

VIRGINIA'S UNSUNG CATFISHES



Michael J. Pinder

Going almost unnoticed in Virginia's waters lives a little-known group of miniature catfishes known as madtoms. Because of their small size and reclusive nature, they do not have the prestige or popularity of their larger cousins—the Flathead *Pylodictis olivaris*, Channel *Ictalurus punctatus*, and Blue *I. furcatus* catfishes.

You will never hear someone brag about the madtom that they fought for over an hour that nearly took them and their fishing rod overboard, or about the diver who saw a monster five-foot madtom near a dam. Such notoriety will never come the madtom's way.

All members of North American catfishes belong to the family Ictaluridae and are collectively called the bullhead catfishes. They are characterized by eight long barbels (i.e., whiskers), a wide head, smooth scaleless skin, rigid spines, and a small, fleshy lobe just above the tail known as the adipose fin.

Two basic features separate madtoms from the larger and showier members of their family. First, madtoms are little, with the smallest measuring less than two inches. The largest madtom in Virginia grows to eight inches; however, most are less than five inches even as adults. In fact, their small size has led many locals to give them the name of “catminnows.” The second feature is that the adipose fin in madtoms is directly attached to the tail (caudal) fin.

A RECLUSIVE CREATURE

What madtoms lack in stature, they make up in species numbers. Of the 46 North American catfishes, 27 are madtoms. Virginia has six species—the Yellowfin *Noturus flavipinnis*, Orange-fin *N. gilberti*, Margined *N. insignis*, Tadpole *N. gyrinus*, Mountain *N. eleutherus*, and Stonecat *N. flavus*. Madtoms are present throughout the state except the Eastern Shore. The Margined Madtom has the widest distribution of all and occurs in most drainages. The Yellowfin, Stonecat, and Mountain madtoms are found in the upper Tennessee River drainage. The Stonecat is also known from the Big Sandy. The Orange-fin Madtom is native to the upper Roanoke and Dan rivers and has one of the most restricted ranges of all madtom species. The Tadpole Madtom ranges along the lower Piedmont and Coastal Plain regions.

Virginia's madtoms are known from small creeks to large rivers; few records are from lakes and reservoirs. Most species inhabit the faster-flowing sections of runs and riffles, although pools are also frequented. The Tadpole Madtom is the exception, prefer-

ring sluggish backwaters and pools. During the day, madtoms are found in areas that have an abundance of large, flat rocks and logs where they can shelter. If discovered in the open, they will quickly and erratically swim away or burrow into gravel and vegetation. Upon seeing this “angry” behavior, early ichthyologists came to call them, “Mad-Toms.”

The lackluster appearance of most species well suits their reclusive nature. Madtoms typically have drab, earthy colors and patterns that blend into their environment. Although most in Virginia are primarily yellowish-brown in color, some species have distinctive characteristics that aid in their identification. For example, the Orange-fin Madtom has a spot at the base of the top (dorsal) fin and a white-to-orange triangle on the upper edge of the caudal fin. Like its name implies, the margined madtom has dark edges on its fin margins. The short and stubby Tadpole Madtom has an easily recognizable dark stripe along each side.

These small catfishes are active at night to avoid competing for food and to reduce the risk of being eaten by larger animals. Their primary prey are small aquatic insects and other invertebrates. Because their eyes are useless except on the brightest moonlit night, madtoms will actually smell out their prey. Robert Jenkins and Noel Burkhead, authors of *Freshwater Fishes of Virginia*, indicate that madtoms use sensory cells or “taste buds” located over their bodies and concentrated in barbels to find hidden prey.

Large fish, watersnakes, herons, and otters are just a few animals that like to put madtoms on their dinner menu. Once captured, the madtom still has a few strategies to keep it from being eaten. Just like their larger catfish cousins, madtoms can lock the position of sharp spines on its front (pectoral) and dorsal



A juvenile Yellowfin Madtom discovered in the Clinch River and photographed during a darter survey. (Photo by Michael J. Pinder/DWR)

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fins, making them bigger and more difficult to swallow. If this doesn't work, the spine is coated with a toxic membrane that is injected into the wound of the attacker. As anyone who has been stuck can testify, the injured area will burn and become red and swollen, similar to that of a bee sting. The sting from the Tadpole Madtom is considered the most painful.

THE LIFE CYCLE

Because of the madtom's secretive nature, little is known about their breeding and nesting habits. That which we do know is generalized for this description. Madtoms breed during spring

and early summer when water temperatures rise above 65°F. The male will excavate a nest under rocks, logs, or vegetation, or simply use pre-made structures such as soda cans, old tires, and empty mussel shells.

