ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Animal Abstract **Element Code:** AFCJB33010
Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Plagopterus argentissimus*
COMMON NAME: Woundfin
SYNONYMS: *Meda argentissimus*
FAMILY: Cyprinidae

AUTHOR, PLACE OF PUBLICATION: Cope, 1874. Proceedings of the American Philosophical Society 14:129-39.

TYPE LOCALITY: **S**an Luis Valley, western Colorado [sic]; Virgin River, Washington County, southwestern Utah (Miller and Hubbs, 1960).

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: Monotypic genus. No described subspecies. Member of tribe Plagopterini, a tribe of 6 species endemic to the Lower Colorado River basin, comprised six species in the genera *Lepidomeda, Meda,* and *Plagopterus.* As referenced in Minckley (1973): Miller and Hubbs (1960) reviewed the tribe Plagopterini and concluded that *Plagopterus* is the most advanced genus among the three represented, and that it and *Meda* are the most closely related. Uyeno and Miller (1973) reached the same conclusions based upon karyotypes, as did Coad (1976 in Lee et al. 1980) based on a study of 28 characteristics.

DESCRIPTION: A small slender, silvery, scaleless minnow. Head and belly flattened, and mouth small and nearly horizontal. According to Minckley (1973), "Rarely exceeds 75.0 mm (2.95 in.)... Body thicker anteriorly, thinner posteriorly, flattened beneath. Scales represented by dermal plates supporting low ridges on antero-dorsal portion of body, deeply embedded. First spinous ray strong, sharp-pointed. Barbels present. Dorsal fin-rays 8 or 9. Anal fin-rays usually 10. Pharyngeal teeth typically 1, 5-4, 1.... Coloration silvery over-all; sometimes with watery-yellow at bases of pectoral fins, and developing ventro-lateral, pinkish coloration in exceedingly "high," reproductive males."

AIDS TO IDENTIFICATION: As with the Virgin spinedace and the spikedace, the woundfin has two large spines in dorsal fin and bright silver sides. They have no scales, and their long snout has barbels located at the corner of the mouth. They can be distinguished from spikedace and spinedace by the presence of barbels. Woundfin has wider, flatter head than spikedace and lacks the scales seen in spinedace. In its present range, the woundfin is unlikely to be confused with sympatric species.

ILLUSTRATIONS:
B&W photo (Minckley 1973:115)
Color drawing (Page and Burr 1991)

TOTAL RANGE: Historic range includes the lower Colorado River basin including the Virgin, Moapa, Salt and Gila River systems in Arizona, Nevada, and Utah. At present, the Woundfin are restricted to approximately 50 miles of perennial reaches of the Virgin River in the states of Utah, Arizona, and Nevada.

RANGE WITHIN ARIZONA: Found sporadically throughout the Arizona portion of the Virgin River mainstem (Mohave County).

Experimental-nonessential designation in portions of the Verde, Gila, San Francisco, and Hassayampa rivers and Tonto Creek. No self-sustaining populations documented from releases in these localities.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: This species is able to exist in heavily mineralized waters and can tolerate extremely high turbidity. Found in association with Virgin chub, *Gila seminuda*. They appear to undertake relatively long downstream migrations within present habitat.

REPRODUCTION: Woundfin batch spawn non-buoyant eggs which adhere to substrate. No parental care is provided. Chasing behavior, particularly of females by males, is typical spawning behavior (Webb et al. 2015). Fry generally appear by June, but continue to be produced throughout summer. It appears that generation time is predominately limited to 1 year, and individuals must achieve sufficient growth or more than 66 mm (2.6 in) total length prior to the spring spawning to contribute to the next generation (Fridell and Morvilius 2005). They have been successfully spawned in hatchery settings, and stocked fish have been shown to contribute to wild spawning events (USFWS 2008).

FOOD HABITS: Omnivorous; eats aquatic insects, algae, detritus, and seeds.

