

Monospecific Families of Freshwater Fishes with no Saltwater Relatives Found in North Carolina
By the [NCFishes.com](https://ncfishes.com) Team

There are 12 families of predominantly freshwater fishes that are monospecific (having only one species) in North Carolina (Table 1; Tracy et al. 2020). [Please note: Tracy et al. (2020) may be downloaded for **free** at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss60/1.1>.] The Family Xenocyprididae (the single species of Grass Carp, *Ctenopharyngodon idella*) was previously discussed along with the Cyprinidae (Barbs and Carps) and Leuciscidae (Minnows) (<https://ncfishes.com/minnow-species-diversity-in-north-carolina/>). Some species listed in Table 3 in Tracy et al (2020) might be represented by one species in fresh water, but are more diverse in estuarine or marine waters (e.g., families Engraulidae, Belonidae, Paralichthyidae, and Archiridae) (<https://ncfishes.com/marine-fishes-of-north-carolina/>).

Table 1. Families with only one species of freshwater fish in North Carolina.

Family	Scientific Name	American Fisheries Society Accepted Common Name
Polyodontidae	<i>Polyodon spathula</i>	Paddlefish
Lepisosteidae	<i>Lepisosteus osseus</i>	Longnose Gar
Amiidae	<i>Amia calva</i>	Bowfin
Hiodontidae	<i>Hiodon tergisus</i>	Mooneye
Anguillidae	<i>Anguilla rostrata</i>	American Eel
Cobitidae	<i>Misgurnus anguillicaudatus</i>	Oriental Weatherfish
Loricariidae	<i>Pterygoplichthys pardalis</i>	Amazon Sailfin Catfish
Umbridae	<i>Umbra pygmaea</i>	Eastern Mudminnow
Aphredoderidae	<i>Aphredoderus sayanus</i>	Pirate Perch
Amblyopsidae	<i>Chologaster cornuta</i>	Swampfish
Cyprinodontidae	<i>Cyprinodon variegatus</i>	Sheepshead Minnow
Gasterosteidae	<i>Apeltes quadracus</i>	Fourspine Stickleback

For each of these 12 species information is provided on: 1) its scientific name and American Fisheries Society (AFS)-accepted common name (Page et al. 2013); 2) its common and vernacular names (Smith 1907; Cloutman and Olmsted 1983); 3) the etymology of its scientific name (<https://etyfish.org/>); 4) unique identifying characteristics; 5) what other species inhabiting fresh water it might be confused with; 6) its distribution within North Carolina; 7) its size; 8) habitats where it can be found; and 9) its imperilment status (where applicable). [Note: see Supplemental Maps 1-3, page 17, showing North Carolina's 100 counties, 21 river basins, and 4 physiographic regions.]

The identification of the monospecific families is not complicated – there are simply few other species with which they could be confused. Some of them are so distinctive, e.g., Longnose Gar, Bowfin, and Swampfish, that it might seem impossible to misidentify them. It is hard to imagine Eastern Mudminnow being mistaken for Bowfin, or Atlantic Needlefish for Longnose Gar, or Bowfin for Northern Snakehead, but it's been done.

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.

Polyodontidae, Bonaparte 1835

- **Scientific Name and AFS-accepted Common Name:** *Polyodon spathula*, Paddlefish.
- **Common and Vernacular Names:** Paddle-fish, spoon-billed cat-fish, spadefish, shovelfish, shovelbilled cat, duck-billed cat.
- **Etymology of *Polyodon spathula*:** *Polyodon* Lacepède 1797 - *poly*, many; *odon*, tooth, referring to its many teeth compared to an absence of teeth in *Acipenser* (sturgeons). However, only juvenile Paddlefish have teeth and the type specimen is a small specimen. The genus name, *Polyodon*, does not allude to the numerous gill rakers possessed by the adults as reported by many authors, but to the numerous teeth possessed by the young juveniles]. *Polyodon spathula* (Walbaum 1792) - *spatula*, referring to paddle-shaped rostrum (<https://etyfish.org/name-of-the-week2014/>).
- **Unique Characteristics:** Long, canoe paddle-shaped snout that is about one-third the body length (Figure 1). Huge mouth. Heterocercal caudal fin. Large, fleshy, pointed flap on rear edge of gill cover. Tiny eyes (Page and Burr 2011). Toothless jaws as adults.



Figure 1. Paddlefish. Photograph courtesy of the U.S. Fish & Wildlife Service.

- **In Fresh Water Most Likely to be Confused With:** No other species.
- **Distribution:** Paddlefish is known anecdotally and historically (in 1869, 1873, and 1874) only from the French Broad River near Asheville and Brevard (Cope 1870; Anon. 1873; Anon. 1874; Luke Etchison, North Carolina Wildlife Resources Commission, pers. com.) and has been long considered extirpated from the state. North Carolina is on the eastern edge of the species' range, and it would have been rare in the state if it ever occurred. If it were to occur in North Carolina waters, one would look for it in the lower French Broad River, downstream from Marshall in Madison County (Tracy et al. 2020).
- **Size:** Maximum reported total length of 2210 mm (7 feet, 3 inches) (<https://www.fws.gov/fisheries/freshwater-fish-of-america/paddlefish.html>).
- **Habitats:** Large rivers and reservoirs.
- **Imperilment Status:** State Endangered (NCAC 2017; NCNHP 2020; NCWRC 2017).

Lepisosteidae, Bonaparte 1835

- **Scientific Name and AFS-accepted Common Name:** *Lepisosteus osseus*, Longnose Gar.
- **Common and Vernacular Names:** Longnosed garpike, needlenosed gar, bill-fish.
- **Etymology of *Lepisosteus osseus*:** *Lepisosteus* Lacepède 1803 - *lepid*, scale; *osteus*, bony, referring to heavy bone-like scales. *Lepisosteus osseus* (Linnaeus 1758) – *osseus*, bony, referring to head bones and ganoid scales on head and body (<https://etyfish.org/lepisosteiformes/>).
- **Unique Characteristics:** Elongate, slender jaws with many needlelike teeth. Long, slender body covered with armorlike ganoid scales. Dorsal fin short, less than half of total length located near caudal fin (Figure 2). Dorsal fin and anal fin higher than long. Caudal fin abbreviate heterocercal. Scales large, lateral line scale series about 55 (Rohde et al. 2009).

