Scientific Name: *Plagopterus argentissimus*
Common Name: Woundfin
BISON No.: 010322

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):

Federal: Endangered, USFS Region 3: Sensitive, State AZ: Special concern.
The abundance of the woundfin since 1983 has declined both above Quail Creek and below Washington diversion on the Virgin River. In that segment of the Virgin River the parasite load has increased (Deacon 1988).
The woundfin is presumably extirpated from the lower basin by reductions in stream flow brought about by climactic phenomena, such as drought and erosion, plus water storage and diversions (Miller and Hobbs 1960). Seasonal drying of extensive reaches of the mainstream has reduced the habitable range of the woundfin. Introduced species have also contributed to the decline of woundfin populations in the lower river via predation and, presumably, competition. Downstream from Mesquite, woundfin abundance decreased as red shiner abundance increased. The decline of the woundfin may have been the result of competition with the red shiner (Cross

1978). Dams and dewatering have made most habitats unsuitable, while exotic species, especially red shiners, have out competed woundfin in the few remaining flowing streams (Poulos 1984). Presently water diversions during low flow periods are capable of removing entire river flow at the Quail Creek diversion. A short distance downstream where Ash and LaVerkin Creeks moderate the extreme effects of increased temperature and salinity, fish survived through 1985 but no species reproduced successfully (Deacon 1988). During low summer flows, Mesquite and Riverside diversions often divert the entire river into local irrigation systems. Dominance by the red shiner has affected the distribution and abundance of native fishes of the southwest (Greger and Deacon 1988). Low summer flows with very high water temperatures are a likely reason for the summer declines of both wild and stocked woundfin (Abate et al 1999).

Distribution (narrative)**:**

Woundfin were distributed in the mainstream Colorado, Gila, Salt, and Virgin Rivers (Lee et al 1981, Poulos 1984). In the 1800's it was found sporadically throughout the lower Colorado River basin, but is currently limited to a short reach of the Virgin River system, in Utah, Arizona, and Nevada (Deacon 1988, Minckley 1991). The woundfin once lived in the Gila River as far upstream as Tempe, but became extinct very soon after Europeans began developing the area (Minckley 1969). The woundfin was last collected in the Gila River basin in the 1890's (Miller and Hubbs 1960). At the present time the woundfin is totally restricted to the Virgin River system, except for a few strays that have been seined from Moapa River, Nevada, formally a tributary of the Virgin River. In the Virgin River the woundfin lives only in the mainstream in any numbers, where it may compromise more than 90% of the total fish population at any given time (Minckley 1973). Within the Virgin River system the woundfin is limited in its upstream distribution by the highly saline LaVerkin springs (Cross 1978).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative)**:**

The spawning habitat and reproductive behavior are not known. The stimuli that initiate the reproductive cycle of the woundfin are not known. Spawning may be initiated by low, clear water; juvenile woundfin first appear coincident with the period of lowest river discharge. Avoidance of high spring discharges and turbidities would be advantageous because eggs spawned at that time would likely be carried away by the current or buried in the silt. There is almost no submergent or emergent vegetation in the mainstream to which eggs could be affixed. (Cross 1978). Reproduction occurs in summer, on basis of occurrence of young in collections. Maturation appears to occur in second summer, and few individuals live more than four years (Lee et. al. 1981). The woundfin was the only short-lived species known from the lower Colorado River. The woundfin select areas with rocky substrate in current for spawning, at a

temperature of about 25 C. Young grow rapidly, achieving lengths of 20-40 mm a month or two after hatching (Minckley 1991).