HABITAT: The species lives in swift parts of silty streams, seemingly avoiding clear waters and very seldom found in quieter pools. They occupy the main channel of seasonally swift, highly turbid, and extremely warm streams, with constantly shifting sandy bottoms (Lee et al. 1980, Matthews and Mosely 1990, Page and Burr 2011). Adults are generally found in habitats with water velocities of 1-2 feet per second (0.24-0.49 meters per second) and depths of 8-18 inches (0.15-0.43 meters). Juveniles use habitats which are generally slower and deeper than those characteristic of the adults. Woundfin larvae are found in backwaters or slow velocity habitat along stream margins, often associated with dense growths of filamentous algae (USFWS 2008).

ELEVATION: Below 4,500 feet (1,372 m).

PLANT COMMUNITY: Presently, the Virgin River riparian community consists primarily of *Tamarix* spp. Biotic communities along the Virgin River include the Great Basin and Mohave desert scrub.

POPULATION TRENDS: Population trends are declining. Resource managers concluded the wild Woundfin population was functionally extirpated throughout critical habitat in 2007 (USFWS 2008). When the Woundfin were listed in 1970, the species occupied 12.5% of their historic range. In the past 30 years, Woundfin have been eliminated from at least 35 miles of formerly occupied habitat in the lower river, and have been extirpated from the Lower Virgin River (from Beaver Dam Wash, perhaps from the Utah/Arizona State line downstream to Lake Mead), and abundance has declined to precariously low levels elsewhere (USFWS 2008).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS:	LE, XN (USDI, FWS 1970, 1985) Experimental nonessential in portions of the Gila River
	Designated Critical Habitat (USDI, FWS 2000)
	[Proposed Critical Habitat (USDI, FWS 1995)]
	[PXN (USDI, FWS 1984)]
	[Proposed Critical Habitat withdrawn (USDI, FWS 1979)]
	[Proposed Critical Habitat (USDI, FWS 1977)
STATE STATUS:	1 (AZGFD, AWCS 2022)
	[1A (AGFD SWAP 2012)]
	[WSC (AGFD, WSCA 1996 in prep)]
	[Endangered (AGFD, TNW 1988)]
OTHER STATUS:	Bureau of Land Management Sensitive (BLM Arizona, 2017)
	Not Forest Service Status (USDA, FS Region 3 2013, 1999)
	[Forest Service Sensitive (USDA, FS Region 3 1988)]
	Endangered, American Fisheries Society.

MANAGEMENT FACTORS: The majority of present-day threats to woundfin, in terms of habitat destruction, occurred between 90 and 110 years ago. Historical habitat has been lost due to human impacts including habitat fragmentation, introduction of nonnative species and

dewatering due to agriculture, mining and urbanization. Damming and drying have caused the disappearance of the woundfin throughout most of its historic range and continue to impact it in the Virgin River. The construction of Hoover Dam and additional water development projects on the Virgin River and its tributaries have further modified the hydrology. Fall woundfin abundance is significantly lower in drought years than non-drought years (Holden et al. 2001). Climate change is expected to lead to increased stream temperatures and decreased stream flow (Nash and Gleick 1993).

The introduction of nonnative species to Lake Mead, and subsequently the Virgin River has further decreased Woundfin population, through competition and predation. Red shiner, a baitfish, is rapidly expanding its range upstream in the Virgin River and causing declines in the remaining Woundfin populations through predation of young of year, competition for food and habitat resources, and introduction of parasitic organisms (Heckman et al. 1986). Other nonnative species (black bullhead, channel catfish, largemouth bass, striped bass, bluegill, green sunfish, common carp, mosquitofish, and blue tilapia) pose threats to woundfin recovery in the lower Virgin River, and may potentially impact upper river populations as well (Albrecht et al. 2007, Golden and Holden 2002). Introduced parasites have been found in woundfin, but are not currently considered a factor in the decline of the species (USFWS 1995a).

