

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Animal Abstract

Element Code: AFCNC05022
Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Poeciliopsis occidentalis sonoriensis*
COMMON NAME: Yaqui topminnow
SYNONYMS: *Poeciliopsis sonoriensis* (accepted), *Girardinus sonoriensis*
FAMILY: Poeciliidae

AUTHOR, PLACE OF PUBLICATION: C. Girard, Philadelphia. 1859.

TYPE LOCALITY: Rio San Bernadino, Sonora.

TYPE SPECIMEN: Unknown

TAXONOMIC UNIQUENESS: Formerly classified as a subspecies of *P. occidentalis*, with *P.o. occidentalis*. Hedrick et al. (2001) suggested that each subspecies be recognized as distinct species, based on genetic variation. This taxonomy is broadly accepted, and has been confirmed by Miller (2005), Minckley and Marsh (2009), and Page and Burr (2011). In total, three species in genus, with two occurring in Arizona.

Although recognition of this organism at the species level is widely accepted, the two subspecies are recognized as Species of Greatest Conservation Need in the Arizona Wildlife Conservation Strategy (AZGFD 2022) with the Yaqui topminnow listed under the taxonomy *Poeciliopsis occidentalis sonoriensis*. Therefore, the Heritage Data Management System tracks the taxon as such.

DESCRIPTION: The dorsal profile slightly curved, body somewhat elongated. Caudal fin rounded to almost square. Gonopodium of male elongated, reaching past snout when in copulatory position. Males small, rarely more than 2.5 mm (0.98 in.) standard length; females larger, sometimes 5.0 mm (1.97 in.) or more, usually 3.0 to 4.5 mm (1.18 to 1.77 in.), standard length (Minckley 1973).

Body tan to olivaceous, darker above, yellowish to whitened below, but generally lacking dark spots on venter. Scales on dorsum outlined, often diffusely; lateral band developed posterior to pelvic-fin insertions, obsolete anteriorly (or diffuse). Breeding males blackened as in *P. o. occidentalis* - somewhat less intense. Females lacking a darkened peritroct (Minckley 1973).

AIDS TO IDENTIFICATION: The two subspecies of topminnows in Arizona, can be distinguished by several morphological characteristics. In *P. o. occidentalis* the snout is short, the mouth subsuperior and the dark lateral band of the female extends from the opercle to the base of the caudal fin. In *P. o. sonoriensis* the snout is longer, the mouth superior and the lateral band of the female rarely begins before the base of the pelvic fins (Minckley 1973, in Stefferud 1982). In addition, *P. o. sonoriensis* are found at the headwaters of the Yaqui River, whereas *P. o. occidentalis* are found below the headwaters (AGFD Native Fish Diversity Review 1995).

Female topminnow may be distinguished from mosquitofish (*Gambusia affinis*) by lack of dark spots on caudal fin and lack of dark sub-orbital teardrop-shaped mark; origin of dorsal and anal fin vertically inline, perpendicular to horizontal axis of fish; in mosquitofish origin of dorsal fin posterior to origin of anal fin. Male topminnows in breeding condition may or may not become dark black, male mosquitofish never do; male topminnows gonopodium, when extended forward in copulatory position, extends very near to or past the snout, male mosquitofish does not. Topminnows have weak, spatulate teeth whereas mosquitofish have strong conically shaped teeth, distinguishable only with a microscope. Female topminnows are generally larger than males.

ILLUSTRATIONS: B&W photo (Minckley 1973:202)

TOTAL RANGE: Historically endemic to the Yaqui, Matape, and Mayo rivers and tributaries in southeastern Arizona and Sonora and Chihuahua, Mexico. Only known from San Bernardino and Leslie Canyon National Wildlife Refuges in the United States. Natural populations persist in Mexico in the Yaqui, Matape, and Mayo rivers.

RANGE WITHIN ARIZONA: Limited to the portion of the Rio Yaqui basin in the San Bernardino and Leslie Canyon National Wildlife Refuges, Arizona. Natural and reintroduced populations occur on the San Bernardino. The population in Leslie Canyon is introduced. All populations occur in Cochise County.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: The topminnow is able to adjust to wide variations in water quality, and appears to be adapted to withstand periodic flash flooding (Galat 1988). Topminnows can withstand water temperatures from near freezing to 32.2-37.7° C (90-100° F). Long breeding seasons and high fecundity rates have allowed topminnows, to rapidly expand their population when habitat is available. Topminnows typically live about one year or a successful breeding season. Actual lifespan is determined by the age at which they reach sexual maturity, which may only be a few weeks.

REPRODUCTION: The Yaqui topminnow is a livebearer who may reproduce year-round where winter temperatures are moderated by spring inflows. In fluctuating temperatures reproduction typically begins in early April and ends in October (USFWS 2005). Males become dark black and aggressively defend individual territories, which females enter when ready to spawn. The male places spermatophores into the female by means of gonopodia. Less dominant males who are unable to defend a territory successfully may attempt inconspicuous breeding by using an extra long gonopodium.

Females may produce broods of 20 or more young approximately every 20 days (USFWS 2011). Females often carry two broods at the same time, each brood at a different stage of development (Minckley 1973). Rinne and Minckley (1991) point out that the female has the ability to store sperm, allowing her to fertilize eggs for the duration of her short life from a single copulation.

