

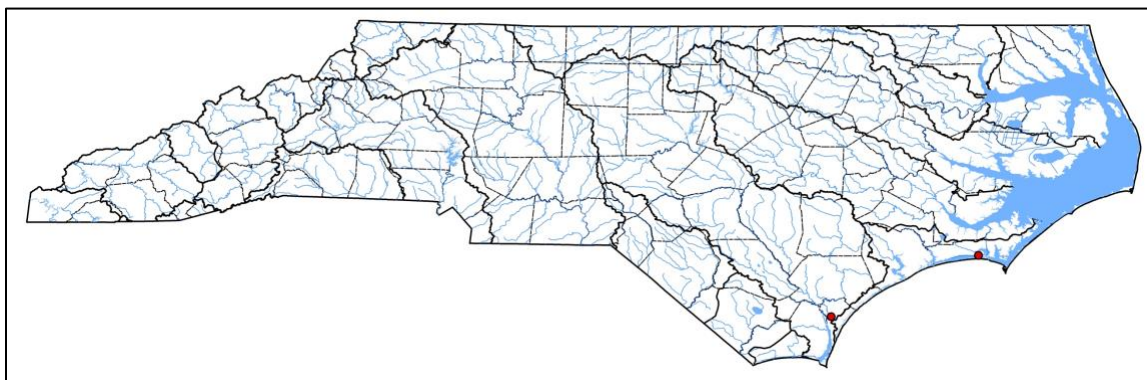
Goby (Family Gobiidae) Diversity in North Carolina
By the [NCFishes.com](https://ncfishes.com) Team

What exactly are gobies? To a freshwater-centric ichthyologist, gobies look like the marine equivalent of our freshwater darters (Family Percidae, <https://ncfishes.com/freshwater-fishes-of-north-carolina/>). In fact one of the species is named Darter Goby, *Ctenogobius boleosoma*, because of its resemblance to Tessellated Darter, *Etheostoma olmstedii*. But to the more widely learned and marine-centric ichthyologists, gobies are some of the most brightly colored and diverse family of fishes found around coral reefs. There are more than 220 genera and 1500 species worldwide primarily inhabiting shallow tropical and subtropical waters (Murphy and Hoese 2002). Along and off the North Carolina shoreline, one may encounter 24 indigenous species, 1 nonindigenous species, and 1 species who we are not really sure what species it is because of the condition of the specimen post-preservation (Table 1).

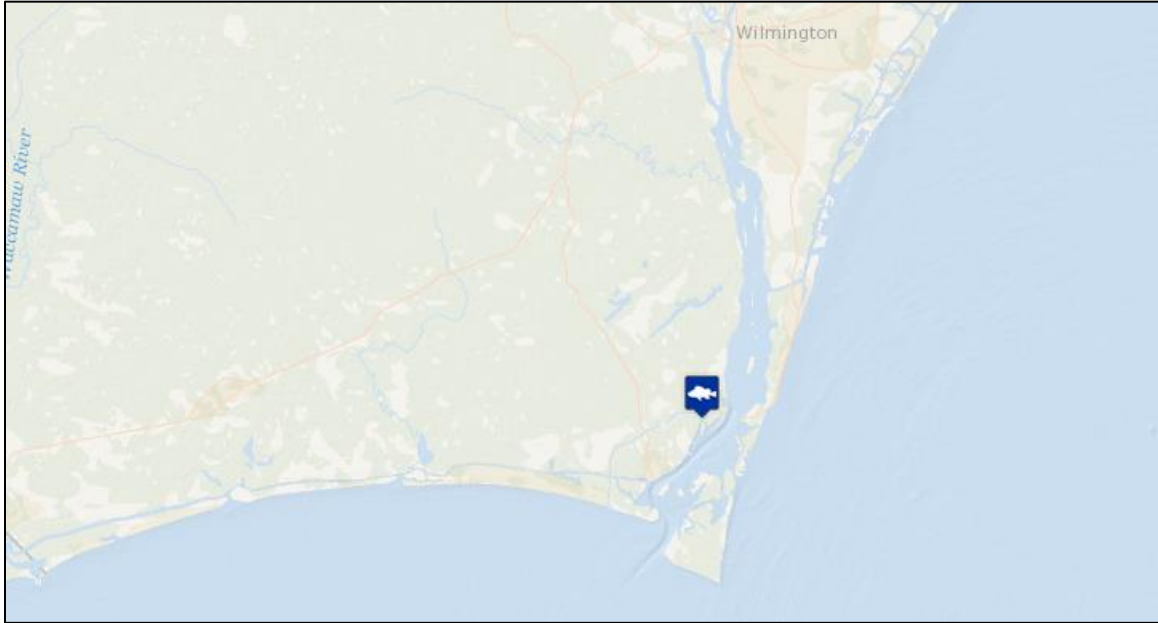
Scientific Name/ American Fisheries Society Accepted Common Name	Scientific Name/ American Fisheries Society Accepted Common Name
<i>Awaous banana</i> – River Goby	<i>Gnatholepis thompsoni</i> – Goldspot Goby
<i>Bathygobius soporator</i> – Frillfin Goby	<i>Gobioides broussonnetii</i> – Violet Goby
<i>Bollmannia</i> sp. – Goby sp.	<i>Gobionellus oceanicus</i> – Highfin Goby
<i>Coryphopterus glaucofraenum</i> – Bridled Goby	<i>Gobiosoma bosc</i> – Naked Goby
<i>Coryphopterus punctipectophorus</i> – Spotted Goby	<i>Gobiosoma ginsburgi</i> – Seaboard Goby
<i>Ctenogobius boleosoma</i> – Darter Goby	<i>Gobiosoma robustum</i> – Code Goby
<i>Ctenogobius saepepallens</i> – Dash Goby	<i>Lythrypnus elasson</i> – Dwarf Goby
<i>Ctenogobius shufeldti</i> – Freshwater Goby	<i>Lythrypnus phorellus</i> – Convict Goby
<i>Ctenogobius smaragdus</i> – Emerald Goby	<i>Lythrypnus spilus</i> – Bluegold Goby
<i>Ctenogobius stigmaticus</i> – Marked Goby	<i>Microgobius carri</i> – Seminole Goby
<i>Elacatinus xanthiprora</i> – Yellowprow Goby	<i>Microgobius gulosus</i> – Clown Goby
<i>Evermannichthys spongicola</i> – Sponge Goby	<i>Microgobius thalassinus</i> – Green Goby
<i>Evorthodus lyricus</i> – Lyre Goby	<i>Priolepis hipoliti</i> – Rusty Goby