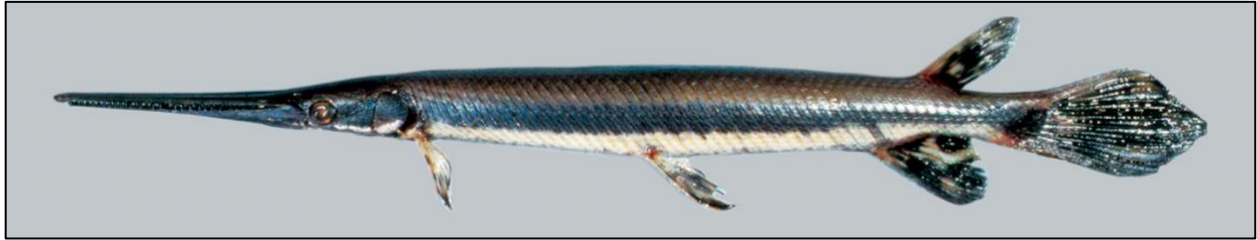
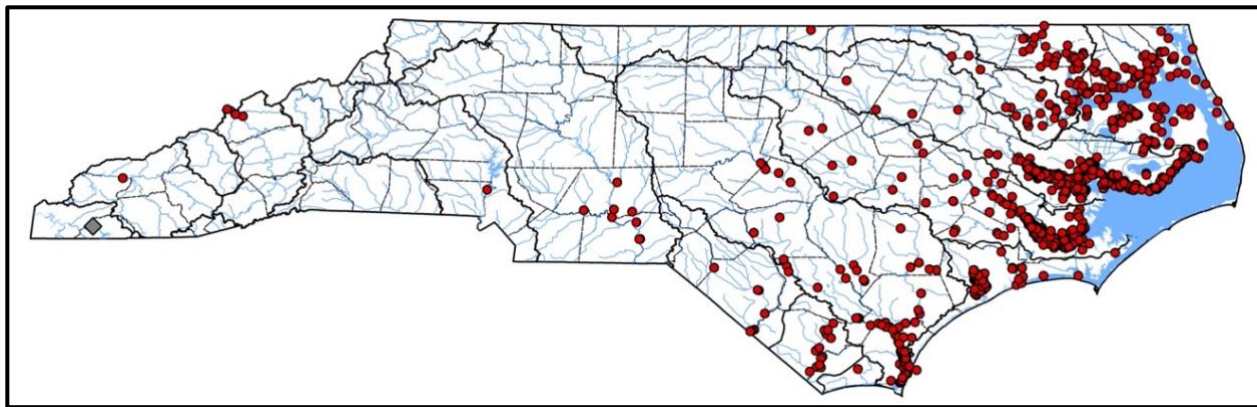


Figure 2. Longnose Gar, juvenile.

- **In Fresh Water Most Likely to be Confused With:** Atlantic Needlefish (Family Belontiidae, *Strongylura marina*, <https://ncfishes.com/marine-fishes-of-north-carolina/strongylura-marina/>).
- **Size:** The total length of adults is 500 to 1,830 mm (19.7 to 72.0 inches) (Rohde et al. 2009).
- **Habitats:** The Longnose Gar is usually found in areas of quiet water or slower current, such as backwaters, pools, and oxbows in medium to large rivers, lakes, and reservoirs; also in brackish, estuarine waters (Rohde et al. 2009).
- **Distribution:** Longnose Gar is widely distributed in large creeks, rivers, reservoirs, and sounds, primarily in the Coastal Plain, from the Albemarle to the Catawba basins. It is also present in the French Broad, Little Tennessee, and Hiwassee basins (Map 1; Tracy et al. 2020).



Map 1. Distribution of Longnose Gar, *Lepisosteus osseus*. Map originally appeared in Tracy et al. (2020).

- **Historical Relevance:** In 1585-1593, John White illustrated Longnose Gar labeled with the Algonquin word used by the Croatoan First Peoples, *Kowabetteo* (<https://www.coastalcarolinaians.com/updated-algonquian-word-list-by-scott-dawson/>), and noted: "Some 5. or 6. a foote in lengthe" (Figure 3). More than a century after John White painted this fish, the Longnose Gar was mentioned as occurring in North Carolina's waters by John Lawson in 1709

who described the species as: “The white Guard-Fish is shaped almost like a Pike, but slenderer; his Mouth has a long small Bill set with Teeth, in which he catches small Fish; his Scales are knit together like Armour. When they dress him, they strip him, taking off Scales and Skin together. His meat is very white, and rather looks like Flesh than Fish. The English account then no good Fish; the Indians do. The Gall of this Fish is green, and a violent Cathartick, if taken inwardly” (Lawson (1709), p.157).



Figure 3. Painting of Longnose Gar by John White, 1585-1593. Painting courtesy of the British Museum, Museum No. SL,5270.106 (https://www.britishmuseum.org/collection/object/P_SL-5270-106).

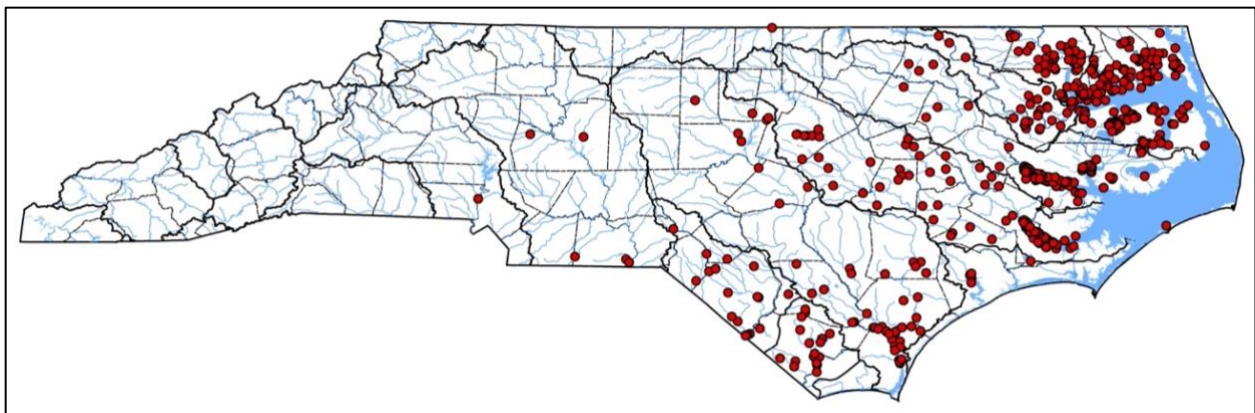
Amiidae, Bonaparte 1831

- **Scientific Name and AFS-accepted Common Name:** *Amia calva*, Bowfin.
- **Common and Vernacular Names:** Grindle, grinnel, brindle-fish, black-fish, mud-fish, dog-fish, shoepike, cypress bass, cypress trout, choupique, scaley cat, German bass, spottail, grinner.
- **Etymology of *Amia calva*:** *Amia* Linnaeus 1766 - meaning unknown, presumably derived from *amia*, ancient name for an unknown fish, long held to be a bonito or a kind of “tunny” (e.g., Atlantic Bonito, *Sarda sarda*) since the Renaissance, but now identified as the Bluefish, *Pomatomus saltatrix*. *Amia calva* Linnaeus 1766 – *calva*, smooth or bald, probably referring to scaleless head (<https://etyfish.org/amiiformes/>).
- **Unique Characteristics:** Long, stout, round body with paired fins placed low on body and far apart. Long dorsal fin that extends for more than half the body length (Figure 4). Large, hard bony plate (gular plate) found on the chin between the two jaws (Rohde et al. 2009).



