

Freshwater Catfish (Family Ictaluridae) Diversity in North Carolina
By the NCFishes.com Team

There are 18 species of catfishes in North Carolina including 3 undescribed species (Table 1) (Tracy et al. 2020). You might have heard people calling them Bullheads, Mud Cats, Butter Balls, Blue Channel Cats, Madtoms, Squealers, or many more colorful colloquial names. But each species has its own scientific (Latin) name, which coincidentally actually means something (please refer to The Meanings of the Scientific Names of Catfishes, pages 9 and 10), and an American Fisheries Society-accepted common name. They are found throughout North Carolina in streams, swamps, big rivers, and reservoirs from Cherokee County in the Mountains to Dare County along the Albemarle Sound. Distributional maps for every species may be found in Tracy et al. (2020).

Catfishes range in size from the diminutive “Broadtail” Madtoms of just a few inches in length to the behemoth Blue Catfish with maximum lengths approaching 5 feet. Similarly, they may weigh just a few ounces for the smaller madtoms upwards to 150 pounds for Blue Catfish. Many species are recreationally and commercially important as delectable table fare such as Blue Catfish, Channel Catfish, and Flathead Catfish. Game species include Blue Catfish, Channel Catfish, Flathead Catfish, and bullheads, *Ameiurus* spp.; whereas the smaller madtom species, *Noturus* spp., are considered non-game species. Several species have been introduced, legally or illegally, outside their historical ranges. For example, the Margined Madtom has been collected and transported outside its native range east of the Appalachian Mountains, and used as bait for catching Smallmouth Bass, *Micropterus dolomieu*, in the New and Watauga River basins.

Table 1. Species of catfishes found in North Carolina. Common names enclosed within tick marks (“”) are scientifically undescribed species.

Scientific Name/ American Fisheries Society Accepted Common Name	Scientific Name/ American Fisheries Society Accepted Common Name
<i>Ameiurus brunneus</i> , Snail Bullhead	<i>Noturus flavus</i> , Stonecat
<i>Ameiurus catus</i> , White Catfish	<i>Noturus furiosus</i> , Carolina Madtom
<i>Ameiurus melas</i> , Black Bullhead	<i>Noturus gilberti</i> , Orangefin Madtom
<i>Ameiurus natalis</i> , Yellow Bullhead	<i>Noturus gyrinus</i> , Tadpole Madtom
<i>Ameiurus nebulosus</i> , Brown Bullhead	<i>Noturus insignis</i> , Margined Madtom
<i>Ameiurus platycephalus</i> , Flat Bullhead	<i>Noturus</i> sp. “Cape Fear Broadtail” Madtom
<i>Ictalurus furcatus</i> , Blue Catfish	<i>Noturus</i> sp. “Lake Waccamaw Broadtail” Madtom
<i>Ictalurus punctatus</i> , Channel Catfish	<i>Noturus</i> sp. “Pee Dee Broadtail” Madtom
<i>Noturus eleutherus</i> , Mountain Madtom	<i>Pylodictis olivaris</i> , Flathead Catfish

Three species are found in only one basin: 1) Mountain Madtom in the lower French Broad; 2) the “Cape Fear Broadtail” Madtom in the Cape Fear; and 3) the “Lake Waccamaw Broadtail” Madtom in the Waccamaw basin. Brown Bullhead is our most widely distributed species. It is found in 18 of our 21 basins, but there are no records of its occurrence in the Nolichucky, Savannah, or Shallotte basins (Tracy et al. 2020).

Our least speciose basin is the small, headwaters basin, the Savannah, where only Margined Madtom and Snail Bullhead are found. However, more species of catfishes, 12, are found in the Roanoke River basin than in any of the other 21 basins. Those 12 species include 5 species that have been introduced from other basins within or from drainages outside of North Carolina – Snail Bullhead, Black Bullhead, Flathead Catfish, Blue Catfish, and Channel Catfish. The seven native species in the Roanoke basin include the Margined, Orangefin, and Tadpole madtoms, White Catfish, Brown Bullhead, Flat Bullhead, and Yellow Bullhead. Seven species are considered imperiled in North Carolina: 1) State Endangered – Stonecat and Orangefin Madtom; 2) State Threatened – Carolina Madtom; and 3) State Special Concern - all three “undescribed “Broadtail” Madtom species (NCAC 2017; NCNHP 2018; NCWRC 2017).