All species seem to be known simply and collectively as gobies. However there are American Fisheries Society-accepted common names (Table 1; Page et al. 2013) and each of the scientific (Latin) names actually means something (please refer to The Meanings of the Scientific Names of Gobies, pages 22-24).

Except for three species, most gobies are to be found along North Carolina’s coast (Maps 1-16) ([NCFishes.com](https://ncfishes.com); Tracy et al. 2020; [Please note: Tracy et al. (2020) may be downloaded for **free** at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss60/1/>].] Some of the species’ mapped distributions may be an artifact of their rarity as vouchered specimens at North Carolina Museum of Natural Sciences, or their rarity in North Carolina waters, or the difficulty in collecting specimens. Distributional maps, based upon vouchered specimens at the North Carolina Museum of Natural Sciences, are unavailable for Spotted Goby, Dash Goby, Goldspot Goby, Violet Goby, Code Goby, Seminole Goby, and Clown Goby.



Map 1. Distribution of River Goby, *Awaous banana*. Map originally appeared in Tracy et al. (2020).



Map 2. Distribution of Frillfin Goby, *Bathygobius soporator*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021.



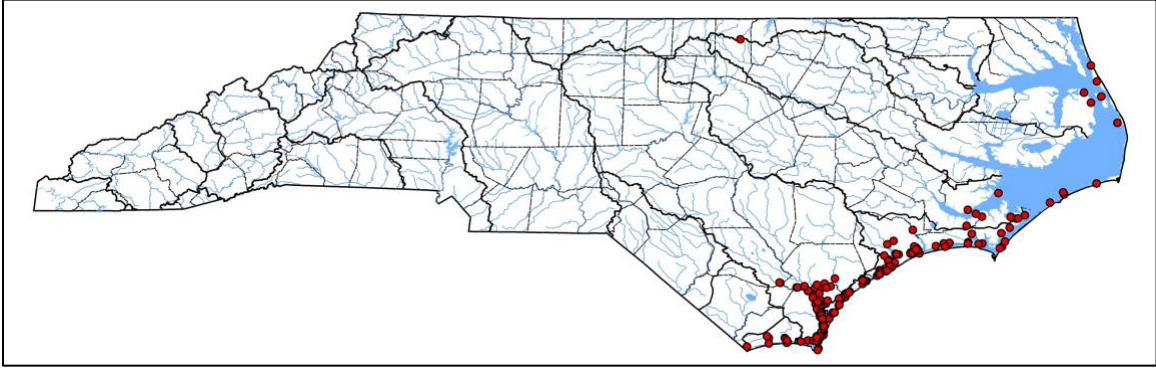
Map 3. Distribution of unidentifiable *Bollmannia*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021. Note: locations is beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