Habitat (narrative)**:**

Woundfin are suited for life in the swift, sandy-bottomed channel of the lower Virgin River, the last stream in Arizona, which supports woundfin (Minckley 1969). The species lives in swift parts of silty streams, seemingly avoiding clear waters and very seldom-found in quieter pools (Minckley 1973). The woundfin presently persists over at least half of its original range within the Virgin River basin. The woundfin is particularly well adapted to the extreme fluctuations in discharge, suspended sediment, and temperature. The woundfin occurred most frequently in runs (75%), less frequently in riffles (20%), and occasionally in pools (5%). It was collected over sand (60%), rubble and cobble (30%), and mud substrates (10%). Water temperatures ranged from 10-35.5 C with a mean of 23.7^{o} C. Current velocities ranged from zero to 1.13 m/s. In more than 60% of the collections woundfin occurred in habitats that were considered to be physically unmodified. Juvenile woundfin occupied shallow areas lateral to the main current. When water levels were low, juvenile woundfin often occurred in the main channel (Cross 1978). Occupies main channel of seasonally swift, highly turbid, and extremely warm streams, with sandy, constantly shifting bottoms (Lee et. al. 1981). The species is adapted for life in highly turbid water over shifting sand bottoms (Minckley 1991).

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)**:**

Woundfin seem to be omnivorous. Stomach contents of woundfin included; sand grains, aquatic insect larvae (predominately diptereans), filamentous green algae, plant debris, terrestrial insects (mainly ants) and amphipod larvae (Cross 1978). The woundfin feed throughout the 24 h period, they have a feeding peak in the early morning. Woundfin fed primarily on ceratopogonid larvae in Feb., mayflies in June, chrionomids in Sept., and chrionomids and ceratopogonids in Dec. simuliid larvae were predominant in the diet only in June in spite of their greater abundance in Feb. and Dec. While organic debris and plants were never a major food source near Mesquite, they were prominent in woundfin diets throughout the year near Beaver Dam Wash (Greger and Deacon 1988).

Diet category (list):

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

Grazing Effects (narrative):

Although habitat and reproductive behavior are not known it is believed that spawning is initiated by low, clear water. Woundfin avoid high spring discharges and turbidities this is advantageous because eggs spawned at that time would likely be carried away by the current or buried in the silt (Cross 1978). The woundfin select areas with rocky substrate in current for spawning, at a temperature of 25°C (Minckley 1991). Grazing by cattle in or near woundfin habitat may greatly impact spawning grounds and further prevent the woundfin population from stabilizing.

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:** H.A. Magaña
- **GP 2001:**
- **GP 2002:**
- **Revision:**

Bibliography:

Abate, P. D. Holden P. B. and Heinrich J. E., 1999, Woundfin population changes in the lower Virgin River in 1997, Proceedings of the Desert Fishes Council, xxxxxxxxxxxxx.

Cross, J. N., 1978, Contributions to the biology of the woundfin, Plagopterus argentissimus (Pice:Cyprinidae), and endangered species: Great Basin Naturalist, v. 38, no. 4, p. 463-468.

Deacon, J. E., 1988, The endangered woundfin and water management in the Virgin River, Utah, Arizona, Nevada: Fisheries, v. 13, no. 1, p. 18-24.

Greger, P. D. and Deacon J. E., 1988, Food partitioning among fishes of the Virgin River. Copeia, v. 2, p. 314-323.

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

Miller, R. R. and Hubbs C. L., 1960, The spiny-rayed Cyprinid fishes (Plagoterini) of the Colorado River System: Miscellaneous Publications Museum of Zoology, University of Michigan, v. 115, p. 36.

Minckley, W. L., 1973, Fishes of Arizona. Phoenix, AZ, Sims Publishing Co.

Minckley W.L., 1991, Native fishes of arid lands: A dwindling resource of the desert southwest. GTR RM-206. Fort Collins, CO, Rocky Mountain Forest and Range Experimental Station.

Minckley, W. L., 1969, Native fishes of Arizona Part II- spiny-rayed minnows. Arizona Game and Fish Department Wildlife Views, v. 16, no. 6, p. 4-9.

Poulos, P. G., 1984, Federal Register, *Proposed Rules* Endangered and threatened wildlife and plants; proposed determination of experimental population status for certain introduced populations of Colorado squawfish and woundfin.

Williams, C. M., 1992, Woundfin, Ich, and temperature, Proceedings of the Desert Fishes Council, xxxxxxxxxxxx.