

**Scientific Name:** *Gila nigrescens*

**Common Name:** Chihuahua chub

**BISON No.:** 010120

**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 (USDI): Threatened, State NM: Endangered.

The decline of the Chihuahua chub in the Mimbres River appears to be primarily related to loss of habitat, recently accelerated by actions of landowners and governmental agencies to prevent flooding, including channelization of the river and construction of levees to contain flood waters (Sublette et. al. 1990, Propst 1999). Reasons for reduced range and abundance of Chihuahua chub in New Mexico include modifications of habitat by agriculture and flood control practices, and establishment of nonnative fish species (**USFWS 1983**). Both range and abundance of the Chihuahua chub have declined dramatically in the past century, and the loss of native aquatic biodiversity in this region seems likely to continue (Propst and Stefferud 1994). Until 1975, the Chihuahua chub was believed to be extirpated from New Mexico (Rogers 1975). It currently is found regularly only in Moreno Spring and it occurs irregularly in the Mimbres River (Propst and

Stefferd 1994). The introduction of exotic species such as rainbow trout, green sunfish, and largemouth bass have undoubtedly led to some detrimental predation and competition with the Chihuahua chub (Sublette et. al. 1990, Propst 1999). In Chihuahua, water quality degradation, surface water diversion, groundwater pumping, stream channelization, and introduced nonnative fishes have contributed to its decline (**Miller and Chernoff 1984**, Propst 1999). The Chihuahua chub was rare or absent where habitat was degraded and nonnative fishes were common (Propst and Stefferud 1994). Longfin dace are the most common and widespread, and they are often found in the pool habitat preferred by Chihuahua chub (Propst 1999). The population is diminishing and the Moreno Spring population is infested with the external parasite yellow grub (Propst and Stefferud 1994). Rarity of larger individuals of Chihuahua chub in some areas with apparently suitable habitat may be due to their capture for human consumption (Propst and Stefferud 1994). In Chihuahua, the Chihuahua chub was the most desirable food fish in the stream (Propst and Stefferud 1994). The future of the Chihuahua chub is bleak (Propst and Stefferud 1994).

### **Distribution (narrative):**

The historic range of the Chihuahua chub included all but the uppermost portions of permanently watered reaches of the Mimbres River, New Mexico and streams of the Guzman and Bustillos basins, Chihuahua, Mexico (**Smith and Miller 1986**, Propst and Stefferud 1994). Specimens of Chihuahua chub were first collected in the Mimbres River in 1851 (**Baird and Girard 1854**) but it was not again found in the Mimbres River drainage until 1975 when **Rogers (1975)** found a small, reproducing population in Moreno Spring. The Chihuahua chub is restricted to tributaries of the Laguna Guzman basin of the northern Chihuahua, Mexico, the Mimbres River, NM, and Rios Casas Grandes, Santa Maria, and del Carmen, Chihuahua, and basin Bustillos, Chihuahua (**Miller 1978**. Nat. Park Serv. Trans. Proc. Ser. 3:365-381 (as cited in Lee et. al. 1981, **Smith and Miller 1986**). In New Mexico the Chihuahua chub is found in the Mimbres River from the confluence of Allie Canyon downstream for approximately 12 km and in Archuleta/Moreno Spring (Sublette et. al. 1990, Propst and Stefferud 1994). The Chihuahua chub probably occupied all warm water reaches in the Mimbres River drainage, but they are now found regularly only in Moreno Spring where the spring population numbers less than 300 adults (Propst 1999). Currently, the Chihuahua chub is limited to stream reaches where modifications (e.g. channelization and dewatering) and human-induced habitat degradation (e.g. livestock overgrazing, municipal and agricultural pollution) are minimal (Propst and Stefferud 1994).

### **Key Distribution/Abundance/Management Areas:**

<p><b>Panel key distribution/abundance/management areas:</b></p>
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**Breeding (narrative):**

Little is known of the reproductive biology of the Chihuahua chub (Propst 1999). The Chihuahua chub has an extended spawning season, and spawning season probably varies among streams and within a stream may vary longitudinally and yearly, and probably encompasses early spring through early autumn (Sublette and Stefferud 1994). The Chihuahua chub spawns in late April to May in Mimbres River, New Mexico (**Miller and Chernoff 1980** as cited in Sublette et. al. 1990, Lee et. al. 1981). Individuals of both sexes appear to mature the first year at about 80 mm standard length (**Miller and Chernoff 1980** as cited in Sublette et. al. 1990). The substrate used by Chihuahua chub is usually gravel (Propst and Stefferud 1994), however **Miller and Chernoff** (1980) reported that eggs were found scattered over sand/silt substrates. In Chihuahua, Mexico, reproductively ripe individuals were found in March at lower elevation sites (1500 m) and small age I individuals (<20 mm SL) were found at higher elevations (2000 m) the same month, suggesting that over its range, the Chihuahua chub may have a spawning season that extends from early spring through autumn (Propst and Stefferud 1994). Length-frequency data from Chihuahua chub populations in Chihuahua indicate that wild fish probably do not live more than 4 or 5 years in the wild and 7-8 years in captivity (Propst and Stefferud 1994).

**Habitat (narrative):**

The Chihuahua chub is habitat specific (Propst and Stefferud 1994). The Chihuahua chub is most often in pools of small to moderate-sized streams, typically in associated with cover such as debris, boulders, or cut banks (Lee et. al. 1981). The Chihuahua chub seeks protection in deep pools with undercut banks or under solid objects in small to medium-sized streams (Sublette et. al. 1990). In larger streams, predominant habitat types are runs, glides, and riffles; pool habitats are uncommon and usually associated with root masses of standing or uprooted trees, and in smaller streams that flow through steeper terrain habitats are mainly riffles, shallow runs, and pools in association with boulders or cliffs (Propst and Stefferud 1994). The Chihuahua chub is found primarily in habitats associated with stream banks\*\*\*, and is most common in lateral scour pools where flow is against and along a stream bank or a partial channel obstruction (boulder, cliff, or rootwad) (Propst and Stefferud 1994).

**Key Habitat Components:** Deep (1-2 m), lateral scour pools with undercut banks and root wads.

**Breeding Season:**

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

**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):

No information is available on the food habits of the Chihuahua chub, but they probably consume mainly aquatic invertebrates (Propst 1999). The feeding habits of the Chihuahua chub are trout-like (opportunistic carnivore) probably taking a variety of invertebrates and possibly some small fish (Sublette et. al. 1990).

## Diet category (list):

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

## Grazing Effects (narrative):

The change in the Mimbres River can be attributed, in large part, to overgrazing in the drainage which, in turn, exacerbates flooding; irrigation diversions that have reduced the quantity of water in the river; and repeated stream modifications by local land owners (Sublette et. al. 1990).

Grazing could impact the Moreno Spring habitat and livestock exclusion should be a priority. Removal of vegetation and bank slough could negatively impact cover, or hiding habitat (e.g. undercut banks).

### 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.A. and Magaña, H.A.
- **GP 2001:**
- **GP 2002:**
- **Revision:**

**Bibliography:**

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- Propst, D. L. 1999. Threatened and endangered fishes of New Mexico. New Mexico Game and Fish Tech Report 1. 84 pp.
- Sublette, J. E., M. D. Hatch, and M. Sublette. 1990. The Fishes of New Mexico. University of New Mexico Press. Albuquerque. 393 pp.