Anywhere between 30 and 300 yellowish-orange eggs are laid in grape-like clusters. The female departs soon after spawning, leaving the male to care for their offspring. In many species, the male will develop enlarged muscles on its head and back that are thought to help in excavating and defending the nest. The male does not eat during this time and will diligently fan and roll the eggs, keeping them well oxygenated and clean. Young hatch in six to 12 days.

VIRGINIA'S SIX SPECIES OF MADTOMS

Species	Size (max.)	Habitat	Spawning	Distribution
Margined Madtom	7 inches	Cool to warm creeks to large rivers, riffles, and runs	May-June	All Atlantic Slope Streams, New River, introduced to North Fork Holston
Mountain Madtom	3 inches	Medium streams to large rivers, riffles, and runs	June-July	Clinch, Powell, and North Fork Holston



Margined Madtom (Photo by Scott Smith)

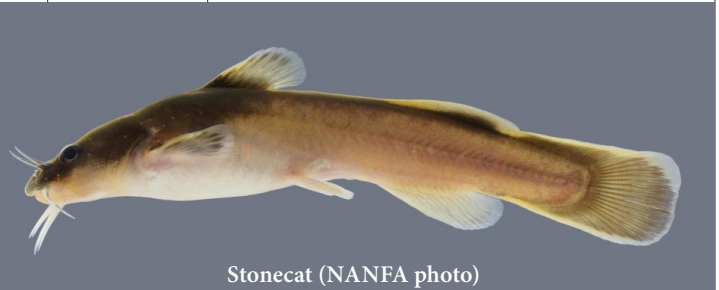


Mountain Madtom (Photo by Fritz Rohde)

Orangefin Madtom	4 inches	Cool to warm rivers, riffles, and runs	April-May	Roanoke and Dan rivers, introduced to Upper James
Stonecat	8 inches	Warm streams, riffles, and runs	June-August	Clinch, North Fork Holston, and Big Sandy



Orangefin Madtom (Photo by Scott Smith)



Stonecat (NANFA photo)

Tadpole Madtom	5 inches	Warm creeks and rivers, pools, and blackwaters	May-August	Atlantic Slope, Piedmont, and Coastal Plain
Yellowfin Madtom	4 inches	Medium streams to large rivers, riffles, pools, and runs	May-July	Clinch and Powell, re-introduced to North Fork Holston



Tadpole Madtom (Photo by Scott Smith)



Yellowfin Madtom (Photo by Derek Wheaton)



A male Yellowfin Madtom guards a clutch of eggs. Pink dots near its dorsal fin reveal this is a previously tagged fish. (Photo by Conservation Fisheries, Inc.)

Being less than one-quarter inch long with a large yolk sac, the young have little resemblance to the adult. The adult male stays on guard for several days until the young can fend for themselves. In a matter of one to three years, depending on the species, the madtom will grow and repeat this critical portion of its life cycle. The life span ranges from two to nine years.

Anglers consider madtoms to be excellent bait for Smallmouth Bass *Micropterus dolomieu*. It is speculated that Smallmouth Bass are able to avoid the venomous spines by swallowing the madtom headfirst. Unfortunately, their popularity as bait may be the leading cause of the introduction of several species outside their native

ranges. The Orangefin Madtom is now established in several tributaries of the upper James River drainage, and Margined Madtoms are in the North Fork Holston River. Introduced madtoms, like other introduced species, have the possibility of competing with native animals and upsetting the natural ecology of those systems. Anglers can help prevent such problems by collecting non-listed madtoms only in the drainage they plan to fish.

MANAGING MADTOMS

Compared to many fish groups, madtoms have a disproportionately large number of imperiled species. Nationally, 18 of the 27 madtom species have protected or special status. Among the species in Virginia, the Yellowfin and Orangefin madtoms have protected status. Remarkably, the Yellowfin Madtom was thought extinct until it was rediscovered in 1969 in the Clinch River drainage.

