5-YEAR REVIEW

Warm Springs pupfish
(*Cyprinodon nevadensis pectoralis*)

Warm Spring pupfish / Illustration by Joseph R. Tomelleri

May 2021

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GENERAL INFORMATION:

Species: *Cyprinodon nevadensis pectoralis*
Date listed: October 13, 1970
FR citation(s): 35 FR 16047
Classification: Endangered

BACKGROUND:

Most recent status review: None. The 5-Year Review was initiated March 25, 2009, but not completed (74 FR 12878).

FR Notice citation announcing this status review:
84 FR 36116. Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of 58 Species in California, Nevada, and the Klamath Basin of Oregon. July 26, 2019

ASSESSMENT:

Information acquired since the last status review:

This 5-year review was conducted by the U.S. Fish and Wildlife Service (Service) Southern Nevada Fish and Wildlife Office. Data for this review was solicited from interested parties through a Federal Register notice announcing this review on July 26, 2019. We also contacted State and local agencies, partners, stakeholders, and species experts to request any data or information we should consider in our review. Additionally, we conducted a literature search and a review of information in our files.

The Warm Springs pupfish (*Cyprinodon nevadensis pectoralis*) is a small-bodied fish (Cyprinodontiformes: Cyprinodontidae) endemic to the Ash Meadows National Wildlife Refuge in Amargosa Valley, Nye County, Nevada (AMNWR). The original listing for this subspecies follows the August 25, 1970, Notice of Proposed Rule (35 FR 13519). At that time, the Warm Springs pupfish was subject to restricted distribution (six, low-flow springs), and imminent changes to the landscape from sources such as domestic land use, clearing of land for road construction and agricultural purposes, pumping of ground water, and diversion of surface flows that threaten the integrity of the species' habitat and therefore their survival (Service 1980, 1990).

At the time of listing in 1970, little was known about the species. Later, life-history information was collected by Soltz (1974). This worked identified that spawning occurs in the spring, and population size varies dramatically throughout the year. The biology of this species is similar to other pupfishes in the region (Minckley 1973, Naiman 1974, Soltz and Naiman 1978), and specifically those occurring on the AMNWR, such as the Ash Meadows Amargosa pupfish (*Cyprinodon nevadensis mionectes*) and Devils Hole pupfish (*Cyprinodon diabolis*). Although this is the first 5-year Review for this species, a previous 5-Year Review for the Ash Meadows

Amargosa pupfish (Service, 2010) noted that all Death Valley group pupfishes are generalist omnivores with similar life-history requirements, and the threats specifically associated with the Warm Springs pupfish are identical with the closely related and geographically proximate Ash Meadows Amargosa pupfish. The entire historical distribution for the Warm Springs pupfish includes six small springs referred to as the Warm Springs complex on the AMNWR.

Today, the Warm Springs pupfish still occurs in the same historically described springs when originally listed (North Indian, South Indian, North Scruggs, South Scruggs, Marsh, and School springs). Since the land ownership was acquired by the Service in 1984, some of the original threats (excluding water-supply threats), such as impacts from competitive and predatory non-native fishes and crayfish have been mitigated. Habitat renovation to remove and prevent these invasive species is an ongoing process [Desert Complex Natural Resource Management Plan (NRMP), *in review*], and its habitat is now characterized by restricted public vehicle access, with a program to monitor environmental DNA for invasive species.

Abundance of this species is highly variable, fluctuating dramatically over the course of the year (Service 1980, 1990), and is reflected in periodic surveys by AMNWR staff. Total catch per spring can range from 1 or 2 individuals in School or Indian springs to several hundred in the Scruggs springs (AMNWR fish monitoring data 2012-2017). Both species biology and the modification of fish sampling protocols over time presents difficultly in estimating abundance, especially in light of changing habitat conditions during the restoration of habitat (see examples in NRMP *in review*; and Desert National Wildlife Refuge Complex Comprehensive Conservation Plan 2009). Further, AMNWR is unable to survey annually due to staffing, oftentimes leading to surveys that occur every 2-3 years, a frequency difficult to determine trends in population size. Despite these successes to manage invasive species, adequate spring discharge remains a primary threat.

The concerns expressed previously for groundwater extraction have heightened in recent years, with new understanding of the level of connectivity of the aquifer feeding springs of Ash Meadows. The hydrogeology of the region has received even more attention given the ongoing demands for water in the desert (i.e., pumping) and the likely reduced springflow as a consequence of climate change. The USGS report of Halford and Jackson (2020) represents the most recent literature available that expands on the basic notion of nearby pumping affecting Ash Meadows. The Ash Meadows discharge area occurs at the terminus of a hydrologically significant feature referred to as the "megachannel" (Winograd and Pearson 1976). The megachannel is an 80 km (50 mi) long by 40 km (25 mi) wide area of fractured carbonate rock that has estimated transmissivities spanning from 20,000 to 2,000,000 ft^2/d (Halford and Jackson 2020, p. 136). High estimated transmissivities and confined aquifer conditions cause groundwater pumping signals to propagate large distances 24–32 km (15–20 mi) in short timespans (less than 2 yrs.) within the megachannel. Therefore, pumping from carbonate rock in the megachannel can significantly impact water levels and spring discharges in the Ash Meadows discharge area. Halford and Jackson (2020) specifically determined that groundwater pumping from within the central Amargosa Desert, along with Indian Springs, Nevada, and the Nevada National Security Site can capture discharge from springs within the Ash Meadows discharge area. Further discussions between the Service and USGS are planned for 2021 that include conducting further aquifer tests to estimate the level of drawdown of the aquifer and the effects on the springs.

