

Big Bend NP Provides Water for Rare Fish

By Gerard Hoddenbach and William Werrell

The top-water minnow, *Gambusia gaigei*, still receives management and research support to promote its survival in Big Bend National Park, Texas.

Since discovery of this rare, endangered fish by Frederick M. Gaige in August 1928, the Big Bend *Gambusia* has been seriously threatened with extinction numerous times and continual efforts are still being made to ensure its survival. The history and details of NPS activities from the mid 1950s to 1981 to perpetuate this fish were documented in *Park Science* (Volume 2, No. 3: p. 12; Spring 1982). Subsequent research and planning are reported here.

One option to provide suitable habitat for Big Bend *Gambusia* was a plan to drill a well in the vicinity of the present *Gambusia* refugium pond. It was anticipated that the well would flow at the surface at about 15 gpm by intercepting the aquifer, which produces the natural spring flows supplying the present *Gambusia* refugium. Thus, the water would be expected to be chemically and thermally acceptable to the fish. A constructed channel leading away from the well would provide a desirable flowing water habitat.

Southwest Regional Hydrologist, Gary Moore, carefully selected a site, and, in the fall of 1983, the well was drilled to a depth of 290 feet. The well bottomed in fractured rock in the lower 40-foot interval believed to be within the aquifer responsible for spring flows in the area. Construction of the well properly included placing cement grout from the surface to a 175-foot depth to prevent loss of aquifer head in the upper portion of the boring where it adjoined adjacent alluvium.

The authors conducted an aquifer test of the well in early 1984. Although the well had not flowed during construction, it was hoped additional pumping and development would cause surface flow. Unfortunately, testing results showed that the static water level of the well was 3.91 feet below ground surface. In view of these data and the perceived hydrologic system present, it was not recommended another well drilling attempt be made.

Further evaluation of possibilities has led the authors to recommend modification of the developed spring cistern. That plan details placement of several pipes at different elevations in the side of the cistern and construction of a pond adjacent to the spring source. Water from the cistern would be released to the ponds in desired flow and at required thermal rates by appropriately valving a pipe at the proper elevation while lower pipes remain capped.

This plan further allows flow adjustments to accommodate seasonal and annual flow variations. A variably terraced stream running at the desired 15-20 gpm could be constructed from the pond overflow and provided shade by planned vegetational plantings. After stabilization and further testing, the pond and outflow would be stocked with *Gambusia*.

This new recommendation provides a naturally occurring water habitat – one not relying upon a difficult-to-maintain, remote electrical power supply. Should water level in the cistern fall below the lowest outlet pipe, a solar-powered pump would provide water to the pond and stream habitat.



***Gambusia* Pond** is marked with this sign, warning against putting other fish in the pond, plus another wooden marker with the legend "FISH SO FRAGILE: This pond contains the world's population of *Gambusia gaigei*. These minnow-sized fish have lived here since mastodons. Unique and fragile, they survive today only because man wants to make it so."

Two back-up populations of *Gambusia* are currently maintained. A small permanent population is located at the U.S. Fish and Wildlife Service fish hatchery in Dexter, New Mexico. The second, now within the present refugium pond, would be maintained for two or more years after completion of modifications at the cistern site to assure unsuspected flooding or other catastrophe does not jeopardize the continued existence of this rare and unique fish.

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