Clear Creek Gambusia

Scientific Name: *Gambusia heterochir*

Federal Status: Endangered, 3/11/67 • State Status: Endangered

Description

The Clear Creek gambusia is a small, stocky fish, about 1.2 to 1.3 inches in length, with a metallic sheen. Scattered dark markings on some scales form distinctive crescent-shaped patterns. Unlike some other *Gambusia* species, this fish has no speckling on the tail or yellow pigment on the dorsal or anal fins. Females have a pronounced anal spot, especially when pregnant, and males have a deep notch at the top of the pectoral fin. Like other live-bearers, the male's anal fin is modified into a tube-like structure called a gonopodium for transferring sperm to the female.

Clear Creek Gambusia

Habitat

The Clear Creek gambusia is restricted to the springfed headwaters of Clear Creek, a tributary of the San Saba River in Menard County in central Texas. This fish was first discovered in February, 1953. Upper Clear Creek consists of a series of limestone springs (Wilkinson Springs) originating from the Edwards Trinity Aquifer. Prior to 1890, a low, earthen-concrete dam was built about 80 yards downstream from the headsprings. In the 1930s, three additional dams were built downstream from the original dam, ponding water to the base of each dam. Extensive collecting of fish in 1956 and 1957 showed that the Clear Creek gambusia was restricted to the springfed uppermost pool. This area, about 2.5 acres in size, provides clear spring water of constant temperature and low pH (slightly acidic), with abundant aquatic vegetation. Below the first dam, the habitat changes abruptly, with higher pH (more alkaline), different vegetation, and greater temperature fluctuations. This habitat is less suitable for the spring-dwelling Clear Creek gambusia, and more suitable for the western mosquitofish (*Gambusia affinis*), a major competitor.

Life History

The Clear Creek gambusia is viviparous (bears living young). Once fertilized, females can store sperm for several months, and they may produce several broods of young from March through September. Factors such as day length, temperature, and food availability have been shown to influence reproductive success.

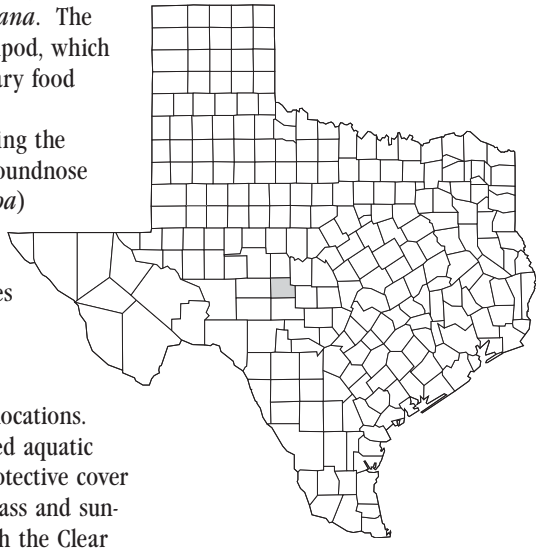
The Clear Creek gambusia is closely associated with coontail (*Ceratophyllum* sp.), an aquatic plant, and an endemic amphipod (small crustacean), *Hyalella texana*. The plant supports the amphipod, which in turn serves as a primary food source for the fish.

Other fishes inhabiting the upper pool include the roundnose minnow (*Dionda episcopa*) and the greenthroat darter (*Etheostoma lepidum*). These small fishes do not compete with the Clear Creek gambusia because of different food preferences and feeding locations. Maintenance of submerged aquatic plants, which provide protective cover from predators such as bass and sunfish, is important for both the Clear Creek gambusia and its prey.

Threats and Reasons for Decline

Originally, Clear Creek was a clear springrun that flowed freely for about 3 miles to its confluence with the San Saba River. Most or all of the creek was probably inhabited by springrun species such as the Clear Creek gambusia and associated plants and animals. A series of dams, the first one built in the 1880s and the others during the 1930s, were constructed to provide irrigation to cultivated fields. The resulting changes in habitat encouraged population buildup of plants and animals more tolerant of variable water temperatures. These eurythermal (wide temperature tolerance) organisms soon overwhelmed the springrun animals that were not isolated upstream from the first dam (Dam 1).