Key characteristics for their proper identification include the shape of the caudal and anal fins; the color of the barbels surrounding the mouth; and body and fin coloration (please refer to the downloadable link at the bottom of this post - Identification Key to the Species of Catfishes (Family Ictaluridae) in North

Carolina). Most species can easily be told apart from one another, with the possible exceptions of Flat Bullhead vs. Snail Bullhead and Black Bullhead vs. Brown Bullhead.

If you have troubles with your identifications, just send us (<https://ncfishes.com/contact/>) an e-mail and include as many quality digital photographs as you can along with all the pertinent locality descriptors so that we will know from where the fish came.

Identification Key to the Species of Catfishes (Family Ictaluridae) in North Carolina

(Please refer to NCFishes.com for additional pictures and characteristics for all species)

- 1. Adipose fin attached to caudal fin (Figure 1). Maximum total length less than 200 mm, except for *Noturus flavus* 2
- Adipose fin free from caudal fin (Figure 1). Maximum total length far exceeding 200 mm..... 9

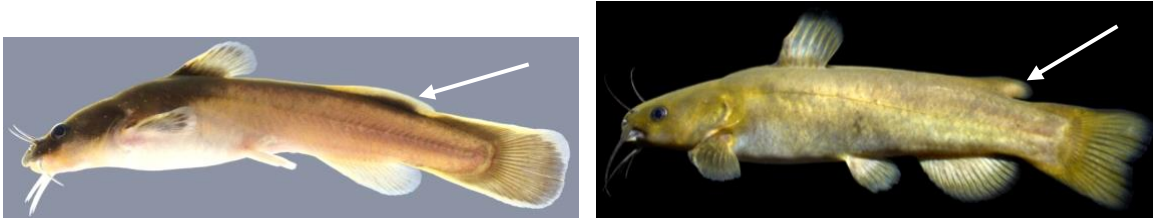


Figure 1. Left - Adipose fin attached to caudal fin; Right - Adipose fin free from caudal fin.

- 2. Band of teeth in upper jaw with backward lateral extensions (Figure 2). Light blotch on nape (Figure 3). Restricted to Nolichucky, lower French Broad, and Little Tennessee River basins Stonecat, *Noturus flavus*

Band of teeth in upper jaw without backward lateral extensions. No light blotch on nape. Range not restricted to Nolichucky, lower French Broad, and Little Tennessee River basins 3

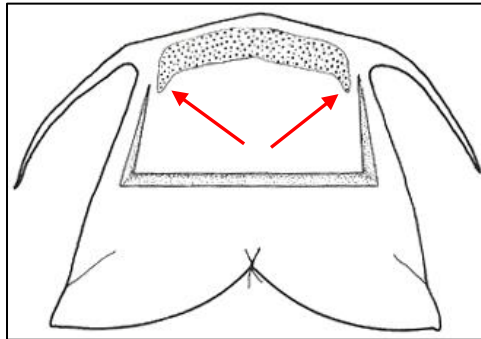


Figure 2. Red arrows pointing to the premaxillary band of teeth in the upper jaw with backward lateral extensions in Stonecat and Flathead Catfish.



Figure 3. Stonecat showing light blotch on nape. Photograph courtesy of Luke Etchison, NCWRC).

- 3. Body with dorsal blotches (Figure 4) 4
- Body without dorsal blotches (Figure 4) 5



Figure 4. Left – Body with dorsal blotches; Right – Body without dorsal blotches.

- 4. Range restricted to Tar and Neuse River basins (Figure 5).... Carolina Madtom, *Noturus furiosus*
- Range restricted to lower French Broad River basin (Figure 5).....
- Mountain Madtom, *Noturus eleutherus*



Figure 5. Left – Carolina Madtom; Right – Mountain Madtom.

