

SEARCH FOR THE HOLY GRAIL: AKA “LAKE WACCAMAW BROADTAIL” MADTOM



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“What on earth are you doing?” I get asked this question a lot by visitors at the Lake Waccamaw dam and walking/fishing bridge (Figure 1) as this old guy leaves his car donned usually in hip boots and armed with a dip net and bucket or collecting jar. My standard response is “Going after the big ones!” If they still show interest or ask more questions, I’m sure that I bore them to death as I go on and on about miniature catfishes called madtoms. I tell them there is one species that is widespread throughout eastern North Carolina and there is one species that is only found here in Lake Waccamaw and nowhere else in the world. But sadly, I have none to show them for I haven’t caught one since 2002. But first, let me provide you with some background information.

Lake Waccamaw is the largest of the Carolina Bay lakes and is located in southeastern North Carolina (Figures 2 and 3). Unlike most of the other Carolina Bay lakes, Lake Waccamaw gets the majority of its water from the surrounding swamp instead of direct rainwater. A limestone bluff along the north shore filters the water and reduces the acidity levels, making the lake ideal for a wide range of aquatic life, including many endemic fish and mussel species. My long-time friends, JR and Peggy Shute (along with Pat Rakes, founders of Conservation Fisheries Inc.) and the late Dr. David Lindquist from the University of North Carolina-Wilmington (UNCW), reported 62 fish species from Lake Waccamaw and the Waccamaw River basin, including three endemics: the Waccamaw Silverside *Menidia extensa*; Waccamaw Killifish *Fundulus waccamensis*; and Waccamaw Darter *Etheostoma perlongum* (Shute et al. 1981). Since their intensive study in the late

1970s, three additional fishes have found their way into the lake: two benign fishes via natural immigration from nearby South Carolina, the Green Silverside *Labidesthes vanhyningi* and Golden Topminnow *F. chrysotus*, and one introduced by anglers, the devastatingly predatory Flathead Catfish *Pylodictis olivaris* (Tracy et al. 2020).

I first visited the lake in 1976 on a pilgrimage that all young (and old) ichthyologists should make to follow in the footsteps of legendary Dr. Edward C. Raney and Dr. Ernest A. Lachner. They, along with R.A. Pfeffer, had driven from Cornell University on Spring Break and visited the lake on the night of March 30, 1941. During that one brief effort they collected many fishes, including the three endemic fishes (thousands of killifish and silverside were encountered) that were later described by Dr. Carl Hubbs and Dr. Raney (Hubbs and Raney 1946).



Figure 2. Lake Waccamaw when viewed from the foot bridge.



Figure 1. Dam with lake and foot bridge to the left and start of Waccamaw River to the right. Midway down the dam is a primitive fish ladder.



Figure 3. Lake Waccamaw. 1=Dam; 2=Secluded Site; 3=Open Site; 4=Transect; 5=Coastal Carolina University Site.

Photos by the author unless otherwise indicated.

Since 1976, my visits have become increasingly laser-focused on a madtom, commonly known as the “Waccamaw Broadtail” Madtom *Noturus* sp., which was initially reported in the lake by Shute et al. (1981). They stated:

The Lake Waccamaw form (found throughout the lake and directly below the dam) was often found in cans and bottles as well as under tiles placed as experimental spawning sites for the Waccamaw Darter. Broadtail Madtoms appear to be relatively common in the lake and may outnumber [Tadpole Madtom] *N. gyrinus*.

Shute et al. (1981) said that the form in the lake clearly differed from “river” specimens found downstream in the Waccamaw River and the adjacent Cape Fear drainage. The difference was clearly shown by Bennetts et al. (1999) who also reported that the Broadtail Madtom forms (Edisto, Pee Dee, Cape Fear, and Lake Waccamaw) were most closely related to the Margined Madtom *N. insignis*. Recently, more advanced genetic analyses by Dr. Joe Quattro, University of South Carolina (personal communication) and morphometric analyses by myself (personal observation) have confirmed the uniqueness of the Lake Waccamaw population. Tracy et al. (2020) listed it as the “Lake Waccamaw Broadtail” Madtom *Noturus* sp., a species of State Special Concern.

So what is the current status of this lake-dwelling fish? My first encounter with it was on May 16, 1984, when Dr. Brooks Burr (Southern Illinois University-retired), Dick Biggins (US Fish & Wildlife Service-retired), and I were invited by Dave Lindquist to join him on a boat trip on the lake. Dave and Dick donned SCUBA gear to search for the Broadtail Madtom beneath the tiles that the UNCW crew had placed in deeper portions of the lake. They were successful and brought several back to the surface for us to view and photograph (Figure 4), along with a Tadpole Madtom (Figure 5). Since then, I have visited the lake an untold number of times to wade the lake and search for the fish in discarded bottles and cans in a roughly designed transect along the south side in knee-deep water with scattered patches of Maidencane *Panicum hemitomum* and Bald Cypress *Taxodium distichum* (Figures 3 and 6) where I could usually find one specimen each trip.