Other causes for more recent decline in woundfin numbers are attributed to the following suite of environmental conditions: low levels of turbidity associated with low flow causing crowding of habitats with cover, increasing predation and competition for resources; continued drought with summer temperatures exceeding behavioral thermal maximum and critical thermal maximum; runoff from burned portions of the drainage; entrainment of woundfin at water diversion structures throughout the Virgin River system; tamarisk intrusion, population growth in riverside communities; and the periodic input of sediment accumulated behind the Quail Creek Diversion Dam, which can depress dissolved oxygen.

Preservation of the last remaining habitat and populations of this species in the Virgin River will require the following: 1) close monitoring of abundance and distribution; 2) guarantees of minimum flows at critical times through critical reaches; 3) control of nonnative fish populations and of parasites introduced with them; 4) refinement of hatchery techniques to produce large numbers for reintroduction; and 5) studies of the species' critical requirements for use in prioritizing management needs in the Virgin River and for evaluating potential reintroduction sites.

PROTECTIVE MEASURES TAKEN: Legal statutes that help protect the woundfin include Section 404 of the Clean Water Act and the Endangered Species Act. Virgin River Fishes Recovery Team conducts biannual monitoring and maintains a database of sampling results. Unsuccessful reintroductions have occurred into four historically occupied areas in Arizona (Sycamore Creek on the Prescott N.F., Hassayampa River near Wickenburg, and the Salt and Paria rivers). Three large scale nonnative fish barriers have been constructed on the Virgin River, along with several smaller scale barriers. Eradication of red shiner above

Washington Fields Diversion Dam in Utah. Maintenance of a buffer zone from Washington Fields Diversion downstream to Johnson Diversion (Fridell et al. 2003). Without the constant effort to prevent spread of red shiner upstream of Washington Fields Diversion, it is likely the entire wild population of woundfin would have been lost (USFWS 2008). Removal of red shiners via seine before stocking woundfin in the lower Virgin River. Implementation of sediment management plan at Quail Creek Diversion Dam coupled with a standardized monitoring protocol (fish and water quality) has proven to greatly reduce the threat associated with sediment sluicing (USFWS 2005). Stocking of hatchery stock began in 2003 to augment populations. A study on genetic diversity of hatchery stock indicated that woundfin at the Dexter National Fish Hatchery and Technology Center were genetically similar to Virgin River woundfin and suitable for management purposes. The study also indicated that stocked fish had contributed to wild recruitment (USFWS 2008). Minimum flows have been secured in portions of the river, but much of the river is still subject to diminished flow from dewatering. Establishment of Virgin River Program cooperative in the upper river and Lower Virgin River Recovery Implementation team in the lower river. (USFWS 2008).

SUGGESTED PROJECTS: Habitat restoration; augmenting base flows to provide flows and temperature needed for recovery, coordination with federal, state, and local governments to develop and implement floodplain and erosion zone ordinances. Nonnative fish control; continue to construct fish barriers throughout the drainage, consider increased rotenone treatments to create progressive buffer zones against red shiner invasion. Policy; work with stakeholders to partner with the Virgin River Program to incorporate coordinated recovery actions. The Virgin River Resource Management and Recovery Program intends to stock 100,000 10-mo-old fish into the Virgin River to spawn each spring (Webb et al. 2015)

LAND MANAGEMENT/OWNERSHIP: Bureau of Land Management, Arizona Strip Field Office, State of Arizona, Private

SOURCES OF FURTHER INFORMATION

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ADDITIONAL INFORMATION: As of July 1994, the Arizona Game and Fish Department, Nongame Branch, Native Fish Program is pursuing the reintroduction of the woundfin into the Hassayampa River.

Revised: 1994-07-14 (RHB)
1995-01-29 (KLY)
2000-01-28 (SMS)
2020-12-04 (KSL)
2023-01-09 (MBL)