FOOD HABITS: Omnivorous; detritus, algae, and aquatic invertebrates such as amphipods and insect larvae. Food choice is usually dependent upon a combination of food availability and the topminnow's size.

HABITAT: Lowland and some upland streams of desert and grasslands, and margins of large, lowland rivers. Prefers warm, shallow, calm waters of spring pools, cienegas, backwaters, permanent and intermittent streams, and marshes. Can also be found in moderate currents and depths up to 1 m, will disperse through flowing water during the warm summer months. Yaqui topminnow are often associated with aquatic vegetation or other cover, with preferred habitats usually including dense mats of algae and debris along stream margins or in eddies below riffles, typically over sandy substrates covered with organic mud and debris (Minckley 1973, Rinne and Minckley 1991, USFWS 2009).

ELEVATION: Below 1,360 m (4,500 ft). According to W. Minckley (AGFD Native Fish Diversity Review 1995), they do not go above 1,300 m (4,265 ft.). Based on records in the Heritage Data Management System (HDMS), elevation ranges from 1138 – 1,409 m (3,730-4,620 ft) (AGFD, unpublished data accessed 2020).

PLANT COMMUNITY: Cottonwood/willow or burrobrush/seep willow terrestrial riparian communities, in association with aquatic plants such as green algae, *Nasturtium*, *Chara*, and *Potamogeton* spp.

POPULATION TRENDS: Uncertain. The Yaqui topminnow has a very small range in the United States, currently limited to waterways of San Bernadino and Leslie Canyon National Wildlife Refuges. Populations in Mexico are not well documented, and no population has been consistently monitored (Stewart et al. 2017). Populations on the wildlife refuges are reproducing and dispersing. Loss of habitat and the exotic mosquitofish (*Gambusia affinis*), are thought to be the main threats posed against this subspecies.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LE (USDI, FWS 1967, 1970) as *Poeciliopsis occidentalis* (incl. Yacqi)

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

OTHER STATUS: Not Forest Service Sensitive (USDA, FS Region 3 1999, 2013)
[Forest Service Sensitive, USDA, FS Region 3 1988]
Full Species - A, Determined Threatened in Mexico (NORMA Oficial Mexicana NOM-059-SEMARNAT-2010)
[Full Species Listed Threatened (Secretaría de Medio Ambiente 2000)]
[Full Species Listed Threatened Secretaría de Desarrollo Social 1994]

MANAGEMENT FACTORS: Water development and diversion, aquifer pumping, reduction in stream flows, drought, introduction of exotic species, and erosion from overgrazing are serious threats to the survival of the Yaqui topminnow. Wetland plant community succession, especially the proliferation and spread of cattail, decrease wetland habitat availability. Mosquitofish have caused the elimination of three introduced Yaqui topminnow sites (Bagley et al. 1991).

Management needs: protect San Bernardino aquifers, and Leslie Creek and San Bernardino Creek watersheds to ensure adequate perennial flow; identify priority management waters; ameliorate effects of nonnative fishes in management waters; re-establish self-sustaining populations in San Bernardino and Leslie Canyon NWR habitats; stabilize and protect populations in Mexico (AGFD 1996 in prep).

PROTECTIVE MEASURES TAKEN: The Nature Conservancy purchased the San Bernardino Ranch in 1980. The land was then sold to the U.S. Fish and Wildlife Service and the area was established as a national wildlife refuge. In 1984, the Sonoran Topminnow Recovery Plan was drafted. In 2007, the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service entered into a Safe Harbor Agreement for Topminnows and Pupfish in Arizona for the purpose of conservation, monitoring, and management (AGFD 2007). Wetland-specific conservation measures have been implemented on the Refuges to maintain or improve habitat conditions. In 2008 the USFWS completed the Leslie Canyon Watershed Safe Harbor Agreement (USFWS 2008a) and a Habitat Conservation Plan with the Malpai Borderlands Project (USFWS 2008b) and that includes conservation benefits for the Yaqui topminnow.

SUGGESTED PROJECTS: As identified in the Recovery Plan (1983): “1. Maintain, protect, and enhance existing populations and their habitats. 2. Continue surveying waters in the Gila River drainage and the United States portion of the Yaqui River drainage for undiscovered populations of topminnow. 3. Maintain stocks of both Gila and Yaqui topminnow at Dexter National Fish Hatchery. 4. Reintroduce Gila and Yaqui topminnow into suitable sites within the United States portion of their historic ranges. 5. Initiate and support further studies of the Gila and Yaqui topminnow. 6. Enforce all State and Federal laws protecting topminnow populations and their habitat. 7. Develop public support through an information and education program.” Work with Mexican authorities to regulate groundwater removal from the San Bernardino valley aquifer.

LAND MANAGEMENT/OWNERSHIP: U.S. Fish and Wildlife Service - San Bernardino National Wildlife Refuge; Leslie Canyon National Wildlife Refuge; Johnson Historical Museum; Private.

SOURCES OF FURTHER INFORMATION

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ADDITIONAL INFORMATION:

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