Figure 4. Bowfin.

- **In Fresh Water Most Likely to be Confused With:** Juvenile Eastern Mudminnow (Family Umbridae, <https://ncfishes.com/freshwater-fishes-of-north-carolina/umbra-pygmaea/>) and Snakehead (Family Chanidae, <https://ncfishes.com/freshwater-fishes-of-north-carolina/amia-calva/>).
- **Size:** The total length of adults is 457 to 1,090 mm (8.0 to 42.9 inches) (Rohde et al. 2009).
- **Habitats:** Bowfin are usually concealed in and near vegetation, logs, branches, and other shelter in clear or tannin-stained waters. It is also found in mill ponds and in a range of slow-moving habitats such as Coastal Plain swamps, sluggish creeks, river, ditches, and borrow pits (Rohde et al. 2009).
- **Distribution:** Bowfin is widely distributed in Piedmont rivers and reservoirs and throughout the Coastal Plain from the Albemarle to the Catawba basins (Map 2; Tracy et al. 2020).



Map 2. Distribution of Bowfin, *Amia calva*. Map originally appeared in Tracy et al. (2020).

- Historical Relevance:** In 1585-1593, John White illustrated Bowfin labeled with the Algonquin word used by the Croatoan First Peoples, *Marangahockes* (<https://www.coastalcarolinaindians.com/updated-algonquian-word-list-by-scott-dawson/>), and noted: "3. or 4. foote in length" (Figure 5). More than a century after John White painted this fish, the Bowfin was mentioned as occurring in North Carolina's waters by John Lawson in 1709 who described it, though in no unflattering words, as: "Grindals are a long scaled Fish with small Eyes; and frequent Ponds, Lakes, and slow-running Creeks and Swamps. They are a soft sorry Fish, and good for nothing; though some eat them for good Fish" (Lawson (1709), p.160).



Figure 5. Painting of Bowfin by John White, 1585-1593. Painting courtesy of the British Museum, Museum No. SL,5270.98 (https://www.britishmuseum.org/collection/object/P_SL-5270-98).

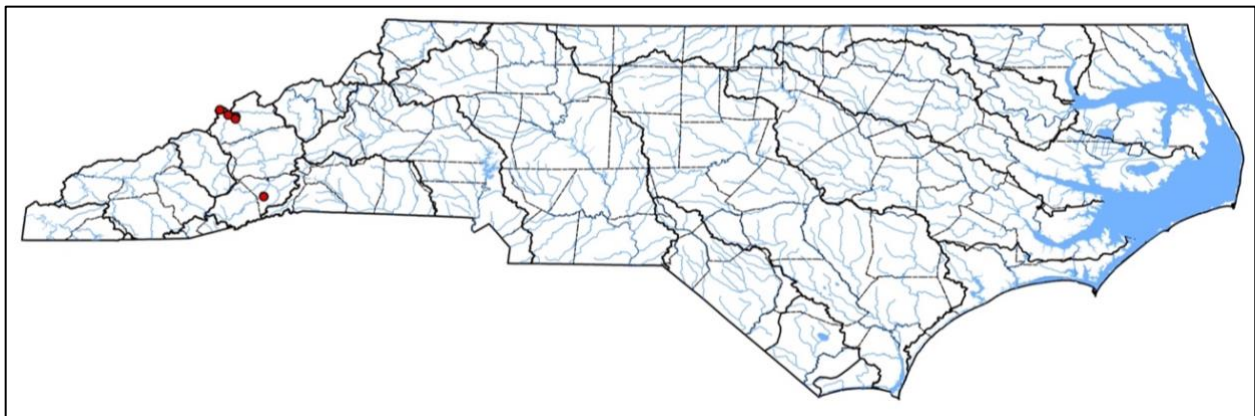
Hiodontidae, Valenciennes 1847

- **Scientific Name and AFS-accepted Common Name:** *Hiodon tergisus*, Mooneye.
- **Common and Vernacular Names:** Slicker, toothed herring.
- **Etymology of *Hiodon tergisus*:** *Hiodon* Lesueur 1818 - *hio*, tongue or hyoid bone; *odon*, tooth, referring to toothed tongue. *Hiodon tergisus* Lesueur 1818 – *tergisus*, polished, referring to silvery sheen (<https://etyfish.org/hiodontiformes/>).
- **Unique Characteristics:** Lateral line present. Breast without a sawtooth margin. Untoothed keel along the belly from the pelvic fin bases to the anus. Strongly laterally compressed body. Scales absent from atop the head. A single dorsal fin; fins without spines. Large eyes with adipose eyelids (Page and Burr 2011). Anal fin origin behind dorsal fin origin (Figure 6).



Figure 6. Mooneye. Photograph courtesy of the North American Native Fishes Association Gallery.

- **In Fresh Water Most Likely to be Confused With:** Gizzard and Threadfin Shad (Family Clupeidae, <https://ncfishes.com/freshwater-fishes-of-north-carolina/>). However, shads do not have a lateral line and do possess a jagged keel along the belly.
- **Size:** To 330 mm (13 inches) for Missouri specimens (Pflieger 1997); maximum reported total length in Tennessee waters is 445 mm (17.5 inches) (Etnier and Starnes 1993).
- **Habitats:** Large pools of large clear streams and rivers and open waters of reservoirs in Missouri (Pflieger 1997).
- **Distribution:** Only known from the state since 1902 at Bowman's Bluff in Henderson County, it is now restricted because of run-of-river dams and habitat fragmentation to the mainstem of the French Broad River downstream from Marshall in Madison County (Map 3; Tracy et al. 2020).



Map 3. Distribution of Mooneye, *Hiodon tergisus*. Map originally appeared in Tracy et al. (2020).

- **Imperilment Status:** State Special Concern (NCAC 2017; NCNHP 2020; NCWRC 2017).