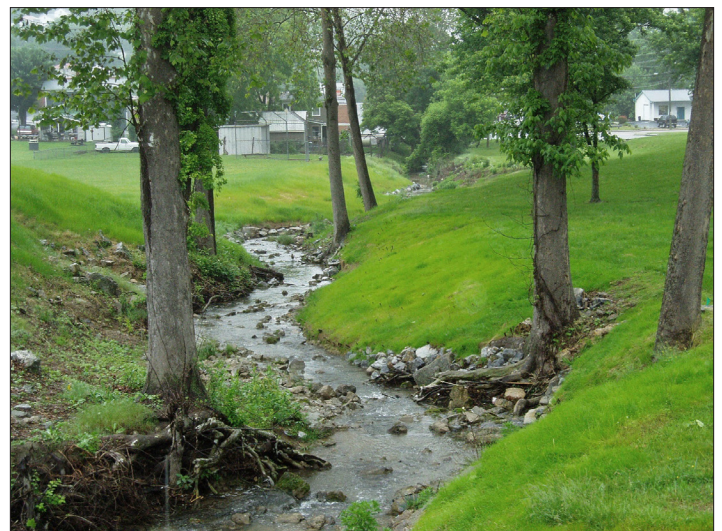
The most significant threat to madtom populations is siltation of their aquatic habitat. Siltation is associated with degraded streambanks and run-off from disturbed areas including agricultural fields, residences, and construction areas. Silt is a very fine substance that fills in the important spaces between gravel and pebbles on the stream bottom. It impacts madtoms by suffocating their eggs and killing their food source.

The good news is that in areas where siltation occurs, there is a cure. Fencing cattle from streams, establishing a wooded buffer strip between fields and streams and rivers, quickly reseeding disturbed areas, and implementing erosion control structures in construction areas can significantly reduce siltation and improve water quality for the benefit of all, including us!

Virginia is actively working to manage madtom recovery. In 2016, the Virginia Department of Wildlife Resources and its partners began releasing Yellowfin Madtoms back into the North Fork Holston River, where they had not been seen since 1888. Over the last several years, more than 1,500 have been propagated and released by Conservation Fisheries, Inc., a non-profit organization in Knoxville, Tennessee. To date, madtoms from each year class have been found, but it's even more encour-



Before: Degraded stream banks such as Asylum Creek in Staunton are serious threats to madtoms and other aquatic species. (Photo by Louise Finger/DWR)



After: After implementing erosion control and reseeding, Asylum Creek is much healthier thanks to DWR and its partners. (Photo by Louise Finger/DWR)

aging that released madtoms have been observed nesting! Additional monitoring will hopefully start finding their offspring, which would be the first step toward establishing a self-sustaining population.

While we still need to know more about them, madtoms should not be underestimated in regards to their importance. They can comprise a significantly large portion of the fish community where good habitat and water quality exists. Because they feed on small animals and are likewise fed upon by larger creatures, madtoms are critically important in moving energy through the ecosystem. They are undoubtedly an interesting and unique aspect of our rich and diverse aquatic environment. So the next time you are near a river or stream, remember to stop and appreciate Virginia's little, unsung catfish.



Yellowfin Madtom juveniles awaiting release. (Photo by Meghan Marchetti/DWR)



In 2016, the Virginia Department of Wildlife Resources and its partners released Yellowfin Madtoms into the North Fork Holston River where they had not been seen since 1888. (Photo by Meghan Marchetti/DWR) You can watch a video of juvenile yellowfin being released in the North Fork North Holston River here: bit.ly/2YENAm7

NANFA News, continued

GIANT SPOTTED SUCKER SETS RECORDS

NANFA member Tyler Goodale, one of the fishiest people in Missouri, set a new state and world record for Spotted Sucker *Mimnytrema melanops* in 2020. He caught a previous state record (3 pounds, 10 ounces) in 2014.

The 2020 catch came during the spawn, which only lasts a few days, so Tyler's timing was excellent. He hadn't planned to fish that day, but he always has fishing gear on hand. The school he found was full of large fish—some the largest he had ever seen—and they were so focused on spawning that they were not easily spooked. He used a single redworm on a small hook and two-pound line. His bait was repeatedly knocked away from the big females by the spawning fervor of the males, but eventually he managed to get a record-breaking fish to eat. He kept her alive and well in the bag of his Perfect Dipnet hanging in the water while he made some calls and set up a time to have the fish weighed and verified the next day.

With his son napping beside him, Tyler kept fishing. "There were still at least two giant females that would come into the group and then disappear. I couldn't believe the size. They appeared to be five or six pounds; was that even possible? It was like a fantasy unfolding in front of me." The many males trying to spawn with them often ended up pushing the females away.

Eventually a big one "surged into the shallower water in front of me with no males around. This was the few seconds I needed. I pitched my redworm gently in front of her and she engulfed it! After a tense tug of war I landed a fish even larger than the huge one I had already caught."

He took both fish home and put them into a huge aerated tank to wait until the next morning to weigh them. The larger of the two weighed 5 pounds, 4 ounces, a new state and world record.