- 5. Range restricted almost entirely to the Sand Hills and Coastal Plain 6
- Range not restricted to the Sand Hills and Coastal Plain..... 8

- 6. Mouth terminal or very slightly subterminal (Figure 6); jaws of equal length. Prominent, narrow, and dark mid-lateral streak present. Caudal fin large. Nasal barbel when pulled backwards extends as far behind eye as occurs in front of eye. Tadpole Madtom, *Noturus gyrinus*

Mouth subterminal (Figure 6); upper jaw projects forward of lower jaw. Caudal fin small with a dark blotch at its base. Nasal barbel extends only to posterior edge of eye or slightly beyond. Thin dark mid-lateral streak usually absent or indistinct..... 7



Figure 6. Left – Tadpole Madtom with a terminal mouth and mid-lateral streak; Right – Subterminal mouth and mid-lateral streak absent.

7. Fins not edged with black. Modally 14 anal rays and 55 caudal fin rays. Caudal fin length : height ratio of 1.11. Broad head. Found only in Lake Waccamaw (Figure 7)
 *Noturus* sp. "Lake Waccamaw Broadtail" Madtom
- Fins not edged with black. Modally 16 anal rays and 59-60 caudal fin rays. Caudal fin length : height ratio of 1.34. Found only in Lumber and Waccamaw River basins (Figure 7)
 *Noturus* sp. "Pee Dee Broadtail" Madtom
- Fins not edged with black. Modally 16 anal rays and 60 caudal fin rays. Caudal fin length : height ratio of 1.42. Found only in lower Cape Fear River basin (Figure 7)
 *Noturus* sp. "Cape Fear Broadtail" Madtom



Figure 7. Top – *Noturus* sp. "Lake Waccamaw Broadtail" Madtom; Middle – *Noturus* sp. "Pee Dee Broadtail" Madtom; Bottom - *Noturus* sp. "Cape Fear Broadtail" Madtom.

8. Caudal fin margin pale, the pale portion slightly to distinctly wider on upper lobe (often forming somewhat a triangular pale area) than on lower lobe (Figure 8). Caudal fin submarginally is distinctly darker on lower lobe than upper lobe. Chin behind barbels strongly papillose. Range restricted to the upper Dan River watershed Orangefin Madtom, *Noturus gilberti*

Caudal fin margin dusky or black, or if margin is pale, the pale portion is narrow and equal in width on upper and lower lobes (Figure 8). Caudal fin with dusky or black color equally developed on both lobes. Chin behind barbels weakly papillose. Range not restricted to upper Dan River Margined Madtom, *Noturus insignis*



Figure 8. Left – Orangefin Madtom; Right – Margined Madtom.

9. Premaxillary band of teeth with backward lateral extensions (Figure 1). Anal fin rays 12-16. Entire body mottled. Tip of dorsal lobe of caudal fin white except in very large specimens (Figure 9) Flathead Catfish, *Pylodictis olivaris*

Premaxillary band of teeth nearly straight, without backward lateral extensions. Anal fin rays 18-36. Entire body not mottled. Tip of dorsal lobe of caudal fin not white 10



Figure 9. Left – Flathead Catfish.

10. Caudal fin deeply forked (Figure 10) 11
 Caudal fin moderately forked, emarginate, or rounded 12
11. Anal fin straight (Figure 10); anal fin rays (27)30-36 (38). Never spotted.
Blue Catfish, *Ictalurus furcatus*

Anal fin rounded (Figure 10); anal fin rays (23)25-30(32). Young to small adults with few to many dark spots Channel Catfish, *Ictalurus punctatus*

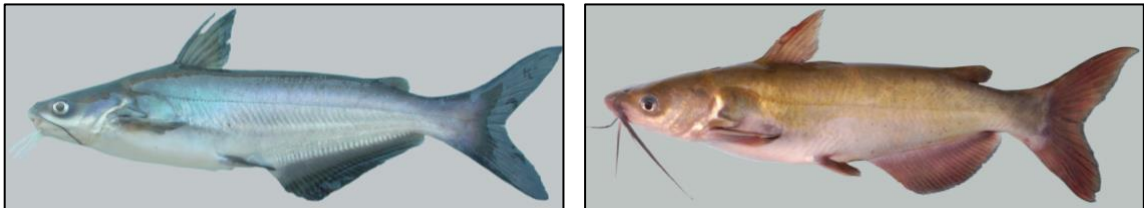


Figure 10. Left – Blue Catfish; Right – Channel Catfish.

