

APPALACHIAN ADVENTURES



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Say the word 'snorkel' and most people would conjure thoughts of sugar sand beaches, turquoise waters, and dazzling tropical fishes. Yet, within the crystalline mountain streams of Tennessee exist communities that rival the brilliance of marine ecosystems. These streams are the stronghold of the elusive Eastern Hellbender, copious freshwater mussels, and contain the highest diversity of freshwater fishes in North America. As spring transitions into summer, many fishes in Tennessee streams develop their nuptial colors.

For most of the year, the Tennessee Shiner (*Notropis leuciodus*) is a humble silvery minnow; during the mating season, they become a resplendent shade of cerise. They are so brightly colored, it is easy to spot schools while standing on the stream bank; however, the best way to observe the multitude of fishes in these streams is to snorkel. For this activity, I highly recommend a full body wetsuit, along with a mask and snorkel. These mountain streams are cold and swift; snorkeling here is rather like rock climbing with an aquatic component. You are constantly grasping bedrock or boulders to pull yourself against the current or simply to stay in place.

Once in the water, you will notice the Tennessee Shiners cascading and circling over distinctive rock mounds on the creek bed. These mounds are nests built by male River Chubs (*Nocomis micropogon*). It is remarkable to watch—a male River Chub will swim to his nest carrying a rock in his mouth. The rock is dropped on to the pile, and the male disappears to find another rock; the behavior repeats. Occasionally, he will filch rocks from abandoned chub nests. A completed nest can be substantial in size—up to several feet in diameter. In contrast to the Tennessee Shiners, male River Chubs are modestly hued—some may develop an olive lateral stripe and blushed cheeks. They also develop a formidable crown of tubercles on the head. Female River Chubs are easy to distinguish: they are

considerably smaller in size and lack tubercles. Males will use the thorny protrusions to defend their territory against other males, and photographers who venture too close. While photographing chub nests in Citico Creek, one individual collided with my camera several times. Later in the breeding season, it is not uncommon to see large territorial males with battle scars.

Thus far, I have introduced the Tennessee Shiner and the River Chub; but, additional nest associates are present.



Figure 1. Active River Chub nest in Citico Creek; male River Chub (center) surrounded by Tennessee Shiners and Rosyside Dace.



Figure 2. Tennessee Shiners and Rosyside Dace over a chub nest in Citico Creek.

Photos by the author.

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Jenna Crovo developed an interest in photography at a young age and blossomed into a serious nature photographer during graduate school. She is currently completing her Ph.D. in fisheries and aquatic sciences at Auburn University, while still finding time to practice her art. You can follow her photographic adventures on her Facebook Page: The Artistic Biologist.



Figure 3. Spring Peeper calling, Cherokee National Forest.



Figure 4. Bald River Falls, Cherokee National Forest.



Figure 5. Male River Chub dropping a rock onto his nest; also pictured are Warpaint and Saffron shiners; Tellico Creek.



Figure 6. Greenfin Darter (breeding male); Citico Creek.

Rosyside Dace (*Clinostomus funduloides*), streaked gold and crimson, intermingle with the shiners. On the periphery, Warpaint Shiners (*Luxilus coccogenis*) blazon with striking red and black patterns. Occasionally, male stonerollers (*Camptostoma* spp.) will appear, possessing a patina of tubercles spanning their entire bodies. Venture into the Tellico River in Cherokee National Forest, and you will encounter the Saffron Shiner (*N. rubricroceus*). While spawning, this species seems to glow, turning scarlet with yellow fins and stripes. Ultimately, these nest associates will spawn over a chub nest. An active River Chub nest is a spectacular sight. On a sunny day, the nest appears to be a mosaic of shimmering gems. The breeding male will continue defending his nest and potential offspring, which includes the fertilized eggs of the nest associates. While the male abandons his nest after spawning, the eggs are protected within the mound. Of course, there is always the risk of egg predation by crayfish, aquatic insects, and other fishes, such as darters.