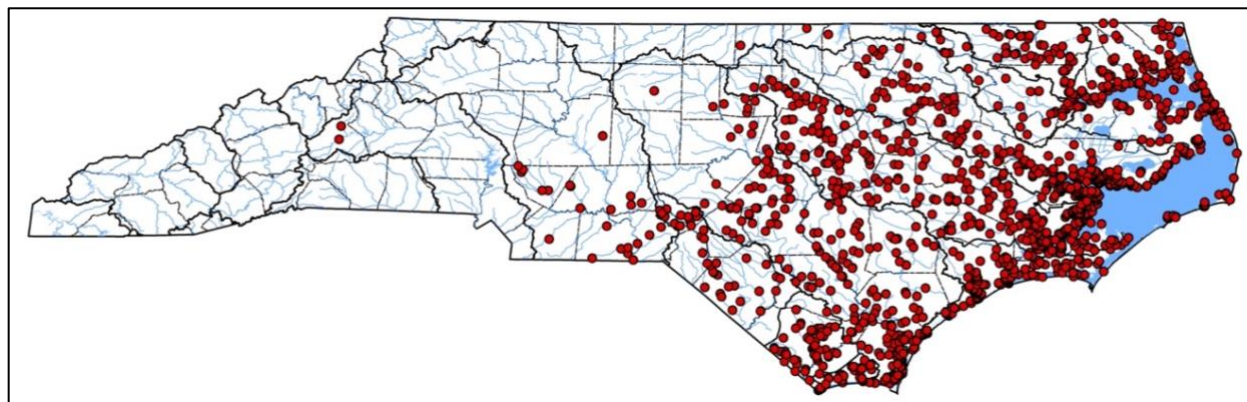
Anguillidae, Rafinesque 1810

- **Scientific Name and AFS-accepted Common Name:** *Anguilla rostrata*, American Eel.
- **Common and Vernacular Names:** Yellow eel, glass eel, elver, silver eel, slippery eel, common eel, freshwater eel, Boston eel, Atlantic eel, snakefish.
- **Etymology of *Anguilla rostrata*:** *Anguilla* Schrank 1798 - tautonymous with *Muraena anguilla*; Latin for eel. *Anguilla rostrata* (Lesueur 1817) – *rostrata*, beaked, possibly referring to the “elongated, pointed and strait” snout on the specimen Lesueur examined (<https://etyfish.org/anguilliformes3/>).
- **Unique Characteristics:** Body elongate and serpentine-like (Figure 7). Dorsal fin long. Jaws present. One pair of gill openings. Pectoral fins present, pelvic fins absent. Tiny, embedded scales (Rohde et al. 2009).



Figure 7. American Eel.

- **In Fresh Water Most Likely to be Confused With:** Lampreys (Family Petromyzontidae, <https://ncfishes.com/freshwater-fishes-of-north-carolina/>).
- **Size:** The total length of the adults is 610-1520 mm (24-60 inches) (Rohde et al. 2009).
- **Habitats:** In freshwater streams of all sizes the American Eel prefers areas with aquatic vegetation and undercut banks over a soft-bottom substrate of mud or sand. In coastal areas it occurs most where there is shelter, such as on the edges of islands, submerged logs, and the undercut banks of tidal streams. (Rohde et al. 2009).
- **Status:** Commercial and recreational harvesting is regulated by NCWRC (2020) and NCDMF (2020)
- **Distribution:** A catadromous species, American Eel is abundant and widespread in the eastern half of North Carolina and is found in all the river basins from the Albemarle to the Catawba (Map 4; Tracy et al. 2020). While mostly distributed throughout the Coastal Plain, there are a number of records in the Piedmont from the Roanoke, Tar, Neuse, Cape Fear, and Yadkin basins. Historically, the American Eel was probably found in all Atlantic slope basins up to the Mountains.



Map 4. Distribution of American Eel, *Anguilla rostrata*. Map originally appeared in Tracy et al. (2020).

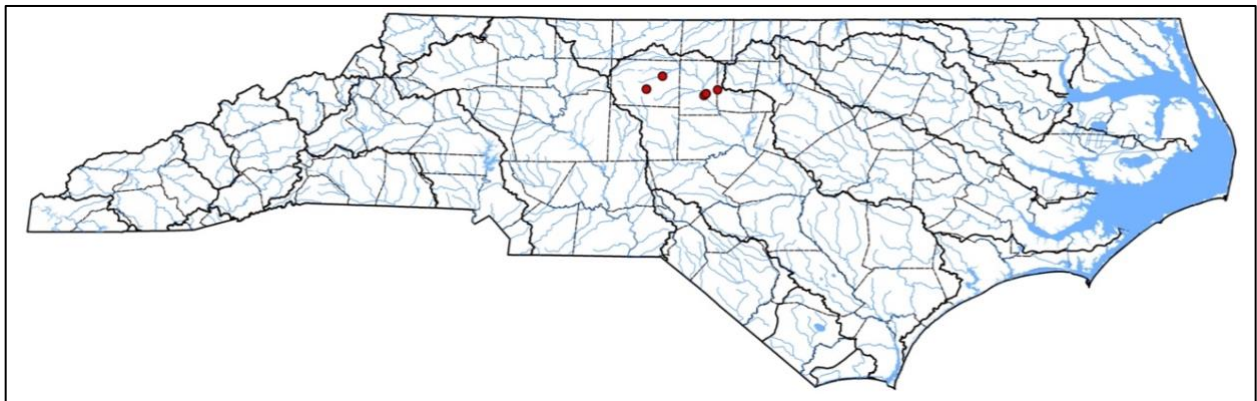
Cobitidae, Swainson 1838

- **Scientific Name and AFS-accepted Common Name:** *Misgurnus anguillicaudatus*, Oriental Weatherfish.
- **Common and Vernacular Names:** Dojo, weather loach, Japanese weatherfish, Amur weatherfish.
- **Etymology of *Misgurnus anguillicaudatus*:** *Misgurnus* Lacepède 1803 - latinization of either mis'gurn, misgurne or misgurnos, Old English, French and Spanish vernaculars, respectively, for *M. fossilis*. *Misgurnus anguillicaudatus* (Cantor 1842) - *anguilla*, eel; *caudatus*, tailed, referring to eel-like caudal fin (<https://etyfish.org/cypriniformes2/>).
- **Unique Characteristics:** Elongate body; subterminal mouth surrounded by 10-12 barbels (Figure 8). Caudal fin rounded. Stout spine on pectoral fin. Dorsal fin origin above pelvic fin origin. Tiny scales (Page and Burr 2011).



Figure 8. Oriental Weatherfish. Photograph courtesy of the North American Native Fishes Association Gallery.

- **In Fresh Water Most Likely to be Confused With:** No other species.
- **Size:** To 280 mm (11 inches) Standard Length (<https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=498>).
- **Habitats:** The Oriental Weatherfish is found in muddy or silty substrates in low-gradient, shallow water, often in aquatic macrophyte beds (<https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=498>).
- **Distribution:** Oriental Weatherfish, a nonindigenous species, is now found in several creeks in Guilford, Alamance, and Orange counties in the Haw River system in the Cape Fear River basin (Map 5; Tracy et al. 2020).



