

Scientific Name: *Cyprinodon tularosa*

Common Name: White Sands pupfish

BISON No.: 010360

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: FWS Species of concern. State NM: Threatened.

The status of the White Sands pupfish population is stable (Sublette et. al. 1990). The White Sands pupfish currently occupies its entire historic range of Salt Creek and Malpais Spring and associated areas (Propst 1999).

The primary threats to the White Sands pupfish in the Tularosa Basin are anthropogenic habitat changes that cause either dewatering or other alterations to their existing habitats and the introduction of exotic fishes (Sublette et. al. 1990). **Pittenger (1996)** reported a major reduction in White Sands pupfish abundance in Mound Spring during 1995 as a consequence of an outbreak of a digenetic nematode (*Diplostomulum* sp.). Security of the limited range and exclusion of nonnative fishes from its habitats are essential to the conservation of White Sands pupfish (Propst 1999).

Distribution (narrative):

The White Sands pupfish is endemic and found only in Tularosa Valley, New Mexico (Fishbase 2002). Locally, the White Sands pupfish is called an "alkali minnow" because it is so abundant in some of the springs, sinkholes, and other bodies of water rich in "alkali" or gypsum (Koster 1957, Lee et. al.1981). The White Sands pupfish is endemic to Salt Creek, Malpais Spring, and its outflow, and Mound Spring, all on White Sands Missile Range in the Tularosa Basin, Sierra County, New Mexico (Jester and Suminski 1982, Sublette et. al. 1990).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative):

Spawning occurs during summer (Koster 1957). Spawning occurs in shallow habitats from mid April when water temperatures reach 18° C to mid September with peak spawning during July (Suminski 1977). Males guard small territories of bottom, or of vegetation, over which females deposit their eggs (Koster 1957). Male White Sands pupfish establish and guard territories in the shallow vegetated littoral zones of springs and playa lakes and in low-velocity, vegetated margins of streams (Propst 1999). Eggs are released and fertilized while the male's anal fin is wrapped around the female's vent (Propst 1999). Only one egg is released during each spawning event, but there may be 12-15 such events during a single bout of repeated spawnings (Suminski 1977). A female White Sands pupfish may spawn twice in a 24 hour period, but it is unknown if an individual female spawns throughout the spawning season (Propst 1999). Fertilized eggs of the White Sands pupfish incubating in 4 to 8 days (Able 1984). Although maximum longevity is 5 years, the numbers of fish older than 3 years are very small (Jester and Suminski 1982).

Habitat (narrative):

The White Sands pupfish inhabits fine mud-silt and sand-gravel bottom of clear, shallow, strongly alkaline pools and streams in the Tularosa Valley (Sublette et. al. 1990). The White Sands pupfish is generally most abundant along the banks in lentic habitats and in shallow portions of low-velocity lotic habitats (Propst 1999).

Key Habitat components: springs, low velocity, shallow sand silt habitats.

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

The White Sands pupfish is an opportunistic omnivore (Jester and Suminski 1982). White Sands pupfish travel in schools and do much of their feeding from the bottom mud and from the vegetation (Koster 1957). The White Sands pupfish is omnivorous, feeding most heavily on Culicidae (mosquitoes) although other invertebrates, algae, and juveniles of its species also occur in the diet (Suminski 1977).

Diet category (list):

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

Grazing Effects (narrative):

Grazing could affect reproduction and recruitment of young through removal of vegetation and trampling and disturbance of shallow water habitats occupied by the species.

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:**

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