12. Dorsal fin with a dark basal blotch (Figure 11). Eye size moderate. 13
 Dorsal fin without a dark basal blotch (Figure 11). Eye size small..... 14



Figure 11. Left – Dorsal fin with dark basal blotch; Right – Dorsal fin without a dark basal blotch.

13. Chin barbels usually profusely pigmented (occasionally pigment only developed basally in small specimens) (Figure 12). Maxillary barbels uniformly dark. When viewed from the side, upper jaw with an extreme “overbite” (Figure 12). Premaxillary tooth patch in large juveniles and adults uniformly wide, lateral ends indented, and in adults, anterior teeth larger than posterior teeth (Figure 13). Anal rays usually 18-20 (18-22). Snail Bullhead, *Ameiurus brunneus*

Chin barbels usually without pigment (pigment may be present in large specimens on lateral barbels, rarely on medial) (Figure 12). Leading edge of maxillary barbel pale, appearing bi-colored. When viewed from the side, upper jaw without an “overbite” (Figure 12). Premaxillary tooth patch in large juveniles and adults narrower medially, lateral ends not indented, and teeth of uniform size (Figure 13). Anal rays usually 22-24 (21-26). ..Flat Bullhead, *Ameiurus platycephalus*



Figure 12. Left – Snail Bullhead with chin barbels usually profusely pigmented and maxillary barbels uniformly dark.; Right - Flat Bullhead with chin barbels usually without pigment and leading edge of maxillary barbel pale, appearing bi-colored.

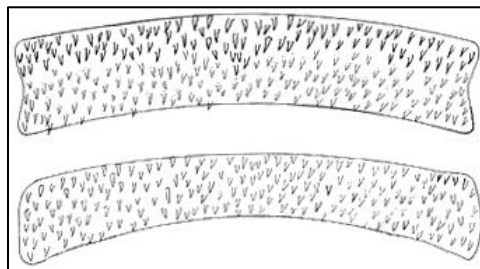


Figure 13. Top – Premaxillary tooth patch in Snail Bullhead; Bottom – Premaxillary tooth patch in Flat Bullhead.

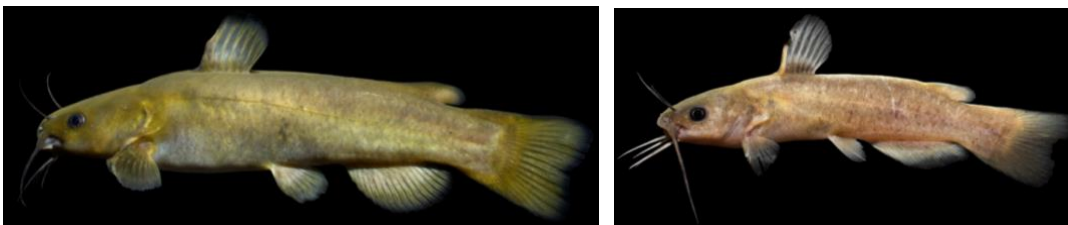


Figure 14. Left – Snail Bullhead; Right - Flat Bullhead.

14. Caudal fin moderately forked or rounded. Chin barbels pale (Figure 15) 15
 Caudal fin slightly emarginate. Chin barbels dark (Figure 16) 16

15. Caudal fin moderately forked (Figure 15). Anal margin rounded; anal fin rays 22-24 (21-25)....
.....White Catfish, *Ameiurus catus*

Caudal fin rounded (Figure 15). Anal margin nearly truncate; anal fin rays 25-28 (23-29).....
..... Yellow Bullhead, *Ameiurus natalis*



Figure 15. Left – White Catfish; Right – Yellow Bullhead.

16. Caudal fin base uniformly dusky or dark in large juveniles and adults (Figure 16). Body often mottled. Total gills rakers on first gill arch typically 13-15
..... Brown Bullhead, *Ameiurus nebulosus*

Caudal fin base with a rectangular pale area often present in large juveniles and adults (Figure 16). Body not mottled. Total gills rakers on first gill arch typically 17-29
..... Black Bullhead, *Ameiurus melas*



Figure 16. Left – Brown Bullhead; Right – Black Bullhead.