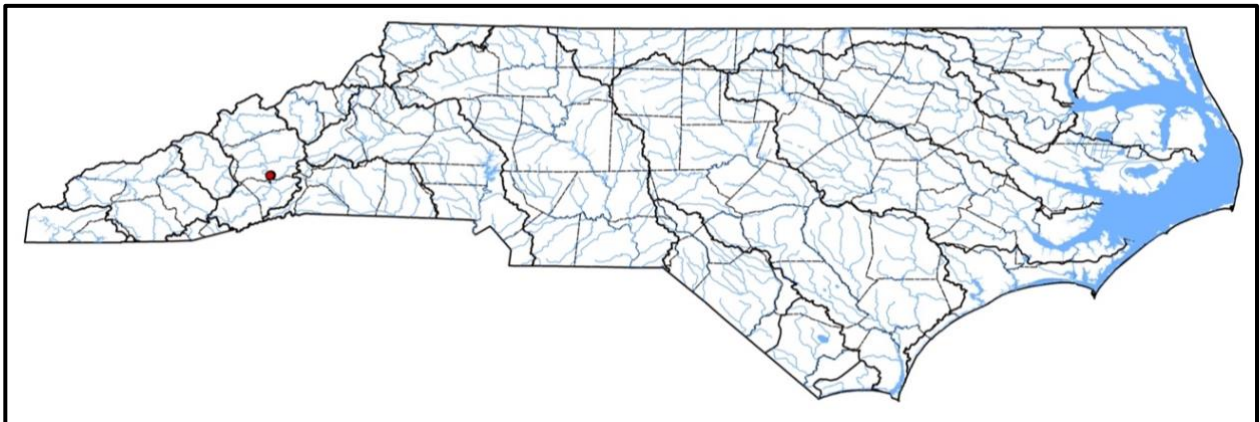
Map 5. Distribution of Oriental Weatherfish, *Misgurnus anguillicaudatus*. Map originally appeared in Tracy et al. (2020).

- **Scientific Name and AFS-accepted Common Name:** *Pterygoplichthys pardalis*, Amazon Sailfin Catfish.
- **Common and Vernacular Names:** Suckermouth catfish, pleco.
- **Etymology of *Pterygoplichthys pardalis*:** *Pterygoplichthys* Gill 1858 - *pterygion*, diminutive of *pteryx* and fin; *hoplon*, weapon, referring to sail-like dorsal fin with single large spine; *ichthys*, fish. *Pterygoplichthys pardalis* (Castelnau 1855) – *pardalis*, like a leopard, referring to round spots or points of dark brown on a light-yellow background (<https://etyfish.org/siluriformes4/>).
- **Unique Characteristics:** Body covered with flexible bony plates. One pair of barbels on a large, subterminal mouth; papillose sucking lips. Spine anterior to adipose fin. Dorsal fin with one spine and 10-14 rays (Page and Burr 2011) (Figure 9).



Figure 9. Amazon Sailfin Catfish.

- **In Fresh Water Most Likely to be Confused With:** No other species.
- **Size:** Generally to 500 mm (19.6 inches) (<https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=769>).
- **Habitats:** Littoral regions of a heated reservoir.
- **Distribution:** A nonindigenous, cold-intolerant species, Amazon Sailfin Catfish, was first detected in Lake Julian in the French Broad basin in 1997 where it thrived until early 2020 (Map 6). In February 2020, the power plant ceased discharging heated effluent to the reservoir and since then the population has most likely died out (Tracy et al. 2020).



Map 6. Distribution of Amazon Sailfin Catfish, *Pterygoplichthys pardalis*. Map originally appeared in Tracy et al. (2020).

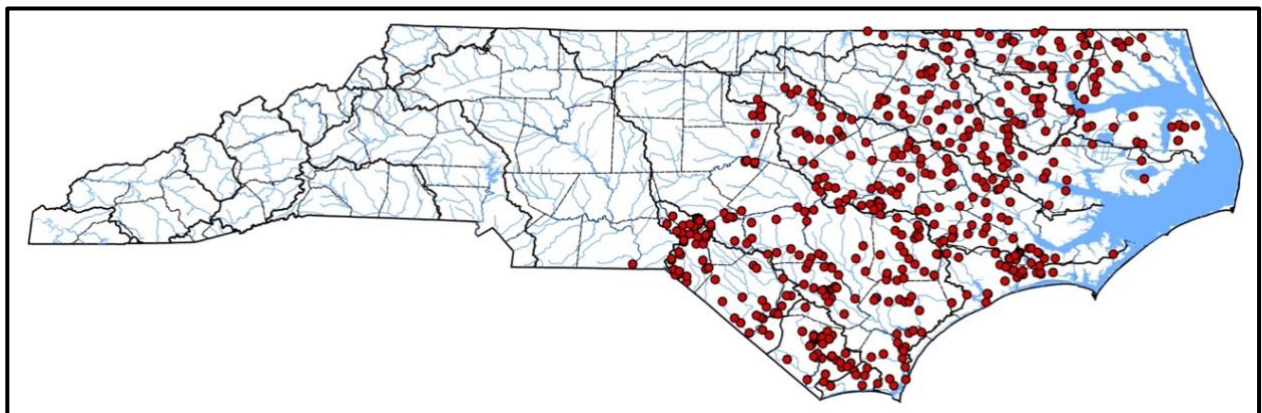
Umbridae, Bonaparte 1845

- **Scientific Name and AFS-accepted Common Name:** *Umbra pygmaea*, Eastern Mudminnow.
- **Common and Vernacular Names:** Mud-fish.
- **Etymology of *Umbra pygmaea*:** *Umbra* Kramer 1777 - shade or shadow, allusion not explained; according to Valenciennes (1846), name refers to belief among early naturalists that *U. krameri* is rarely seen because it “preferably lives in underground caves where light does not penetrate” (translation) [name first published in 1756 but not available until 1777]. *Umbra pygmaea* (DeKay 1842) – *pygmaea*, dwarf-like, referring to small size (~25.4 mm) of type specimens (now lost), described as a “pigmy dace” (<https://etyfish.org/esociformes/>).
- **Unique Characteristics:** Stout, cylindrical body with broad head and short snout. Body color brown with 10-14 thin dark-brown stripes on the sides and a black bar just before the caudal fin base (Figure 10).



Figure 10. Eastern Mudminnow.

