

Beneath the Waters of Balmorhea State Park

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by

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After reading John Bondhus' proposal for a NANFA Endangered Species Conservation Program in *American Currents*, I thought there is no better example of how public recreation, endangered species protection, and agriculture programs can work together as they do at Balmorhea State Park in Toyahvale, Texas.

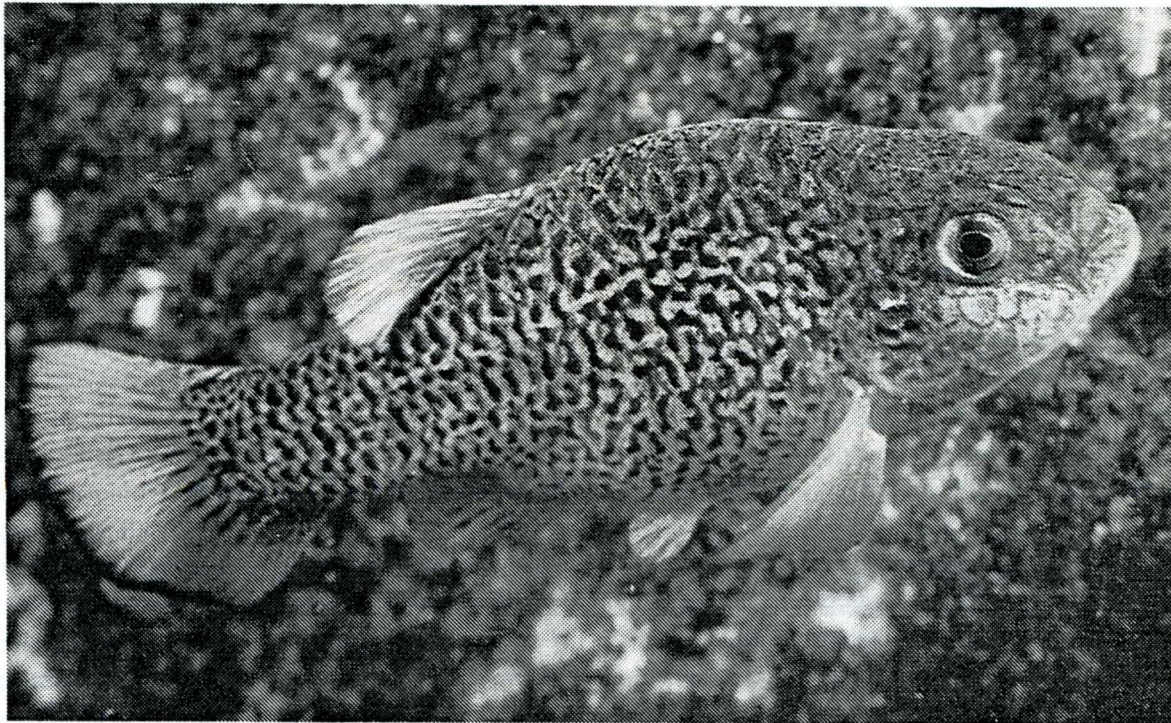
Balmorhea State Park and its refugium were constructed in 1975 to provide a stable habitat for two endangered species, the Comanche Springs pupfish (*Cyprinodon elegans*) and the Pecos gambusia (*Gambusia nobilis*). The swimming pool is one of the largest man-made pools in the United States, fed by 22 to 26 million gallons of clear, 76° water from San Solomon Springs. The pool has a large main circular area 25-feet deep with two long rectangular arms extending out. One arm is three to five-feet deep, the other is 20-feet deep. The circular pool is reserved for scuba divers while the two arms are open to swimmers and snorkelers. Water from the pool flows into a series of canals constructed around the park. Recently, water has been diverted into a newly constructed *ciénega*, or wetlands, area. After the water flows through the park it is available for agricultural use in the surrounding area. The canals and *ciénega* provide additional safe habitat for the two endangered fishes. The canals are off limits to swimming, but both fishes can easily be observed from the bank.

What drew me to the park was the opportunity to photograph the Comanche Springs pupfish underwater in the swimming area. Photographing fish underwater is

not an easy task, as anyone who has ever attempted it will tell you. There is no way you can sneak up on or chase a fish in its own element. Your subject has to realize you are not a threat and be willing to swim up to you, or, at the very least, ignore you as he or she goes about their daily business. The best way I can describe how to do this is to move slowly, not to make any sudden moves, and basically act like you are nothing more than a floating log.

My first attempts at photographing the Comanche Springs pupfish during the day were not successful. The pupfish were very active and wary. Worse yet were the schools of Mexican tetras (*Astynax mexicanus*) that were swarming around me. Whenever I would attempt to get close to the pupfish, the tetras would spook them. The park is a very popular scuba diving site on weekends and divers often feed the tetras. The tetras have become so accustomed to being fed that any time divers enter the water the tetras swarm around them.