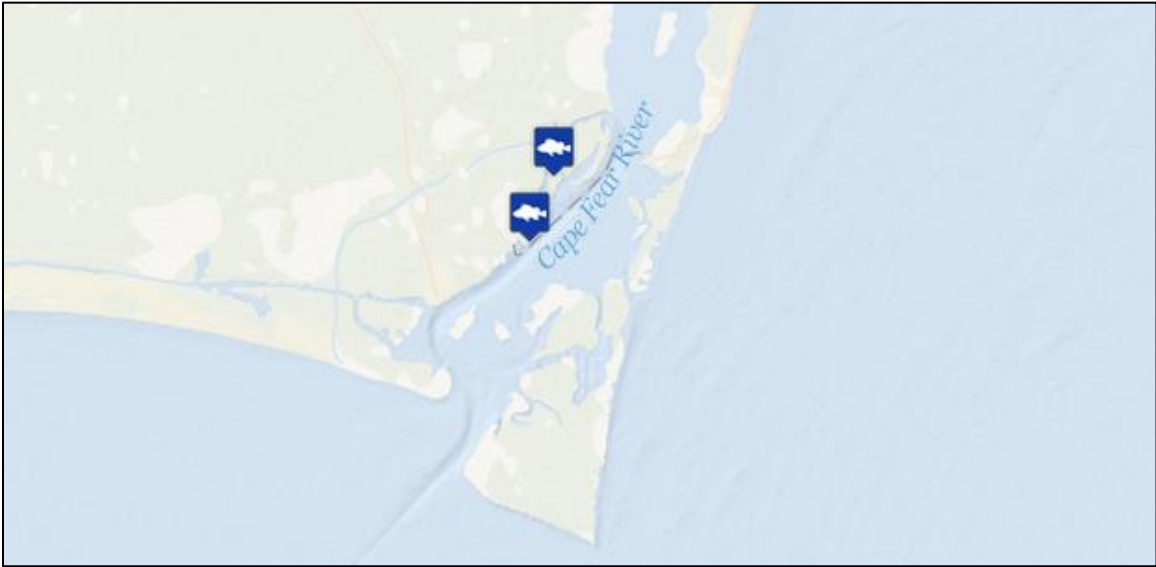
Map 4. Distribution of Bridled Goby, *Coryphopterus glaucofraenum*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021. Note: location is beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



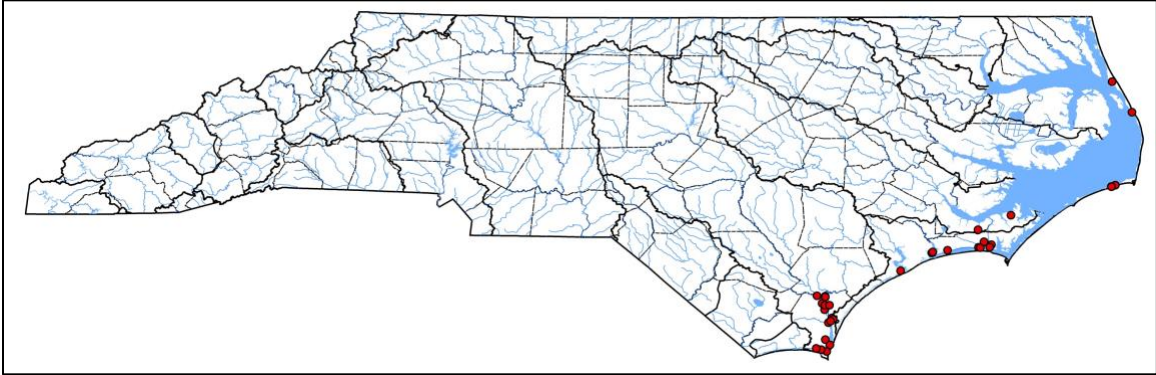
Map 5. Distribution of Darter Goby, *Ctenogobius boleosoma*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021.