- **In Fresh Water Most Likely to be Confused With:** Eastern Mudminnow may be mistaken for juvenile Bowfin (Family Amiidae, <https://ncfishes.com/freshwater-fishes-of-north-carolina/amia-calva/>).
- **Size:** The total length of adults is 50-110 mm (2-4.3 inches) (Rohde et al. 2009).
- **Habitats:** The Eastern Mudminnow prefers small sluggish streams, roadside ditches, sloughs, and swamps, particularly along their margins, over a mud bottom and with abundant vegetation and debris (Rohde et al. 2009).
- **Distribution:** Eastern Mudminnow is primarily found in most Atlantic slope Coastal Plain basins east of the Fall Zone, except for the Catawba, Broad, and Savannah basins, but seems to avoid brackish waters along the Outer Banks (Map 7; Tracy et al. 2020).



Map 7. Distribution of Eastern Mudminnow, *Umbra pygmaea*. Map originally appeared in Tracy et al. (2020).

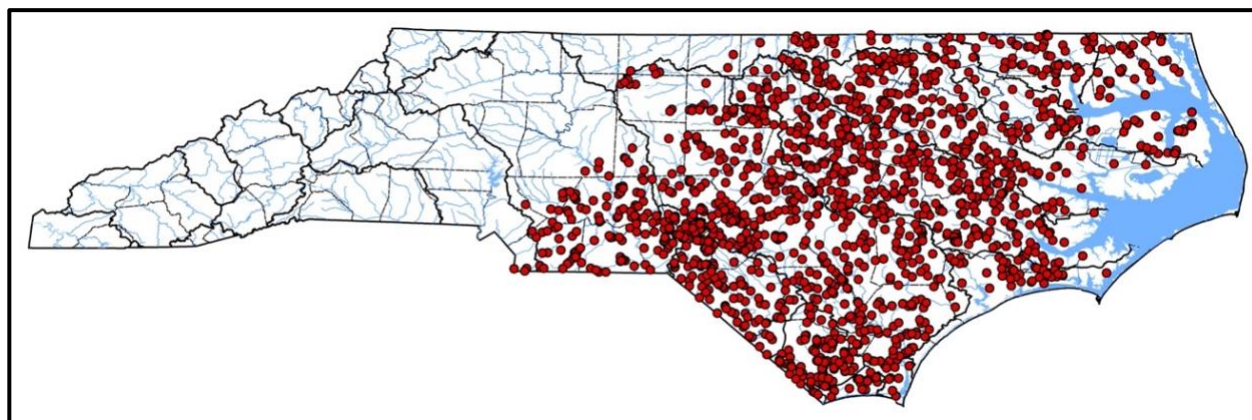
Aphredoderidae, Bonaparte 1845

- **Scientific Name and AFS-accepted Common Name:** *Aphredoderus sayanus*, Pirate Perch.
- **Common and Vernacular Names:** None that we are aware of.
- **Etymology of *Aphredoderus sayanus*:** *Aphredoderus* Lesueur 1833 - *aphodos*, excrement; *dere*, neck or throat, referring to anterior placement of anus, just under head in front of pelvic fins [note: vernacular name “Pirate Perch” was coined by naturalist Charles C. Abbott (ca. 1870) after observing that captive specimens ate only other fishes]. *Aphredoderus sayanus* (Gilliams 1824) - *-anus*, belonging to: eponym not identified but almost certainly in honor of Gilliams’ good friend and colleague, naturalist Thomas Say (1787-1834) (<https://etyfish.org/percopsiformes/>).
- **Unique Characteristics:** Stout-bodied with a large head terminal mouth, and single dorsal fin. Dark bar below the eye and a larger one at caudal fin base (Figure 11). In the adult the anus is located in the throat.



Figure 11. Pirate Perch.

- **In Fresh Water Most Likely to be Confused With:** Small sunfish and bass (Family Centrarchidae, <https://ncfishes.com/freshwater-fishes-of-north-carolina/>).
- **Size:** The total length of adults is 64-144 mm (2.5-5.7 inches) (Rohde et al. 2009).
- **Habitats:** The Pirate Perch is found in a variety of habitats, including swamps, ponds, ditches, backwaters and quiet pools of creeks and rivers, usually over mud or in woody debris, undercut banks, or submerged root masses (Rohde et al. 2009).
- **Distribution:** Pirate Perch is a lower eastern Piedmont, Sand Hills, and Coastal Plain species that is found in all Atlantic slope basins, except for the Savannah and Broad, but seems to avoid brackish waters along the Outer Banks (Map 8; Tracy et al. 2020).



Map 8. Distribution of Pirate Perch, *Aphredoderus sayanus*. Map originally appeared in Tracy et al. (2020).

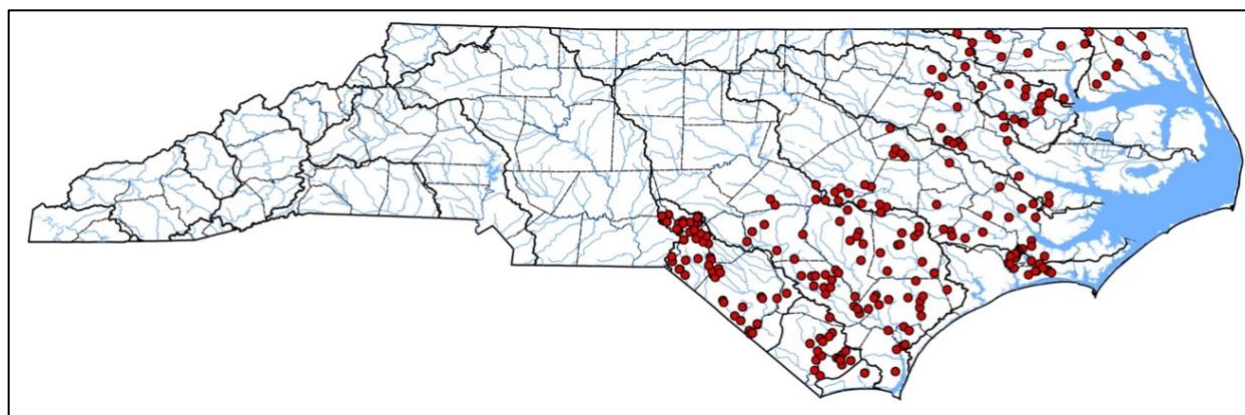
Amblyopsidae, Bonaparte 1845

- **Scientific Name and AFS-accepted Common Name:** *Chologaster cornuta*, Swampfish.
- **Common and Vernacular Names:** Fish of the Dismal Swamp.
- **Etymology of *Chologaster cornuta*:** *Chologaster* Agassiz 1853 - *cholos*, maimed; *gaster*, belly, referring to its lack of ventral fins. *Chologaster cornuta* Agassiz 1853 – *cornuta*, horned, referring to its tubular, horn-like nostrils (<https://etyfish.org/percopsiformes/>).
- **Unique Characteristics:** Bicolored fish with brown back that contrasts sharply with creamy white to yellow belly and has three dark stripes on the sides (Figure 12). Lacks pelvic fins and mouth is supraterminal. Eyes position “normal”; eyes covered with translucent skin. Anus in throat region between the gills. Scales embedded, not visible (Rohde et al. 2009).