Turn away from the nest, and you will find other exciting creek denizens. In Citico Creek, endemic male Greenfin Darters (*Nothonotus chlorobranchius*) turn a deep shade of teal. Rainbow Trout (*Oncorhynchus mykiss*) flash by with

the current. Northern Hog Suckers (*Hypentelium nigricans*), Longnose Dace (*Rhinichthys cataractae*), and sculpin (*Cottus* sp.) are more benthic and cruise near the substrate. Crayfish scuttle in search of a rocky refuge. Aquatic salamanders and Musk Turtles may peek out from under rocks. Northern Water Snakes (*Nerodia sipedon*) are commonplace, especially during the warmer months; but, they are nonvenomous and completely harmless, unless harassed. As a safety note, it is always prudent to be aware of your surroundings while hiking down to a creek. On warm sunny days, venomous snakes may be found basking on rocks and tree roots. The best policy is to give them space and watch from a reasonable distance; I personally think they make excellent photo subjects.

River snorkeling during daylight hours is certainly more colorful; however, snorkeling at night is just as exciting. For this activity, you will need an underwater flashlight. The first change you will notice is a shift in wildlife activity. As you walk to the edge of a creek, a highland nocturne of frog and toad calls fills the night air. The vibrant fishes aforementioned are absent, taking repose until daybreak. Sporadically, you may encounter a dozing stoneroller in the lee of a boulder. In their place, Rock



Figure 7. Hellbender, Tumbling Creek, Cherokee National Forest.



Figure 8. Male River Chub and Saffron Shiners in Tellico Creek.



Figure 9. Fantail Darter (*Etheostoma flabellare*), Tellico Creek.

Bass (*Ambloplites rupestris*), catfish (*Ictalurus* spp.), Freshwater Drum (*Aplodinotus grunniens*), and madtoms (*Noturus* spp.) emerge in search of an evening repast. The creek bed becomes speckled with scores of scavenging crayfish. Some of the larger Rock Bass will predate upon crayfish. The last time my colleagues and I were night snorkeling in Citico Creek we witnessed a standoff between an ambitious Rock Bass and a defiant crayfish. The crayfish boldly raised its claws as the Rock Bass made several attempted strikes. Against all odds, the crayfish



Figure 10. Saffron Shiner, Tellico Creek.



Figure 11. Saffron Shiner, Tellico Creek.



Figure 12. River Chub closeup.

was victorious, and the Rock Bass retreated into the gloom. We hoped to catch a glimpse of the imperiled Yellowfin Madtom (*N. flavipinnis*). For one fleeting moment, we saw one dart in front of our dive lights; but, it disappeared in an instant.

Here in these bracing Appalachian streams, the night belongs to the Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*). You may be familiar with some of its vernacular titles such as, but not limited to: the snot otter, devil dog, mud-devil, lasagna lizard, and Allegheny alligator. The Hellbender is king among salamanders; it can reach an impressive size of



Figure 13. River Chub carrying rock.



Figure 14. River Chub carrying rock.



Figure 15. Male stoneroller and Tennessee Shiners over chub nest in Citico Creek.

nearly a meter in length. This species of salamander is fully aquatic and is endemic to the eastern United States. Hellbenders require clear, cool streams to thrive and are sensitive to anthropogenically induced changes in habitat. Consequently, this species is near threatened; but, progress is being made to save this magnificent amphibian. If you are lucky, you will see one ponderously crawling along the creek bed; its mottled coloration allows it to blend seamlessly into its environment. During the day, Hellbenders return to their lairs beneath large flat rocks.



Figure 16. Tennessee Shiners and Rosyside Dace over chub nest.



Figure 17. Warpaint Shiner over chub nest

The species introduced in these brief passages is not an exhaustive list of the tremendous biodiversity found within Tennessee streams. Akin to the hellbender, many of the species present in these cool mountain streams depend on clear, pristine water to truly thrive. Care should be taken to preserve these beautiful habitats. So, the next time you find yourself in the Cherokee National Forest in Tennessee, bring a wet suit and snorkel gear—you never know what you may see beneath the water's surface.

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