In recent years, the Nevada State Engineer (NSE) further recognized the potential for groundwater reduction to threaten the habitat at Devils Hole (a nearby spring within the AMNWR boundaries). The NSE signed Order 1197A (January 12th, 2018, State of Nevada 2018), *Curtailment of New Appropriations of Groundwater within the Amargosa Valley Hydrographic Basin 230*, that prohibits new applications for water or water diversions within 25 miles of Devils Hole. Order 1197A supersedes 1197 (State of Nevada 2008), which imposed similar regulations at 10 miles from Devils Hole.

Conclusion:

After reviewing the best available scientific information, we conclude that the Warms Springs pupfish (*Cyprinodon nevadensis pectoralis*) remains an endangered species. The evaluation of threats affecting the species under the factors in 4(a)(1) of the Act and analysis of the status of the species in our listing determination (35 FR 16047) remain an accurate reflection of the species current status.

RECOMMENDATIONS FOR FUTURE ACTIONS:

1. Monitor compliance with Nevada Revised Statute Order 1197A (January 12, 2018), Curtailment of New Appropriations of Groundwater within the Amargosa Valley Hydrographic Basin 230, that prohibits new applications for water or water diversions within 25 miles of Devils Hole (and by proximity to AMNWR). Water levels in Devils Hole, and concomitantly, spring flows at AMNWR, are affected by pumping centers in the Amargosa Desert and the Ash Meadows groundwater basins (Halford and Jackson 2020).

2. Collaborate with the AMNWR to implement the *Desert National Wildlife Refuge Complex – Ash Meadows, Desert, Moapa Valley, and Pahranagat National Wildlife Refuges Final Comprehensive Conservation Plan and Environmental Impact Statement, Volume I – August 2009* (Service 2009) and also the *Draft Ash Meadows Natural Resource Management Plan* in review (Service*, in review*); and

3. Support Ash Meadow Amargosa pupfish research at the AMNWR to monitor the population as identified in the *Recovery Plan for the Endangered and Threatened Species of Ash Meadows* (Service 1990); and

4. Monitor the future activity of mineral rights in the Ash Meadows area. The BLM ACEC surrounding the refuge is withdrawn from mining and entry until 2029 (PLO# 7737, signed November 2nd, 2009), but requires renewal every 20 years. Mining can still occur on private inholdings within the refuge, but no active mining permits exist at this time.

Lead Field Supervisor, Fish and Wildlife Service

Approved GLEN KNOWLES Digitally signed by GLEN KNOWLES Date: 2021.05.06 12:39:08 -07'00' Date _____

Literature Cited:

Halford, K.J., and Jackson, T.R. 2020. Groundwater characterization and effects of pumping in the Death Valley regional groundwater flow system, Nevada and California, with special reference to Devils Hole: U.S. Geological Survey Professional Paper 1863, https://doi.org/10.3133/pp1863. 178 pp.

Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department.

Naiman, R.J. 1975. Food habits of Amargosa pupfish in a thermal spring. Transactions of the American Fisheries Society, Volume 104, Number 3: 536-538.

Soltz, D.L. 1974. Variation in life history and social organization of some populations of Nevada pupfish, *Cyprinodon nevadensis*. Ph.D. thesis, Univ. California, Los Angeles, 160 pp.

Soltz, D.L. and R.J. Naiman. 1978. The natural history of native fishes in the Death Valley system. Natural History Museum of Los Angeles County, Science Series 30: 1-76.

State of Nevada. 2018. Order 1197A. Nevada State Engineer, Department of Water Resources, Carson City, Nevada. Online at: http://images.water.nv.gov/images/Orders/1197Ao.pdf; accessed on 9/30/20. 2 pp.

State of Nevada. 2008. Order 1197. Nevada State Engineer, Department of Water Resources, Carson City, Nevada. Online at: http://images.water.nv.gov/images/Orders/1197o.pdf; accessed on 9/30/20. 2 pp.

[Service] U.S. Fish and Wildlife Service. 1980. Recovery plan for the endangered and threatened species of Ash Meadows, Nevada. U.S. Fish and Wildlife Service, Portland, Oregon. 149 pp.

[Service] U.S. Fish and Wildlife Service. 1990. Recovery plan for the endangered and threatened species of Ash Meadows, Nevada. U.S. Fish and Wildlife Service, Portland, Oregon. 123 pp.

[Service] U.S. Fish and Wildlife Service. 2009. Desert National Wildlife Refuge Complex: Ash Meadows, Desert, Moapa Valley, and Pahranagat National Wildlife Refuges: final comprehensive conservation plan and environmental impact statement. Pacific Southwest Region Office. Sacramento, California.

[Service] U.S. Fish and Wildlife Service. 2010. Ash Meadows Amargosa pupfish 5-year Review Summary and Evaluation. U.S. Fish and Wildlife, Las Vegas, Nevada. 40 pp.

Winograd, I.J. and Pearson Jr, F.J., 1976. Major carbon 14 anomaly in a regional carbonate aquifer: Possible evidence for megascale channeling, south central Great Basin. Water Resources Research 12(6), pp.1125-1143.