Figure 12. Swampfish.

- **In Fresh Water Most Likely to be Confused With:** No other species.
- **Size:** The total length of adults is 23-68 mm (0.9 -2.7 inches) (Rohde et al. 2009).
- **Habitats:** The Swampfish is found in vegetation and accumulated debris in calm, acidic, tannin-stained waters of swamps, sloughs, roadside drainage ditches, and sluggish Sand Hills and Coastal Plain creeks (Rohde et al. 2009).
- **Distribution:** Swampfish is a Coastal Plain species that is widely distributed in every river basin from the Virginia border to the South Carolina state line, but seems to avoid brackish waters along the Outer Banks (Map 9; Tracy et al. 2020).



Map 9. Distribution of Swampfish, *Chologaster cornuta*. Map originally appeared in Tracy et al. (2020).

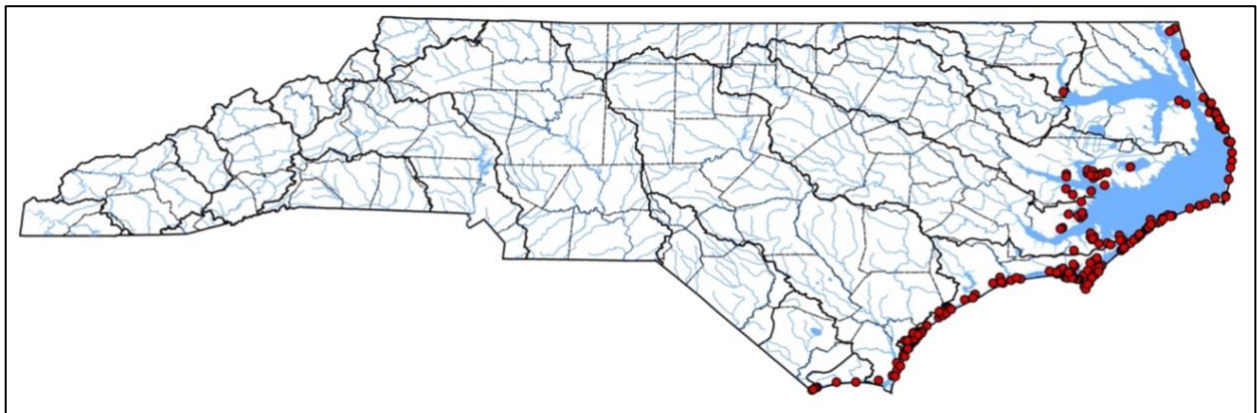
Cyprinodontidae, Wagner 1828

- **Scientific Name and AFS-accepted Common Name:** *Cyprinodon variegatus*, Sheepshead Minnow.
- **Common and Vernacular Names:** Variegated minnow, short minnow.
- **Etymology of *Cyprinodon variegatus*:** *Cyprinodon* Lacépède 1803 - *cyprinus*, carp or minnow; *odon*, tooth, i.e., a carp- or cyprinid-like fish but with teeth (hence “tooth carps,” another name for the order). *Cyprinodon variegatus* Lacépède 1803 – *variegatus*, variegated, referring to variable color patterns of brown spots and bands on sides (<https://etyfish.org/cyprinodontiformes3/>).
- **Unique Characteristics:** Deep bodied with an arched back and 5-8 triangular-shaped dark bars on the side (Figure 13). Humeral scales at least twice as large as surrounding scales. One row of tricuspid teeth on each jaw (Rohde et al. 2009).



Figure 13. Sheepshead Minnow.

- **In Fresh Water Most Likely to be Confused With:** No other species.
- **Size:** To 76 mm (3 inches) (Kells and Carpenter 2014).
- **Habitats:** Shallow, coastal, vegetated, fresh, brackish, and marine waters (Kells and Carpenter 2014).
- **Distribution:** Sheepshead is found along the coast from the Shallotte to the Albemarle basins, except for the Roanoke basin (Map 10; Tracy et al. 2020).



Map 10. Distribution of Sheepshead Minnow, *Cyprinodon variegatus*. Map originally appeared in Tracy et al. (2020).

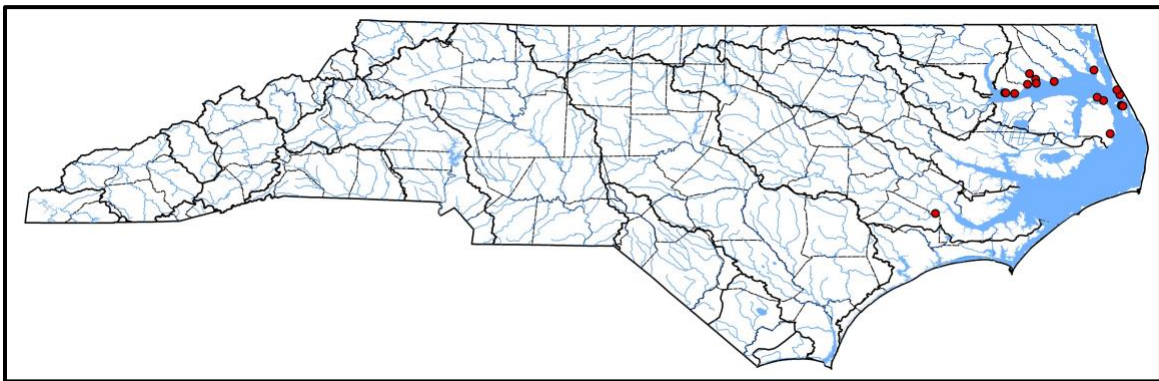
Gasterosteidae, Bonaparte 1831

- **Scientific Name and AFS-accepted Common Name:** *Apeltes quadracus*, Fourspine Stickleback.
- **Common and Vernacular Names:** None that we are aware of.
- **Etymology of *Apeltes quadracus*:** *Apeltes* DeKay 1842 – *a*, without; *pelte*, shield (<https://www.fishbase.se/Summary/Apeltes-quadracus.html>), (perhaps alluding to having a scaleless body). *Apeltes quadracus* (Mitchill 1815) – *quadra*, four, *cus*, pertaining to, referring to the four dorsal spines.
- **Unique Characteristics:** Scaleless body with four dorsal spines angled alternately left to right. Long slender caudal peduncle. No bony plates on sides. Pelvic fins below pectoral fins (Figure 14).



