirring bottom substrate and causing high biological oxygen demands. Removal of streamside vegetation by livestock could accentuate stream water temperatures.

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

Panel causal mechanisms comments:

Authors

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

Bibliography:

- Branson, B.A., McCoy, C.J., and Sisk, M.E. 1960. Notes on the freshwater fishes of Sonora with an addition to the known fauna. Copeia 3:217-220.
- 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.
- Minckley, W. L. 1973. Fishes of Arizona. Arizona Game and Fish Department. Phoenix, Arizona. 293 pp.
- Minckley, W.L. 1991. Native fishes of arid lands: A dwindling resource of the desert southwest. USDA Forest Service. General Technical Report RM-GTR-206. pp 18.

Rinne, J.N. and Minckley, W.L. 1970. Native Arizona Fishes Part III "Chubs". Arizona Game and Fish Publication 17: 12-19.