

Scientific Name: *Gila purpurea*

Common Name: Yaqui chub

BISON No.: 010142

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, State AZ: Threatened.

The last known population of this species in the United States persisted in about 100 meters of Astin Wash (Black Wash), fed by seeping springs (Minckley 1973). In 1969, the spring failed and the fishes were destroyed. In 1969, just before the population of Astin Spring disappeared, about 200 Yaqui chubs were seined and then introduced into Leslie Creek (Minckley 1973). The seepage springs feeding Astin Draw failed in 1969, in large part, and cattle decimated the population by trampling the remaining waters to a quagmire (**Schoenherr 1973**). The Yaqui chub is nearly extirpated in the United States, persisting in only one artesian well in San Bernadino Creek drainage (McNatt 1974). Extensive pumpage of the San Bernadino Creek valley, both in the United States and Mexico, in addition capping of some artesian wells which formerly flowed into ponds of natural cienegas destroyed considerable surface water and hence

indigenous fish fauna (McNatt 1974). Major impacts on the Yaqui chub in the Rio Yaqui basin will likely come from expansion of introduced fish populations as more lentic habitat becomes available with increasing numbers of reservoirs (Hendrickson et. al. 1980).

Distribution (narrative):

The Yaqui chub is found in smaller streams of Rio Matape, Sonora, and Yaqui systems, Sonora, Mexico (Lee et. al. 1981). Branson et. al. (1960) found the Yaqui chub in a small tributary of the Rio Yaqui 21 miles south of Agua Prieta, near the village of Cabullonas. The Yaqui chub which enters the United States only in the extreme southeastern Arizona in the headwaters of the Rio Yaqui on the San Bernadino Ranch, east of Douglas in Cochise county, AZ (Minckley 1973). Prior to 1900 the Yaqui chub was recorded from Morse Canyon, in the drainage of the Wilcox Playa (Rinne and Minckley 1970). About 200 specimens were moved to Leslie Creek prior to the failure of Astin Draw, and this population continues to thrive and reproduce (Minckley 1973). The Yaqui chub was also found and in an artesian bore and associated pool on the San Bernadino Ranch near Douglas, AZ (McNatt 1974).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative):

Little is known of the reproductive biology of the Yaqui chub, however, Minckley (1973) reported that the Yaqui chub reproduction occurs in spring and early summer, on the basis of the dates of occurrence of young. Lee et. al. (1981) reported that the Yaqui chub spawns in March. Minckley (1991) reported that Yaqui chubs breed sporadically throughout the summer (Minckley 1991).

Habitat (narrative):

Places of occupation are typically the most permanent habitat, usually deep, undercut zone adjacent to a fixed object such as a cliff face, large boulder, or roots of a mature riparian tree (Hendrickson et. al. 1980). Yaqui chubs also occupy pools of creeks, marshes, and other quiet water habitats, often in association with dense aquatic vegetation (Minckley 1991). The Yaqui chub lives in deeper pools of small streams near undercut banks or debris, and often in association with higher aquatic plants (Lee et. al. 1981). In Leslie Creek the Yaqui chub was most abundant in the deepest pools and in areas of detritus or heavily overgrown cut banks (McNatt 1974).

Key Habitat Components: deep pools, springs, woody debris

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):

Yaqui chubs are carnivorous as adults, feeding upon aquatic invertebrates and sometimes other smaller fishes. Smaller individuals often feed on aquatic plants, usually algae (Rinne and Minckley 1970). Foods of 20 small adults examined were entirely algae and a few terrestrial insects and arachnids in springhead habitats (Minckley 1973, Minckley 1991).

Diet category (list):

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

Grazing Effects (narrative):

No specific literature related to grazing and Yaqui chub, however, inferences can be made from existing literature. The trampling of pool habitats by grazing livestock and removal of streamside vegetation facilitating elevation of stream water temperatures can have a negative impact on Yaqui chub survival.

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:** Rinne, J.N. and Magaña, H.A.
- **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.
- Hendrickson, D.A., W. L. Minckley, R. R. Miller, D. J. Siebert, and P. H. Minckley. 1981. Fishes of the Rio Yaqui basin, Mexico and the United States. *J. Arizona-Nevada Academy of Sciences* 15(3): 65-106.
- 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.
- McNatt, R.M. 1974. Re-evaluation of the native fishes of the Rio Yaqui in the United States. Pages 273-279 In: Proc. 54th Annual Conference of Western Assn. State Game and Fish Co. 16-19 July 1974, Albuquerque, New Mexico.
- 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.