The last time I saw a “Lake Waccamaw Broadtail” Madtom was when I found one in a brown beer bottle on May 12, 2002 (Figure 7), almost 18 years after I saw my first one and now 21 years since I last saw one. After my last sighting in 2002, I had visited the lake 28 more times from 2007–2015. And in addition to searching bottles and cans along my transect (while getting strange looks by the locals), I even placed floor tiles on the bottom to attract them (unsuccessful), baited minnow traps (unsuccessful), and once a “trot line” of beer bottles connected by a string (also unsuccessful). It’s possible that Lake Waccamaw State Park staff or concerned citizens may have picked up some of my “debris,” believing they were clearing up trash in the lake.

In 2019 Brena Jones, nongame aquatic biologist with the North Carolina Wildlife Resources Commission (NCWRC), contacted me about jointly participating with them in a hunt for Broadtail Madtoms, with me focusing on Lake Waccamaw because it’s only about an hour from my home in Wilmington and I was already going over there on a regular basis. Her idea was to use madtom “motels” similar to what North Carolina State University graduate students had used to catch Carolina Madtom *N. furiosus* (Midway 2010; Cope et al. 2019). The motel is an inverted clay flowerpot, glued onto a clay base and a weighted disc, with a notch chiseled out of the rim (Figure 8). I quickly agreed and she later supplied me with ten motels. I first put



Figure 4. My first “Lake Waccamaw Broadtail” Madtom in 1984.



Figure 5. Tadpole Madtom collected in 1984. Yes, I know it’s out of focus. In the days of 35-mm film, shots were not unlimited.



Figure 6. Part of my original transect with Bald Cypress and Maidencane.



Figure 7. “Lake Waccamaw Broadtail” Madtom found in 2002.



Figure 8. Madtom motel.



Figure 9. Motel in the lake held in place with rebar.

seven of them into the lake on February 17, 2020, secured by rebar (Figure 9). My initial site was in one part of my transect (Figure 3), but after a couple of visits I added three more motels and divided the ten motels into two sites: one secluded and the other more open (Figure 3, 10, and 11).

The actual number of motels checked each visit has varied due to missing motels, high lake levels, or often turbid waters. After 14 visits in 2020 (when I was excited and enthusiastic), 7 in 2021, 3 in 2022 (lake levels and my enthusiasm were dropping substantially by late 2021 and remained low through 2022), and 9 visits in 2023 (last one on Christmas Day), I have tallied the contents of my 268 motel-efforts: motel visitors included Tadpole Madtom (55) (Figure 12), Red Swamp Crayfish *Procambarus clarkii* (30), Warmouth *Lepomis gulosus* (9), Redbreast Sunfish *L. auratus* (3), American Eel *Anguilla rostrata* (2), White Catfish *Ameiurus catus* (2), Bluegill *L. macrochirus* (1), Waccamaw Darter (1), Waccamaw Crayfish *P. braswelli* (1) (Figure 13); and



Figure 10. Secluded Site.



Figure 11. Open Site.

ZERO reservations by Broadtail Madtom. Almost all species caught had taken up residence at the secluded site.

Well, they do work great for Tadpole Madtom (Figure 14), and I often find a pair sharing a room. However, the results sadly contradict the observations made by the Shutes back in the late 1970s where the Broadtail Madtom was the dominant species. These findings have led me to ponder: is the “Lake Waccamaw Broadtail” Madtom extirpated from the lake, perhaps being gustatorily consumed by Flathead Catfish, has it been displaced/out-competed by Tadpole Madtom, or are the young madtoms being preyed upon by the invasive Red Swamp Crayfish?

Just as importantly as the madtom’s demise, I have also thought long and hard about what keeps me faithfully returning to the lake. That’s easy to answer: optimism! On October 12, 2019, I received an email from Dr. Derek Crane of Coastal Carolina University located in Conway, South Carolina. He and his class were at Lake Waccamaw, and he wanted to know if the attached images were in fact Broadtail Madtom (Figure 15 and 16). Heck, yes they were! I immediately called him to ask if he still had them because I needed to get a good photograph. Sadly, he was already back on campus, but he did tell me they were caught at the east end of the lake by the state park, one by using a seine and the other hand-caught by a student after it fell out of an empty mussel shell. Both fish were released unharmed. This one sighting is what keeps me going back and back and back! Maybe one day...



Figure 12. Tadpole Madtoms caught in secluded Site.



Figure 13. Waccamaw Crayfish. (Photo by Scott Smith)



Figure 14. Tadpole Madtoms right out of the motels.

Addendum: I initially wrote this narrative in summer 2023 and then periodically updated the numbers after each unsuccessful trip. Much to my surprise—almost shock—I got an email from NCWRC fisheries biologist April Boggs on November 7 telling Brena and I that the day before they had “popped up” a madtom while boat electrofishing for game fishes in Lake Waccamaw and thought it was a Broadtail. Bingo! Based on her photos it was indeed a “Lake Waccamaw” Broadtail Madtom (Figure 17). After measuring, photographing, and taking a fin clip, the madtom was released back into the lake near its capture site under a dock slightly to the northwest of the dam. Now more energized, my search continues.



Figure 15. “Lake Waccamaw Broadtail” Madtom caught by Coastal Carolina University crew. (Photo by Derek Crane)



Figure 16. Second “Lake Waccamaw Broadtail” Madtom caught by Coastal Carolina University crew. (Photo by Derek Crane)



Figure 17. “Lake Waccamaw Broadtail” Madtom caught by NCWRC on November 6, 2023. (Photo by April Boggs)

References

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