

VANISHING FISHES OF NORTH AMERICA

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paintings by Aleta Pahl

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The woundfin was first placed on the Department of Interior's Endangered Species List in 1967. Biologists attempted to transplant the woundfin into four streams in Arizona at the periphery of the woundfin's historic range, but the efforts failed. In 1979, a group of biologists sponsored by the U.S. Fish and Wildlife Service formed the Woundfin Recovery Team and developed a Woundfin Recovery Plan. The goal is to establish self-sustaining populations of the woundfin in the Virgin River and at least two other streams in the woundfin's historic range to secure the woundfin from extinction. The recovery team's success will depend to a large extent on the outcome of the proposed Virgin River energy and water projects. In the final analysis, survival of the woundfin depends on whether the Virgin River habitat is eventually upgraded and stabilized.

The reason for saving the woundfin and preventing the further deterioration of the Virgin River ecosystem is stated in the conclusion of one of the Allen-Warner project technical reports: "Irrigation projects in the southwest are generally shown to be short-lived in a geologic timescale, whereas continued productivity of a natural ecosystem is a long-term phenomenon. Therefore, we are trading a relatively short-term use of a natural resource for economic gain for long-term productivity of a natural ecosystem. Consequently, we are losing the availability of the knowledge contained in the ecosystem, a long-term benefit to man."

Moapa Dace *Moapa coriacea*

The Moapa River originates from the warm outflow of more than twenty thermal springs in the northeastern part of Clark County, Nevada, and flows southward for 26 miles into the Overton Arm of Lake Mead. Before Hoover Dam was built and the Colorado River and the lower portion of the Virgin River were impounded, the Moapa River emptied into the Virgin River just above its confluence with the Colorado River. Heading south, the warm crystalline headwaters of the Moapa River cooled a little and picked up sediments, taking on the turbid appearance that earned the river its Paiute Indian name of "moapa" or muddy.

Five native fishes inhabit the Moapa River: the Moapa speckled dace, *Rhinichthys osculus moapae*; the roundtail chub, *Gila robusta*; the Moapa White River springfish, *Crenichthys baileyi moapae*; the desert sucker, *Catostomus clarki*; and the Moapa dace, *Moapa coriacea*. A sixth native species, the woundfin, *Plagopterus argentissimus*, has been found in the Moapa River, but is not a permanent resident. As a result of the physical and chemical alterations of the river, the depletion of its headspring waters for commercial and domestic uses, and the introduction of exotic fish species, all of the native fishes in the Moapa River are either endangered or threatened.

The endangered Moapa dace is endemic to the headwaters of the Moapa River where the springs and their outflow maintain the water temperature between 82° and 90°F. Historically this habitat was chemically and physically

very stable compared to downstream areas. The Moapa dace can tolerate the cooler temperatures and increased turbidity of the downstream waters, but is most abundant in the headwaters. In the upstream areas, it appears to prefer crystalline clear pool areas that support an abundant algal growth. The pools are three to fifteen feet wide, six inches to five feet deep, and are partially overgrown by a canopy of streambank vegetation. The gentle currents of the pools and streams flow over a substrate of gravel and pebbles, occasionally interrupted by sandy or muddy areas.

The Moapa dace, the only species of the genus *Moapa*, is among the smallest of the endangered fishes of the Colorado River basin. The Moapa dace reaches sexual maturity when only 1.3 to 3 inches long. Its small scales are deeply embedded in the skin, giving the skin the leathery texture from which the fish's scientific name "*coriacea*," which means leathery, is derived. The Moapa dace is colored deep olive along its back and sides, with greenish brown patches on its upper sides and a wide, black stripe along the middle of its back. Its sides have a shining golden brown band that contrasts sharply with lighter colors of the sides. The Moapa dace is distinguishable from the similar roundtail chub and Moapa speckled dace by its prominent back stripe and by a black spot at the base of its tail. Virtually no detailed information exists on the life history of this tiny fish. The Moapa dace lives in schools and feeds primarily on insects. Like many warm spring desert fishes, they spawn year round, with peak spawning activities in the spring and summer.

Between 1933 and 1950 the Moapa dace was abundant in the Moapa River headwaters, and ichthyologists estimated that the species occupied 25 springs and about 10 miles of spring outflows. By 1964, the Moapa dace was rare in collections from the same area. In 1969, the International Union for Conservation of Nature and Natural Resources (IUCN) Red Data Book on the status of freshwater fishes estimated that the Moapa dace population numbered 500 to 1000 individuals. By 1977, the IUCN estimated that only "a few hundred" Moapa dace remained in the river. Current estimates indicate that the species exists in only three springs and less than two miles of outflow. Reproduction has been documented only in a one hundred yard stretch of outflow from one spring.

The dramatic decline in the Moapa dace population coincided with the introduction and establishment of at least two exotic fishes—the mosquitofish, *Gambusia affinis*, and the shortfin molly, *Poecilia mexicana*—which competed for the limited habitat resources and introduced new parasites. Ichthyologists estimate that a total of nine exotic species have been introduced into the Moapa River, seven of which have become common to abundant since the early 1970s.

The Moapa dace has also suffered from destruction of habitat. Most of the Moapa River headwater springs are on private property and have been lined with gravel or cement and channeled into irrigation canals or water conduits and chlorinated for human consumption. In addition, much of the vegetation that once formed a protective canopy over the springs and pools has been cleared, further altering the environment. The only surviving populations of the Moapa dace are found in springs on agricultural land owned by the Church of the Latter Day Saints and on a section of private land managed by the Moapa Valley Water Users District.

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Thermal headwater springs and pools are prime habitat for the Moapa dace. These
springs are located in the headwaters of the Moapa River. Photo by J. D. Williams.

In 1967 the U.S. Fish and Wildlife Service listed the Moapa dace as an endangered species. They later, in 1979, purchased twelve acres of land and the water rights for several headsprings and established the Moapa National Wildlife Refuge. Under the provisions of a Recovery Plan developed in 1982, the Fish and Wildlife Service will delist the Moapa dace after restoring the species to five of approximately twenty of the species' original habitats. To accomplish this goal the U.S. Fish and Wildlife Service plans to reintroduce the Moapa dace into existing spring outflows and newly constructed stream and pool habitats on the Moapa National Wildlife Refuge. The dace also will be introduced into the Upper Plummer Springs, one of the original spring habitats of the Moapa dace that is currently part of the Desert Warm Springs Resort.