The Rio Grande Silvery Minnow Recovery Effort at the Albuquerque Biological Park

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The Rio Grande silvery minnow (*Hybognathus amarus*) is a federally endangered fish native to large Rio Grande drainage rivers of New Mexico and Texas. It has been extirpated from 90-95% of its historic range. Currently, Rio Grande silvery minnows exist within 174 miles of the Rio Grande between Cochiti Dam and Elephant Butte reservoir. The population is fragmented by three diversion dams: Angostura, Isleta and San Acacia. Interchange between population fragments may occur in a downstream direction via drifting eggs and larvae. However, it is highly unlikely that Rio Grande silvery minnows are able to emigrate upstream through the diversion dams. For this reason the minnow is most rare upstream, and increasing in abundance downstream.

Other factors that have decreased the minnow's survival include surface flow intermittency, hypolimnetic release from upstream dams, capture of sediment by dams, reduction of peak flows, modification of geomorphology and the riparian corrider, depletion of groundwater aquifers, diversion of river water and groundwater onto croplands, and entrainment of the minnows into irrigation works and canals.

Recent surveys have documented that the Rio Grande silvery minnow populations in the Albuquerque and Belen reaches are in steep decline.

Reestablishment of Rio Grande silvery minnow populations into suitable habitat within its historic range is included in the Rio Grande Silvery Minnow Recovery Plan. The plan suggests transplanting wild fish and/or culturing wild stock to develop broodstock for future repatriation.

Working with the U.S. Fish and Wildife Service

In early 1999, the Fishery Resources Office of the U.S. Fish and Wildife Service (FWS) asked the aquarium staff at the Albuquerque Biological Park in Albuquerque, New Mexico, if we would be interested in a cooperative project to captive-rear silvery minnows for reintroduction to the Rio Grande. The plan was to collect gravid adults from the river just above Elephant Butte reservoir, and spawn them at the Biopark. (Eggs spawned at that site are generally considered to be lost as they wash into the reservoir and cannot survive there.) We would then captive-rear the larvae throughout the summer and release them into the Albuquerque reach of the river where they are much more scarce.

Silvery minnows had rarely been spawned or captive-raised before, so the whole project was an experiment to see if it could be done, as a last-ditch effort to save the species.

With funding from the Albuquerque Public Works department, we hired two additional staff people and set up tanks for the minnows. In two trips to Socorro in the spring of 1999, with personnel from the FWS, we collected about 200 gravid minnows. We successfully transported the fish to the Biopark, where Head Aquarist Chris Altenbach spawned them that night by injecting them with carp pituitary extract to stimulate the release of their eggs and milt, a technique often used in aquaculture.

The next day we had hundreds of thousands of eggs and shortly after that hundreds of thousands of fry.

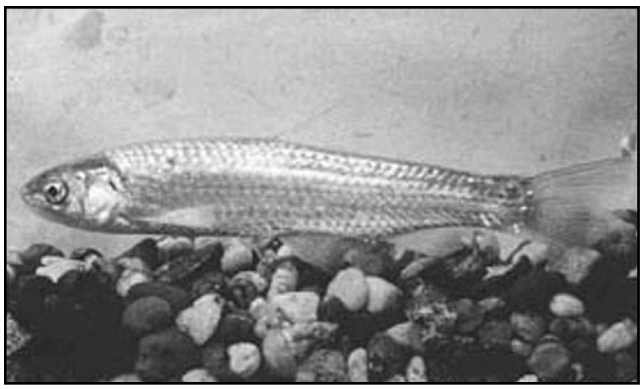

Fig. 1.
Rio Grande silvery minnow, *Hybognathus amarus*.
Photo: U.S. Fish and Wildlife Service.

Captive Reproduction of the Rio Grande Silvery Minnow

We had hoped to raise 5000 juveniles for release and considered that number to be feasible, because of natural recruitment rates and available space. We lost many of them as expected, however. Silvery minnows are especially difficult to transition from the larval stage where they get their nutrients from an attached yolk sac, to the stage where they begin to eat on their own. They are also very sensitive to any change in water quality. Tanks had to be kept immaculate to prevent fungal and bacterial growth. And many were just puny, deformed, or otherwise failed to thrive.

Throughout the summer we fed the minnows, cleaned their tanks, fed them some more, and they grew! We scrambled to add more tanks to accommodate their growth. In August 1999, we were running out of space, so we called FWS to tell them we needed to release some early or risk losing them to overcrowding. We released 3400 minnows into the Rio Grande, and, breathing a sigh of relief, went back to raising the rest of them.

During this time, FWS was conducting regular surveys of the minnow population in the river, and was alarmed to find a drastic decline. Especially alarming was the fact that FWS found only a handful of the young-of-the-year. Silvery minnows complete their life cycle in a year or two at the most, so a failure of the young to survive in any given year can have drastic consequences for the species. Our silvery minnows suddenly became extremely important. It was no longer merely an experiment, but possibly the means to save the species from extinction. We were asked to hold onto our minnows through another season and hopefully spawn them in the spring.

As the project continues there have been several new and exciting developments. The New Mexico Interstate Stream Commission along with the Bureau of Reclamation has agreed to fund a silvery minnow "Naturalized Refugium" and a support building to be built on Biopark property, to the tune of $1.3 million. The refugium will consist of a naturalistic stream, continuously flowing in a roughly donut-shaped configuration. Like the river, it will have a gravel/silt substrate, boulders, cottonwood boughs, shaded areas, sunny areas, deeper pools, and shallow areas. The current velocity will be variable to mimic conditions in the river and water from the river will be used in it whenever possible. The goal is to stock the refugium with minnows and let them breed and grow through their natural life cycle. We plan to harvest surplus minnows for release into the river. Since the refugium concept is strictly experimental at this point, a support building with traditional tanks and filtration systems will ensure that we will be able to raise minnows for release and/or stocking the refugium. Construction of the refugium is scheduled to begin soon with a completion date set for Spring 2002.

Other exciting news is that as of this writing, we have successfully spawned approximately 175,000 minnows this year, both wild-caught adults and our spawn from last year! A second generation of captive-spawned minnows has never happened before, so we are continually learning and gaining valuable information on the life history of this little fish.

We hope that our efforts and those of others pay off and save the Rio Grande silvery minnow from extinction.

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