Figure 14. Fourspine Stickleback. Photograph courtesy of David Neely.

- **In Fresh Water Most Likely to be Confused With:** Threespine Stickleback *Gasterosteus aculeatus*. Although not yet recorded from North Carolina, it has been documented in Chesapeake Bay. It has three dorsal spines and a short caudal peduncle. Bony plates on sides. Pelvic fins behind pectoral fins.
- **Size:** To 64 mm (2.5 inches) (Kells and Carpenter (2014).
- **Habitats:** Shallow brackish inlets, tidal creeks, estuaries and lagoons (Kells and Carpenter 2014).
- **Distribution:** Until recently, known only from three records from the Albemarle and one record from the Neuse basins. Recent data collected by the North Carolina Division of Marine Fisheries has documented the Fourspine Stickleback along the shoreline of Albemarle Sound and behind the Outer Banks in Dare County (Map 12; Tracy et al. 2020).

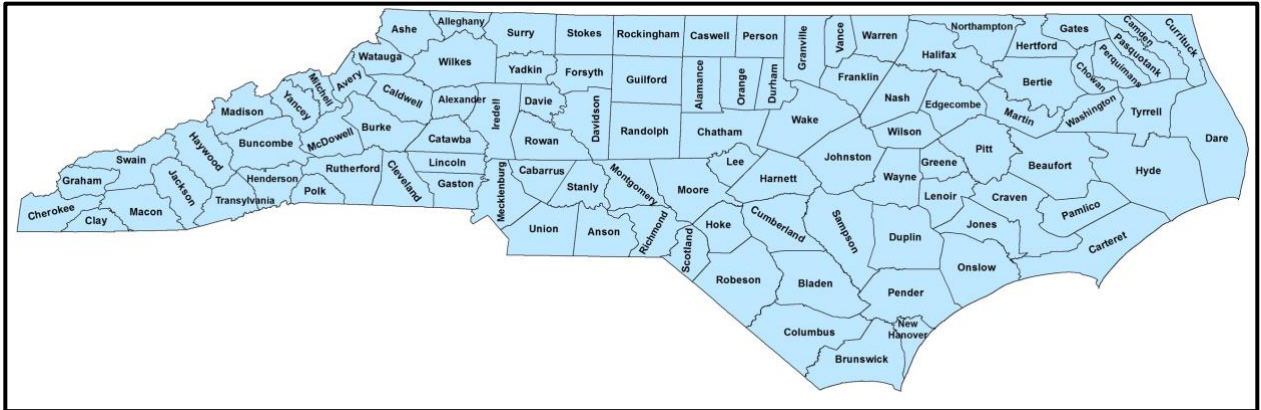


Map 12. Distribution of Fourspine Stickleback, *Apeltes quadracus*. Map originally appeared in Tracy et al. (2020).

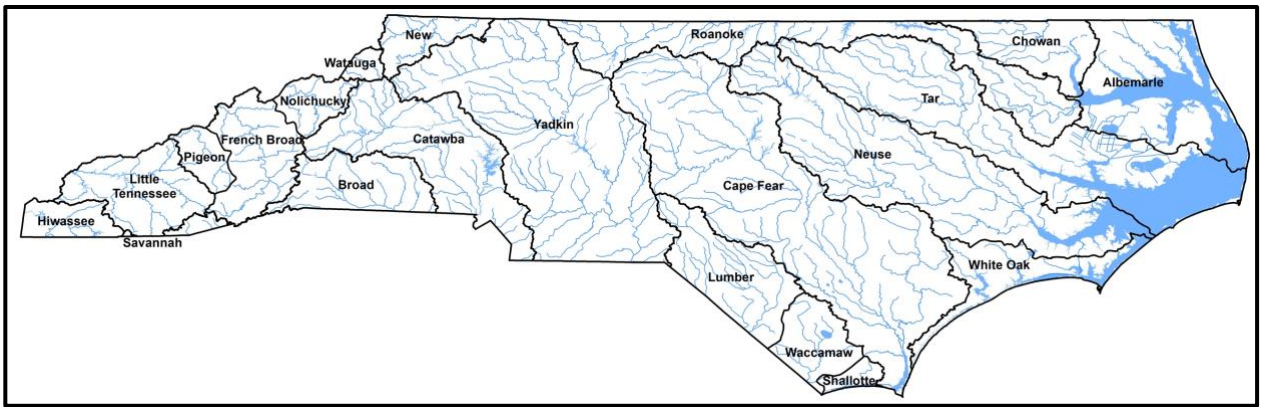
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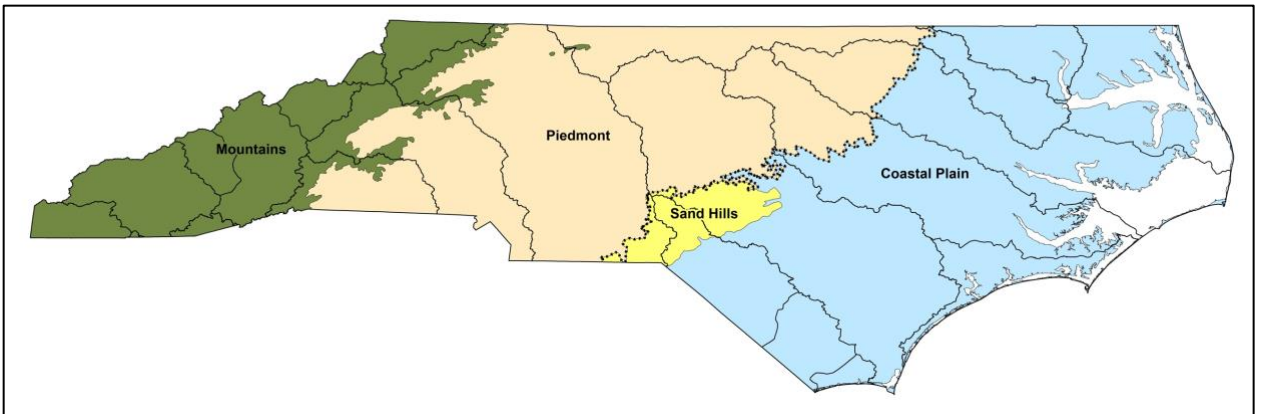
Supplemental Maps



Map No. 1. North Carolina's 100 counties. Map originally appeared in Tracy et al. (2020).



Map No. 2. North Carolina's 21 river basins. Map originally appeared in Tracy et al. (2020).



Map No. 3. North Carolina's four physiographic regions. Map originally appeared in Tracy et al. (2020).