ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Animal Abstract **Element Code:** AFCJB37140
Data Sensitivity: Yes

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Tiaroga cobitis*
COMMON NAME: Loach Minnow
SYNONYMS: *Cliola cobitis, Rhinichthys cobitis*
FAMILY: Cyprinidae

AUTHOR, PLACE OF PUBLICATION: Girard, C. 1857. Researchers upon the cyprinoid fishes inhabiting the freshwaters of the United States of America, west of the Mississippi valley, from specimens in the Museum of the Smithsonian Institution. Proceedings of the Academy of Natural Sciences of Philadelphia 8(1856):165-213.

TYPE LOCALITY: San Pedro River, Arizona.

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: Monotypic genus. Coburn and Cavender (1992) and Woodman (1992) concluded that this species should be placed in the genus *Rhinichthys*; this change was adopted in the 1991 AFS checklist (Robins et al. 1991) and continued in subsequent checklists (Nelson et al. 2004, Page et al. 2013). Fricke et al. (2023) retain the use of *Tiaroga*. HDMS retains the use of *Tiaroga* because it is listed endangered under the Endangered Species Act as *Tiaroga cobitis*.

DESCRIPTION: Small stream dwelling minnow, less than 80 mm (3 in) in length. Elongated body is a little compressed, and flattened vertically. Mouth is small, terminal, and highly oblique with no barbels present. Upper lip is non-protractile and attached to the snout by a broad fold of tissue. Gill openings are restricted. Two rows of pharyngeal teeth, dental pattern is 1,4-4,1 (Minckley 1973).

Loach minnow have an olivaceous background coloration highly blotched with darker pigment. Whitish spots are present at the origin and insertion of the dorsal fin as well as the dorsal and ventral portions of the caudal fin base. A black basicaudal spot is usually present. There are 65 scales in the lateral line. The dorsal fin contains 8 rays, and the anal contains 7. Breeding males develop bright red-orange coloration at the bases of paired fins, on adjacent fins, on the base of caudal opening, and often on abdomen. Breeding females become yellowish in color on their fins and lower body (Minckley 1973).

AIDS TO IDENTIFICATION: Distinguished from the similar speckled dace by whitish spots that are present on the origin and insertion of the dorsal fin as well as on the dorsal and ventral portions of the caudal fin base.

ILLUSTRATIONS:
B&W drawing (Marsh 1991:i.)
B&W photos (Minckley 1973:133)
Color line drawing (Page and Burr 1991)
Color photos (Rinne and Minckley 1991:16)
B&W photo (Wildlife Habitat Management Staff Group 1975:23)

TOTAL RANGE: Historically was endemic to Gila River Basin near and upstream of Phoenix, and included the Agua Fria, Gila, Salt, San Pedro, and Verde River systems in Arizona. They were also found in New Mexico, and Sonora, Mexico. In Arizona and New Mexico, it is estimated the present range is 15 to 20 percent or less of its historic range. The species is extirpated from Sonora, Mexico (USFWS 2012).

RANGE WITHIN ARIZONA: Historically in Arizona, the loach minnow occupied as much as 2,000 stream km (1,243 miles), but now are found in less than 200 stream km (124 miles) (Propst et al. 1987). In Arizona, loach minnow are limited to reaches in the Blue River and its tributaries; Campbell Blue and Pace creeks (Greenlee County), Aravaipa Creek and its tributaries; Turkey and Deer Creeks (Graham and Pinal Counties), Eagle Creek (Graham and Greenlee Counties), The North Fork East Fork Black River (Apache and Greenlee Counties), and possibly the White River and its tributaries; the East and North Fork White River (Apache, Gila, and Navajo Counties) (USFWS 2012). An introduced population exists in Bonita Creek (Greenlee County).

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Loach minnow are short lived. Few, if any, live through the fourth year. Populations of loach minnow vary both spatially and temporally because of natural changes in their environment and differing dynamic characteristics of individual populations.

REPRODUCTION: Spawning was observed to take place in late winter to early spring in Aravaipa Creek and from late March to early June in New Mexico. First spawn occurs in their second year. Spawning occurred in the same riffles that were occupied by adults during the non-reproductive season. Adhesive eggs are deposited on the underside of flattened rocks. The nest cavities are usually open on the downstream side while the upstream portion of the rock is embedded in the substrate. The male, and possibly the female, guards the nest cavity. The number of eggs per rock ranges from 5 to more than 250, with means of 52 to 63 (Marsh 1991). Individual females contain from 150 to 1200 mature ova. Eggs incubated at 18 to 20 ºC hatched in five to six days.

FOOD HABITS: Loach minnow are opportunistic benthic insectivores, feeding mainly upon riffle-dwelling larval emphemeropterans, simuliid, and chironomid dipterans. They actively seek their food among bottom substrates, rather than pursuing items in the drift.

