THREE SPRINGS IN CENTRAL FLORIDA

by David Arbour, DeQueen, Arkansas

Over 100 major springs exist in north and central Florida. Under the surface of most of the state is a limestone cap eroded by rainfall that collects underground in reservoirs and sub-surface rivers. As the soft stone wears away, water under pressure forces its way to the surface, resulting in crystal-clear rivers and springs. In these springs can be found a great variety of fish and other aquatic organisms. Some of the springs near the coast have even been invaded by saltwater species of fish.

Last year, while working temporarily in central Florida, I had the chance to visit and snorkel in several of the springs in and around the Ocala National Forest. The following is a description of three of the more notable springs that I visited.

Alexander Springs

Alexander Springs emerges from a hole about 30' across and 30' deep with a small cave at the bottom. Around this is a large pond-like area with a sand beach on one side and sub-tropical woodland on the other. This spring serves as a major swimming area. Because of this, there is almost no vegetation in the immediate area of the spring. The spring is well lit and has a sand bottom. The temperature is a constant 72°-73° F year round.

Water coming from underground tends to be low in oxygen. Because of this, and because of the lack of vegetation in the spring, the spring itself may lack oxygen. Lending credence to this theory is that most of the fishes in the spring had enlarged, puffed-out gills.

In spite of the large crowds of swimmers and possible low oxygen content, there was an amazing variety of fish to be seen. Especially noticeable were the Redbreast Sunfish (*Lepomis aurita*) and schools of Bluefin and Rainwater Killifish (*Lucania goodei* and *L. parva* respectively).

An interesting thing about the killies was that they were schooling together and apparently hybridizing; one male individual had the typical golden body and lemon-yellow tail of a Rainwater Killifish and lacked a dark stripe down the side, but it also had the bright metallic blue fins of a Bluefin Killifish. Another individual looked like a Bluefin Killifish, but had sulfur-yellow fins and red at the base of the caudal fin. These were extremely beautiful fish; working with them in captivity could produce interesting strains and crosses for the aquarium hobby.

Another notable sighting in this spring was a face-to-face encounter with a large Bowfin (*Amia calva*). The Bowfin is a primitive species with an abbreviated heterocercal tail and lung-like gas bladder.

I did not encounter Bowfins, Redbreast Sunfish, or Inland Silversides (Menidia beryllina) in the other two springs.

Blue Springs

Blue Springs is located just outside of the Ocala National Forest near Orange City. It is Florida's second-largest spring in volume, dispersing 160 cubic feet of water per second at a constant 72°F. Water flows from a deep (125' long) cave, and visibility often reaches 100'.

The area around the spring and downstream is a dense sub-tropical woodland growing to the banks and leaning out over the water. The heavy shading allows almost no plant growth. According to my theory, the water is also low in oxygen, as I noticed more fish with puffed-out gills. Also I noticed one eddy area with Bluegills (Lepomis macrochira), Florida Largemouth Bass (Micropterus salmoides floridanus), and Bluefin Killifish gasping for oxygen at the surface. The most impressive thing about Blue Springs was that it had the nicest Bluefin Killies I have ever seen. One individual I encountered had cherry-red fins with a yellow spot on the front part of the dorsal fin and no blue anywhere. As there were no Rainwater Killies noticed at Blue Springs, it was probably a natural sport and not a hybrid.

Other interesting fish encountered here were large Florida Gar (Lepisosteus platyrhinchus) and "Least Killifish" (Heterandria formosa). The latter are not true killies, but tiny livebearers. Aquatic invertebrates observed here included several isopod and crayfish species.

Silver Glen Springs

The spring water here flows out of a cave 30' down at the bottom of a fairly large pool and flows to Lake George a half-mile away. The pool area around the spring is well lit and the bottom is heavily vegetated with all manner of aquatic plants, producing a luxuriant underwater garden. The resultant oxygenation may have made a difference, for there was a tremendous abundance of fish compared to the other springs, and none of the fish observed had puffed-out gills.

