

Aquatic Life in the Sonoran Desert

by Glen Knowles



Sonoyta mud turtle.

Photo by Jim Rorabaugh/USFWS

Nestled in one of the driest parts of the Sonoran desert, a pair of unique and fragile aquatic ecosystems straddles the border between the United States and Mexico: Quitobaquito Springs and the Rio Sonoyta. These permanent water sources have been a focal point of human migration and occupation for thousands of years and still are today. Biologists in the U.S. and Mexico are working together to protect a unique aquatic fauna that depends on these ecosystems.

The Quitobaquito spring snail (*Tryonia quitobaquitae*), the Quitobaquito pupfish (*Cyprinodon eremus*), and the Sonoyta mud turtle (*Kinosternon sonoriense longifemorale*) are endemic to the aquatic ecosystems of the Rio Sonoyta basin, where they persist as small remnant populations. These ecosystems include the springs and pond at Quitobaquito, stream habitat in the Rio Sonoyta, and another spring complex south of the Rio Sonoyta at Quitovac.

Quitobaquito Springs flows from fractured granite and gneiss rock of the Quitobaquito Hills in Organ Pipe Cactus National Monument, just on the Arizona side of the U.S./Mexico border. The two largest springs are capped and conducted into a manmade stream channel, which flows about 800 feet (244 meters) south to a small pond about a half acre (0.2 hectares) in size. About a mile (1.6 kilometers) south across the border from Organ Pipe Cactus National Monument, in the Mexican state of Sonora, lies the Rio Sonoyta. The Rio Sonoyta drainage originates on Tohono O'odham tribal lands in Arizona and Sonora and ends at the Sea of Cortez near the town of Rocky Point, Sonora. In the 1800s, water was probably much more extensive in

the Rio Sonoyta; many springs occurred at what is now the town of Sonoyta.

Today, permanent surface water occurs only in a few short reaches of no longer than a mile (1.6 km) over about 20 miles (32.2 km) of stream course.

The Quitobaquito spring snail is a tiny, 0.06 inch long (1.5 mm) aquatic snail that belongs to the Hydrobiidae family. The Hydrobiidae is composed of numerous endemic populations in springs and seeps throughout the southwestern U.S. The Quitobaquito spring snail is found only in Quitobaquito and two nearby springs. Little is known about the snail, although it appears to require hard substrates and moderately flowing water. Quitobaquito Springs offers both these requirements in the manmade channel that flows from the spring source to the pond.

The endangered Quitobaquito pupfish is a small fish, typically about 1.2 inches (3 cm) long, that can live up to 3 years. Silvery in color, with darker vertical bars on their sides, males turn an iridescent light- to sky-blue during the spring breeding season. Pupfish are well suited to desert environments, where high evaporation rates can create water with high salinity levels and high temperatures. They can tolerate salinity levels ranging from normal tap water to water twice as salty as seawater and water temperatures as high as 113 degrees Fahrenheit (45 degrees Celsius). They occur only in the pond and channel at Quitobaquito Springs, and in a short perennial reach of the Rio Sonoyta about a mile (1.6 km) long, just across the border from the pond at Quitobaquito, on the Pinacate and Gran Desierto Biosphere Reserve. Organ Pipe Cactus National Monument monitors the

Biologists from the U.S. and Mexico collecting data on Sonoyta mud turtles in the Rio Sonoyta.

Photo by Ami Pate/NPS



population in Quitobaquito, estimated to be stable at about 3,500 fish. No population data exists for pupfish in the Rio Sonoyta, though they appear to be abundant where they occur.

Highly aquatic, Sonoyta mud turtles spend a good deal of time creeping slowly and methodically along the bottom of pools looking for food. They eat algae, aquatic insects, fish, and frogs. Sonoyta mud turtles may live as long as 40 years and take 5 to 6 years to mature. Small but reproducing populations occur in the pond at Quitobaquito, two reaches of the Rio Sonoyta (one near the town of Sonoyta and another near the village of El Papalote just across the border from Quitobaquito) and in a spring complex to the south of the Rio Sonoyta at Quitovac.

Like so many aquatic habitats in the southwest, the Rio Sonoyta and Quitobaquito are threatened ecosystems. The major threat to these systems is groundwater withdrawal. The Rio Sonoyta valley has extensive amounts of irrigated agriculture that utilizes water from underground wells. Likewise, most of the water supply for the town of Sonoyta, as well as the nearby border town of Lukeville, comes from the groundwater aquifer. Continued groundwater pumping could completely dry the river. The introduction of exotic species, agricultural pesticide use, and destruction from ever-increasing human activities related to illegal border traffic are also threats. Hydrologic investigations of Quitobaquito Springs indicate that groundwater pumping miles away in the Rio Sonoyta valley could lower water tables and ultimately drain the pond.

In 2002, the Arizona Game and Fish Department began working to develop a conservation agreement for the Sonoyta mud turtle, which is a candidate for listing under the Endangered Species Act. The Department formed the Quitobaquito and Rio Sonoyta Working Group to help develop the agreement. The working group consists of representatives from the Arizona Game and Fish Department, the U.S. Fish and Wildlife



Service, the National Park Service (Organ Pipe Cactus National Monument), the Pinacate and Gran Desierto Biosphere Reserve, the Institute of Environment and Sustainable Development in Sonora, and the University of Arizona. Together, the group is developing a conservation strategy and agreement for Quitobaquito and the Rio Sonoyta. Because the snail, pupfish, and turtle are all dependent on the same habitat, the group is developing a habitat-based strategy that addresses the conservation of all three species. The agreement will focus on addressing the threats to the ecosystem, continuing research, and expanding educational outreach. Through this collaborative effort, the team hopes to preserve these unique aquatic habitats for generations to come.

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Top: The pond at Quitobaquito Springs.

*Photo by John Crossley
www.americansouthwest.net*

Bottom: Male Quitobaquito pupfish in breeding colors.

Photo by Martin Ravn Tversted