I have learned from experience that a number of fish species that are active during the day are completely dormant at night and are easy to approach. So I decided to try photographing the pupfish at night. I noticed that during the day there were only tetras and pupfish present in the shallow 3-foot arm of the swimming area. I decided to enter this arm just after dusk. As I suspected, the tetras were inactive near the surface and the pupfish were spread all over the bottom completely inactive and easily approachable. What I did not expect to see was the feeding frenzy of predators on the pupfish. Several



**Comanche Springs pupfish, *Cyprinodon elegans*** (photo by Garold W. Sneegas)

- described by Baird and Girard in 1854 from Comanche Springs, near Fort Stockton, Pecos County, west Texas
- Comanche Springs population went extinct in 1955 when the springs went dry
- now only found in Toyah Creek and the effluents and irrigation canals of San Solomon, Phantom Cave and Griffin Springs, Reeves Co., Texas, and in the man-made Lake Balmorhea
- endangered species; illegal to keep in captivity
- males defend breeding territories; females enter to spawn a few eggs, then flee
- eggs take 5 days to develop at 20°C
- growth of fry is rapid, reaching sexual maturity as early as 5 months; males usually grow faster than females
- requires high level of dissolved oxygen in water
- hybridizing in Lake Balmorhea with sheepshead minnow, *Cyprinodon variegatus*, which was introduced as a baitfish, but not in refugium
- separated from congeners by long and slender caudal peduncle
- source: R.H. Wildekamp, *A World of Killies*. Volume II. American Killifish Assoc., 1995.

green sunfish (*Lepomis cyanellus*) and headwater catfish (*Ictalurus lupus*) had moved into the shallow arm and were scouring the bottom, feeding on the immobile pupfish. In addition to the fishes, at the head of the arm four Texas spiny softshell turtles (*Apalone spinifera pallida*) were lined up in a straight line moving up the arm. They reminded me of a line of infantry moving into battle. This may seem like a terrible fate to befall an endangered species, but keep in mind that pupfish are prolific breeders and spawn virtually year round. Without some type of predator control, they can rapidly over populate their environment.

Due to time constraints I was only able to shoot a few rolls of film before having to move on. I was not able to see the results of my efforts until I returned home a few days later. Unfortunately, I had made some exposure errors and was not pleased with the few images I took. The memories of what I had witnessed on the night dive haunted me for weeks.

I decided to return to Balmorhea in mid-April and spend three days concentrating on just photography. My second efforts resulted in a vast improvement over the first ones. I was also fortunate to have park ranger Tom Johnson assist me. Even though Tom was very busy

during the day, he still found time after work to help out on a couple of dives.

I mentioned earlier that my first attempt at photographing pupfish during the day was hindered by the swarms of tetras around me. After several dives during my second visit the tetras began to realize I did not have anything to offer them and began to ignore me. I was then able to slowly allow the pupfish to get accustomed to my presence until they knew I was not a threat. This allowed me to closely observe some interesting behavior. Male Comanche pupfish set up territories and vigorously guard them from intrusion by other males and even from larger tetras. Without making several

dives and patiently waiting for the pupfish to get used to my presence, it would have been impossible to observe this behavior.

Balmorhea State Park is a great example of what can be done when state, federal and private interests cooperate fully. The park's staff plays a major role in educating the general public on the plight of native fish species, while the park itself is a recreational oasis in the parched west Texas landscape. The park also gave me the opportunity to observe and photograph natural behaviors of an endangered species which I may not have been able to do elsewhere.

### The Pecos gambusia, *Gambusia nobilis* (photo by Garold W. Sneegas)

- described from the same collection as the Comanche Springs pupfish
- species name, *nobilis*, is Latin for *noble*, a reference to its handsome coloration
- once found throughout upper western courses of the Pecos River in Texas and New Mexico, now restricted to four series of springs: Bitter Lake National Wildlife Refuge near Roswell, NM; Blue Springs near Carlsbad, NM; Diamond Y Spring and Leon Creek near Fort Stockton, TX; and springs that flow into Toyah Creek near Toyahvale, TX
- population decline due to salinity increases caused by irrigation, dams and flood control
- endangered species; illegal to keep in captivity
- males succumb more quickly than females to adverse environmental conditions
- distinguished from other gambusia by black scale outlines on back and upper 2/3 of body, and dusky edges on dorsal and caudal fins
- source: G. K. Meffe and F. F. Snelson, Jr., eds., *Ecology and Evolution of Livebearing Fishes (Poeciliidae)*. Prentice Hall, 1989