Glossary

(Adapted from Jenkins and Burkhead 1994)

Adipose Fin – A small or medium-sized, fleshy fin lacking rays and spines and occurring on the dorsum between the dorsal and caudal fins

Emarginate – A fin margin with a slight middistal concavity

Maxillary Barbel – Dorsolateral barbel located at the “corner” of the mouth

Premaxillary band of teeth (tooth patch) – Tooth patch located at the anterior portion on the “roof” of the mouth; best observed by placing the fish on its back and prying open its mouth

Nape – The dorsal area between the posterior end of the head (occiput) and the dorsal fin

Occiput – The posterodorsal portion of the head, immediately anterior to the nape

References

(Identification key adapted from these references)

(Permission to use Figure 47 (page 529) in Jenkins and Burkhead (1994) was granted by the American Fisheries Society, October 11, 2020)

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Additional References

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(Available at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss60/1>)

The Meanings of the Scientific Names of Catfishes

Adopted from the ETYFish Project by Christopher Scharpf and Kenneth J. Lazara,
accessed September 30, 2020, <http://www.etyfish.org/>

Ameiurus Rafinesque 1820: *a-*, without; *meiosis*, to reduce; *urus*, tailed, literally “not curtailed,” referring to absence of deep notch in caudal fin compared to forked tail of *Ictalurus*

A. brunneus Jordan 1877: brown, referring to brownish color of young and juveniles

A. catus (Linnaeus 1758): Latin for cat, referring to its cat-like whiskers

A. melas (Rafinesque 1820): black, referring to color (which varies to yellowish and brown)

A. natalis (Lesueur 1819): Latin for “of or belonging to birth,” often applied to Christmas (*Noel* in French), as reflected in Lesueur’s vernacular name for this catfish, “Pimelode Noël,” allusion not explained but almost certainly in honor of Simon Barthélemy Joseph Noël de la Morinière (1765-1822), French naturalist, journalist, author, and fisheries inspector who devoted 20 years to a projected six-volume history of fisheries of which only one volume (1815) appeared (Lesueur mentioned Noël in his 1817 description of the American Eel, *Anguilla rostrata*); most sources claim name means “having large nates or buttocks,” referring to either a swollen and elevated caudal peduncle, a large adipose fin, or the swollen head and nape muscles of breeding males, an etymological error apparently based on the assumption that *natalis* was the adjectival form of the Latin noun *natis* (rump or buttocks)

A. nebulosus (Lesueur 1819): cloudy, referring to cloudy (i.e., mottled) yellow-brown color

A. platycephalus (Girard 1859): *platys*, flat; *cephalus*, head, referring to “very much depressed” head

Ictalurus Rafinesque 1820: *ichthys*, fish; *aelurus*, cat, i.e., “catfish”

I. furcatus (Lesueur 1840): forked, referring to forked tail

I. punctatus (Rafinesque 1818): spotted, referring to small, dark spots on body

Noturus Rafinesque 1818: *noton*, back; *oura*, tail, i.e., tail over the back, referring to connected caudal and adipose fins

N. eleutherus Jordan 1877: free, referring to “free adipose fin,” i.e., incomplete fusion of adipose and caudal fins

N. flavus Rafinesque 1818: yellow, referring to the Kentucky (USA) specimens Rafinesque examined, “entirely of rufous yellow”

N. furiosus Jordan & Meek 1889: mad, “the poison of its axillary gland is more virulent than that of” its congeners

N. gilberti Jordan & Evermann 1889: in honor of friend and colleague Charles H. Gilbert (1859-1928), ichthyologist and fisheries biologist

N. gyrinus (Mitchill 1817): Latinization of *gyrinus*, tadpole, referring to tadpole-like shape

N. insignis (Richardson 1836): remarkable or extraordinary, allusion not evident since Richardson did not provide a description; Taylor, in his 1969 revision of the genus, said the “probable intention [of the name] was to emphasize the [yellowish] color and the long adipose fin, features which were at one time considered unique”

***Pylodictis* Rafinesque 1819:** *pelos*, mud; *ichthys*, fish, with the “*d*” likely inserted for euphony, reflecting several local vernaculars (e.g., mudcat, mudfish, mudsucker); Rafinesque wrote that the fish “lives on muddy bottoms, and buries itself in the mud in the winter”

***P. olivaris* (Rafinesque 1818):** olive, referring to its coloration