Since the only habitat for the Clear Creek gambusia exists upstream from Dam 1, this dam is vital for protecting an environment isolated from invasion by the western mosquitofish. In 1979, Dam 1 was in serious disrepair due to age, the effects of tunneling by nutria (a large introduced rodent), and the expansion of root systems of trees. Hybridization between the Clear Creek gambusia and western mosquitofish had occurred in the vicinity of the dam. This hybridization problem was the



result of mosquitofish juvenile females moving to the upper pool through damaged portions of the dam. If allowed to continue, hybridization and competition from the western mosquitofish may have eliminated the Clear Creek gambusia. In the summer of 1979, Dam 1 was rebuilt, securing the upper pool habitat for the Clear Creek gambusia.

In 1985, researchers found an increased number of Clear Creek gambusia downstream from the reconstructed dam. Soon after the dam

was rebuilt, rainwater killifish (*Lucania parva*) were found in Clear Creek below the dam. This fish is not native to the Edwards Plateau and may have been released into Clear Creek by someone discarding leftover bait. Rainwater killifish and western mosquitofish, although not closely related, are very similar with respect to food habits, habitat preferences, and tendency to move seasonally to areas of warmer water. Thus, rainwater killifish compete directly with western mosquitofish. Reduction in the numbers of western mosquitofish apparently allowed the Clear Creek gambusia to survive in greater numbers below the upper dam.

Finally, the continued existence of the Clear Creek gambusia depends on continued flow of Wilkinson Springs. Protection of the Edwards-Trinity recharge zone is essential. Any changes which reduce water flow or deteriorate water quality in Wilkinson Springs could have disastrous consequences for the Clear Creek gambusia.

Recovery Efforts

Continuous monitoring is ongoing to detect factors that may affect the Clear Creek gambusia population and determine the current genetic status of the population. The owners of Wilkinson Springs have been instrumental in protecting the species' habitat. Providing information to landowners and the general public concerning habitat requirements for rare and endangered fishes is an important part of the recovery process.

How You Can Help

Area landowners can help by protecting the groundwater of the Edwards-Trinity Aquifer. Do what you can as an individual to conserve water and prevent pollutants from entering the aquifer. Care should be taken to avoid reduction in recharge to the aquifer. Limestone aquifers are vulnerable to pollution and measures to prevent aquifer contamination are urged. Land managers can help by implementing sound range management practices designed to protect vegetative cover, improve range condition, and prevent soil erosion and runoff. Good vegetation management will help to ensure optimum aquifer recharge and the continuous flow of Wilkinson Springs and others like it.

Since competition and/or hybridization with closely related or introduced species is a major threat to endangered fishes, never release fish into natural waters from which they didn't originate. Although an exception occurred in the case of the rainwater killifish at Clear Creek, beneficial impacts resulting from introductions of exotic species are the exception and not the rule.

Finally, you can support the Special Nongame and Endangered Species Conservation Fund by purchasing a stamp, available at the Texas Parks and Wildlife Department (TPWD) headquarters in Austin or at most State Parks. Part of the proceeds from the sale of these items is used to conserve habitat and provide information concerning rare and endangered species.

For More Information Contact

Texas Parks and Wildlife DTexas Parks and Wildlife Department
Wildlife Diversity Branch
4200 Smith School Road
Austin, Texas 78744
(512) 912-7011 or (800) 792-1112
or
U.S. Fish and Wildlife Service
Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, Texas 78758
(512) 490-0057

Clear Creek spring
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Biologists using a seine net to sample fish
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References

Edwards, R.J., and C. Hubbs. 1985. *Temporal changes in the* Gambusia heterochir *x* G. affinis *Hybrid Swarm Following Dam Reconstruction.* USFWS, Albuquerque, New Mexico. 31 pp.

U.S. Fish and Wildlife Service. 1980. *Clear Creek Gambusia* (Gambusia heterochir) *Recovery Plan.* USFWS, Albuquerque, New Mexico. 29 pp.

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