

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

Animal Abstract

Element Code:
Data Sensitivity:

AFCNB02060
No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Cyprinodon macularius*
COMMON NAME: Desert Pupfish
SYNONYMS: *Cyprinodon macularius macularius*
FAMILY: Cyprinodontidae

AUTHOR, PLACE OF PUBLICATION: Baird and Girard, 1853, Proceedings of the Academy of Natural Sciences of Philadelphia 6:1-155.

TYPE LOCALITY: San Pedro River, Arizona.

TYPE SPECIMEN: Unknown

TAXONOMIC UNIQUENESS: 12 species of *Cyprinodon* in North America, two species in Arizona, *C. macularius* and *C. eremus*.

DESCRIPTION: "Body thickened, chubby, or markedly compressed, laterally, in adult males. Mouth superior, highly protractile, armed with tricuspid teeth. Circuli of scales with marked, spine-like projections. Dorsal profile smoothly rounded, not markedly concave posterior to origin of dorsal fin.

Body color of females and juveniles with silvery background, with narrow, vertical, dark bars on sides, generally interrupted laterally to give the impression of a disjunct, lateral band. Fins generally colorless, with the exception of an ocellate spot in dorsal, and rarely a dark spot in anal fin. Mature, breeding male with caudal fin and posterior part of the caudal peduncle yellow or orange, sometimes intense orange-red; other fins generally dark. Body iridescent light- to sky-blue, especially on dorsum of head and predorsal region" (Minckley 1973).

AIDS TO IDENTIFICATION: *C. macularius* differs from the Quitobaquito pupfish, *C. eremus*, by having a narrower head, body, and mouth; longer pelvic fins and depressed anal fins (Miller and Fuiman 1987).

ILLUSTRATIONS: B&W photo (Minckley 1973:189)
Color drawing (Page and Burr 1991)
Color photo (Rinne and Minckley 1991:25)

TOTAL RANGE: Historic range includes lower Gila River basin in Arizona and Sonora, Mexico, including the Gila, Santa Cruz, San Pedro, and Salt rivers as well as the lower Colorado River in Arizona, California, and adjacent Mexican states from the vicinity of Needles downstream to the Gulf of California. Presently, the only remaining natural populations are found in a few sites in the Salton Sea drainage in California, and the Colorado Delta in Baja California and Sonora, Mexico (Minckley 1973, U.S. Fish and Wildlife Service [USDI, FWS] 1993).

RANGE WITHIN ARIZONA: There are no natural populations of this subspecies remaining in Arizona. Reintroduced populations exist at Cold Springs in Graham County, AD Wash in Maricopa County, and Finley Tank in Santa Cruz County. There are also several (9) refugia populations in private ponds and aquariums.

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: Capable of withstanding extreme environmental conditions. Known to survive in water with low oxygen content, temperatures over 35EC (95E F), and salinities almost 3 times that of sea water (Minckley 1973).

REPRODUCTION: When breeding, male pupfish become highly aggressive and territorial. When female ready to spawn, she enters a male's territory. Upon spawning, fertilized eggs are deposited randomly within territory. Territorial behavior of males tends to protect eggs although unintentionally. Hatching occurs within a few days. Growth of young is rapid, sexual maturity may be reached in six weeks under favorable conditions. Pupfish seldom live longer than a year (Minckley 1973).

FOOD HABITS: Small invertebrates, mosquito larvae, detritus, algae, and small bits of aquatic vegetation (Naiman 1979). In softer substrates, dig small pits in search of food and then aggressively defend the pits (Minckley 1973).

HABITAT: Pupfish occupy shallow waters of springs, small streams, and marshes. Often associated with areas of soft substrates and clear water (USFWS 1993).

ELEVATION: Below 1,500 m [4,920 ft.] (Rinne and Minckley 1991). Based on records in the Heritage Data Management System (HDMS), elevation ranges from 1,200 to 3,450 ft (366 - 1,052 m) (AGFD, unpublished data accessed 2001).

PLANT COMMUNITY:

POPULATION TRENDS: Once common fish, now extirpated from most of natural range. Trend since early 1900's has been loss of habitat and declining numbers.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LE (USDI, FWS 1986)
STATE STATUS: WC (AGFD, WSCA in prep)
 [State Endangered at subspecies, AGFD, TNW 1988]
OTHER STATUS: No Forest Service Status (USDA, FS Region 3 1999)
 [Forest Service Sensitive, USDA, FS Region 3 1988]
 Determined Subject to Special Protection (Secretaría de Medio Ambiente, 2000)

MANAGEMENT FACTORS: Activities that are known to be detrimental to pupfish populations should be avoided ie.: dewatering of habitats, stream impoundment, channelization, domestic livestock grazing, timber harvesting, mining, road construction, polluting, and stocking non-natives.

Threats: spring habitat alteration and development; habitat destruction; drought; predation by and competition with nonnative fishes. **Management needs:** protect existing populations; assess genetic composition of remaining naturally occurring populations; identify refugium populations; re-establish populations; monitor and manage reintroductions to maintain minimum of 55 sites in Arizona.

PROTECTIVE MEASURES TAKEN: Recovery plan developed in 1993. Refugia populations established in private ponds and aquariums. Reintroduction efforts made in natural and "quasi-natural" locations.

SUGGESTED PROJECTS: As outlined in recovery plan (USDI, FWS 1993): 1) Protect natural populations of desert pupfish; 2) Re-establish desert pupfish populations; 3) Develop protocols for exchange of genetic

material among desert pupfish populations; 4) Monitor and maintain natural, re-established, and refugium populations; 5) Determine factors affecting population persistence; 6) Information and education.

LAND MANAGEMENT/OWNERSHIP: BLM - Kingman, Safford and Tucson Field Offices; USFS - Tonto National Forest; TNC - Hassayampa River Preserve; Roper Lake State Park; Private.

SOURCES OF FURTHER INFORMATION

LITERATURE CITATIONS:

- Arizona Game and Fish Department. 1988. Threatened Native Wildlife in Arizona. p.28.
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- Page, L.M. and B.M. Burr. 1991. A field guide to freshwater fishes: North America, north of Mexico. Houghton Mifflin Co., Boston. p. 228.
- Rinne, J.N. and W.L. Minckley. 1991. Native fishes of arid lands: a dwindling resource of the desert southwest. U.S. Department of Agriculture, Forest Service, General Technical Report RM-206. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. pp.25-27.
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- USDI, Fish and Wildlife Service. 1986. Endangered and threatened wildlife and plants; determination of endangered status and critical habitat for the desert pupfish. Federal Register 51(61):10842-10850.
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ADDITIONAL INFORMATION:

Revised: 1994-09-15 (JNY)
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