Everywhere I looked, plants were photosynthesizing in the bright sunlight and sending air bubbles to the surface. It was like snorkeling in a heavily planted, well stocked aquarium. There was no swimming beach here; the plant growth apparently discouraged swimmers. Only the occasional snorkeler penetrated these waters. Most of the time, I had the entire spring to myself.

The most noticeable feature of the spring, besides the vegetation, was a large school of Striped Bass (Morone saxatilis), ranging in size from about a pound up to seven pounds. The bass schooled in the deepest part of the spring where the current came up from the cave. Also very noticeable were schools of Striped Mullet (Mugil cephalus), some up to 3" in length. A close relative of theirs, the White Mullet (Mugil curema), was also present, but in smaller numbers.

In the deepest part of the spring near the mouth of the cave were several large (1 to 2 lb.) Lake Chubsuckers (Erimyzon sucetta). Their coloration was nearly solid black, and they contrasted sharply with the white sand at the mouth of the cave.

Around the edges of the spring pool, in shallower water, the vegetation grew to the surface, and schools of Redeye Chubs (Notropis harperi) could be seen, as well as Florida Largemouth Bass hiding in wait for the chubs to come too close. Also in this shallower, heavily vegetated area were scattered individual Bluefin and Rainwater Killifish. They did not form the tight schools seen at Alexander Springs, where there was very little cover. Also, I saw no signs of hybridization between these two species here. Possibly the lack of cover in Alexander Springs forced these two species to school together for protection, and this close contact resulted in occasional hybridization.

Other interesting species of fish observed were large Golden Shiners (Notemigonus crysoleucas) approaching a foot in length, with golden-colored bodies and a reddish-orange tinge to some of the fins; Sailfin Mollies (Poecilia latipinna); Mosquitofish (Gambusia affinis), including Blackspotted individuals; and Heterandria formosa. One species I wish I hadn't seen there was a tilapia. Several tilapia species have been introduced into Florida and have literally taken over in some places. The several large specimens I saw were probably Blue Tilapia (Oreochromis aureus).

A small patch of sand at the back of the pool had a colony of Spotted Sunfish (Lepomis punctatus) guarding their nests, which were depressions in the sand that they had dug to contain their eggs. I was able to get quite close to them. As I watched, a female came in to one of the nests and spawned for several minutes with one of the males. Her eggs were large enough that I could see them leaving her body and falling into the nest.

Other noteworthy creatures encountered here were large Peninsular Cooters (turtles, Chrysemys floridana peninsularis) and Florida Red-bellied Turtles (C. nelsoni), which I would grab a hold of expecting to be taken for a ride. Instead, they would pull inside their shells and sink to the bottom. Other, smaller turtles seen were a Florida Mud Turtle

(Kinosternon subrubrum steindachneri) and a Florida Softshell Turtle (Trionyx ferox). The softshell was a medium-sized individual. It was feeding on the carcass of a large tilapia. As I moved in for a closer look, it saw me and darted off with the speed of a fish.

Notable invertebrates were Apple Snails (Pomacea), Turatella-type snails, crayfish, freshwater shrimp (Palaemonetes sp.), and a Blue Crab (Callinectes sapidus). The Blue Crab surprised me, since the ocean was so far away. He was one of the largest Blue Crabs I had ever seen. He lived in the cave at the bottom of the spring and came out to feed on occasion.

Anyone interested in photographing or studying native fishes in their natural environment should plan a trip to these crystalline waters. SCUBA is allowed at Blue Springs, but Alexander and Silver Glen Springs allow snorkeling only. These springs are closed to fishing, so I would imagine they are closed to collecting as well. Downstream from the springs and outside of the recreation areas, one can probably collect if the required permits are obtained.

One can see how sunlight, vegetation, and disturbance, and man play parts in determining the variety and number of fishes a spring can support.

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