HABITAT: Riffle obligate species. Found in small to large perennial streams. Use shallow, turbulent riffles with moderate to swift currents and primarily cobble substrate. The lee side of

rocks and spaces between rocks are used for resting and spawning. Loach minnow are rare or absent from habitats where fine sediments fill these interstitial spaces. Sometimes associated with dense, filamentous green algae. Restricted almost exclusively to a bottom dwelling habitat because of a reduced gas bladder.

ELEVATION: Up to about 8,240 ft (2,513 m). Based off records in the Heritage Data Management System (HDMS), elevation ranges from 2,325 – 8,240 ft. (709 – 2,513 m) (AGFD, unpublished data accessed 2001).

PLANT COMMUNITY: Prefers an open, low growing riparian type community composed mostly grass and shrubs.

POPULATION TRENDS: Loach minnow was once locally common throughout much of the Verde, Salt, San Pedro, San Francisco, and Gila (upstream from Phoenix) river systems, occupying both the mainstream and perennial tributaries up to about 2,200 m (7,218 ft.) elevation. This range has been dramatically reduced and fragmented, due to habitat destruction, and competition and predation by introduced fish species. It is now considered rare to uncommon in Arizona, except Aravaipa Creek and Blue River. The loach minnow is believed to be extirpated from Mexico, although the Gila River drainage in that country still lacks adequate surveys. Its distribution in New Mexico is fragmented. According to Marsh (1991), unknown populations of the loach minnow may still occur in places not surveyed or incompletely inventoried, especially in Mexico, and within the expansive San Carlos Apache and Fort Apache Indian reservations, or on National Forest lands.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS:
LE with Critical Habitat (CH) (USDI, FWS 2012)
[PE with Proposed CH (USDI, FWS 2010)]
[CH Designated (USDI, FWS 2007)]
[CH Proposed (USDI, FWS 2005)]
[CH Revoked (Court Order No. CIV 02-0199 JB/LCS, 08-31-2004)]
[CH Designated (USDI, FWS 2000)]
[CH Rroposed (USDI, FWS 1999)]
[CH Revoked (USDI, FWS 1998)]
[CH Designated (USDI, FWS 1994)]
[LT (USDI, FWS 1986)]
[PT with Proposed CH (USDI, FWS 1985)]
[C1 (USDI, FWS 1982)]

STATE STATUS:
1 (AZGFD, AWCS 2022)
[1A (AGFD SWAP 2012)]
[WSC (AGFD, WSCA 1996 in prep)]
[Threatened (AGFD, TNW 1988)]

OTHER STATUS:

Bureau of Land Management Sensitive (USDI, BLM Arizona 2017)
Not Forest Service Sensitive (USDA, FS Region 3 1999, 2013)
[Forest Service Sensitive (USDA, FS Region 3 1988)]
E, probably Extinct in the wilds of Mexico (NORMA Oficial Mexicana NOM-059-SEMARNAT-2010).
Listed Endangered (Secretaría de Medio Ambiente 2000)
[Listed Endangered Secretaría de Desarrollo Social 1994]

MANAGEMENT FACTORS:

Threats: Competition with and predation from non-native fish species are the largest known threat (Torresdal 2020). Other threats include water withdrawals, dewatering of stream reaches, groundwater pumping, impoundment, sedimentation, stream channel alteration, water quality, recreation, road and bridge development and maintenance, development, livestock grazing, habitat alteration, drought, climate change, genetic isolation.

Management needs: conserve, protect, and monitor existing populations; delineate priority waters; ameliorate impacts from nonnative predatory and competitory species from loach minnow waters; develop captive propagation techniques; enhance or restore select habitats within historical range; reintroduce into select historical habitats.

PROTECTIVE MEASURES TAKEN: Listed Proposed Endangered with Critical Habitat February 2012. A Loach Minnow Recovery Plan was prepared by the USFWS (1990). Draft Recovery Criteria and Recovery Units have been proposed by the USFWS (2019). An artificial propagation project with loach minnow was completed in 2004. Renovation efforts in the Blue River and Spring Creek. Translocations or reintroduction of loach minnow have occurred in 7 stream reaches with only 1 having persisted (Torresdal 2020). Refuge and captive breeding populations established at Bubbling Ponds facility (USFWS 2012).

SUGGESTED PROJECTS: Protect existing populations of loach minnow. Monitor status of existing populations. Identify nature and significance of interaction with non-native fishes. Quantify, through research, loach minnow habitat needs and the effects of physical habitat modification on life cycle completion. Enhance or restore habitats occupied by depleted populations. Reintroduce populations to selected streams within historic range. Establish replicate populations across Recovery Units. Determine quantitative criteria for describing a self-sustaining population. Consider contingency planning and preliminary investigations for captive holding, propagation and rearing. Information and education (USDI, FWS 1990).

LAND MANAGEMENT/OWNERSHIP: BIA; BLM - Safford Field Office; USFS - Apache-Sitgreaves National Forest; TNC - Aravaipa Canyon and Muleshoe Ranch Preserves; Private.

SOURCES OF FURTHER INFORMATION

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ADDITIONAL INFORMATION:

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