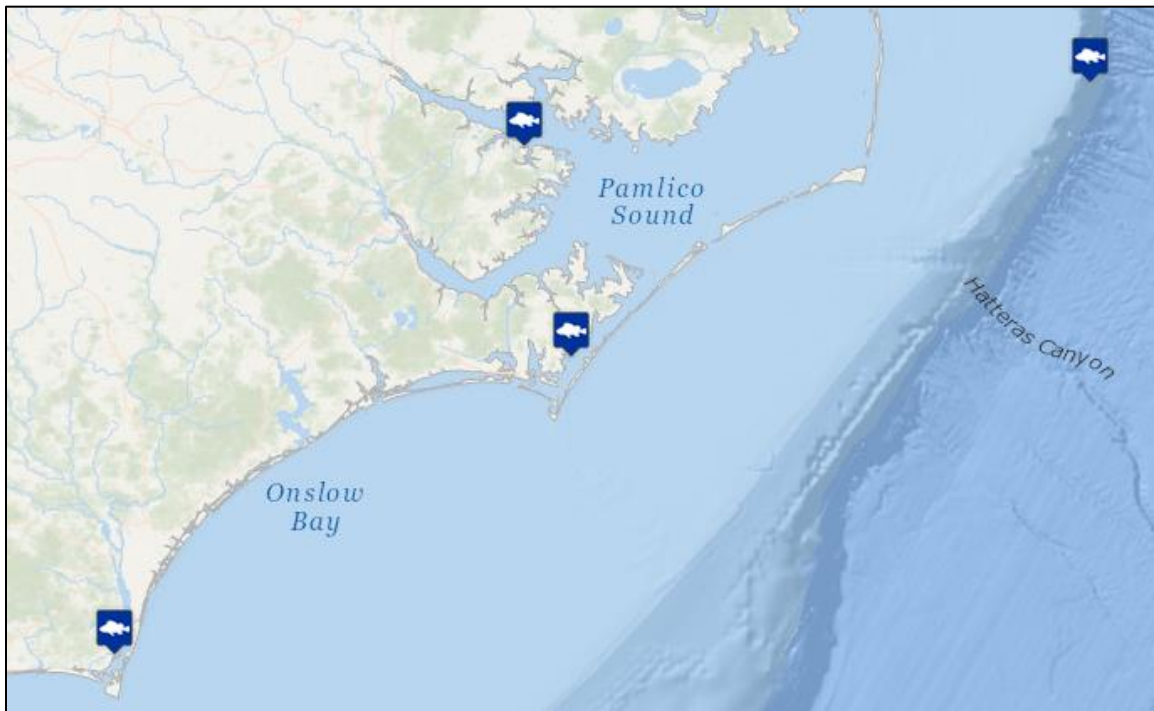
Map 6. Distribution of Freshwater Goby, *Ctenogobius shufeldti*. Map originally appeared in Tracy et al. (2020). Note: the locality plotted in Granville County is in error. The coordinates for that locality should be in the vicinity of 34.950446, -76.286847 in Carteret County.



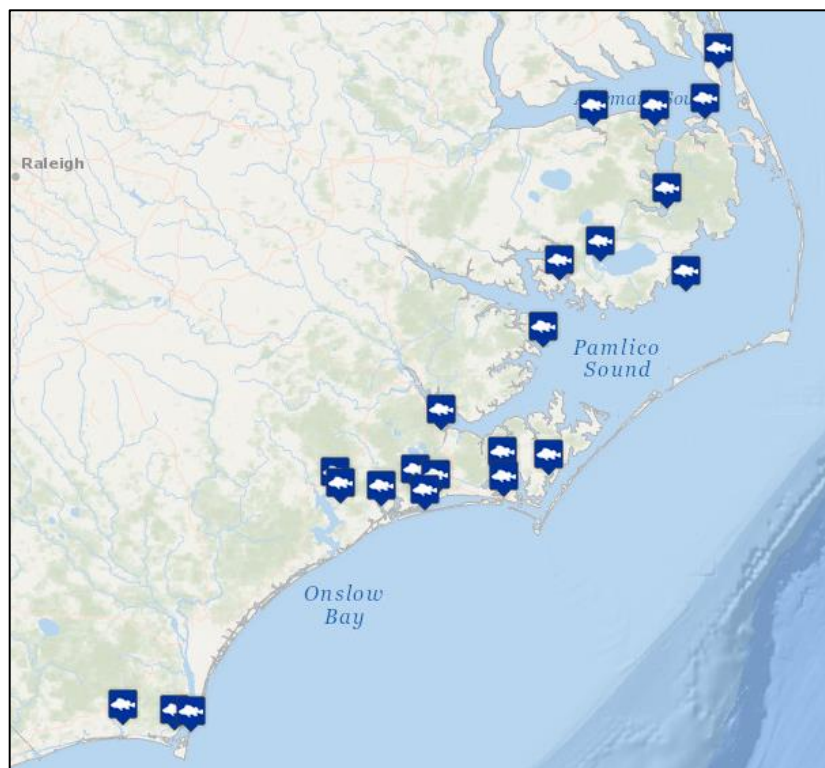
Map 7. Distribution of Marked Goby, *Ctenogobius stigmaticus*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021.



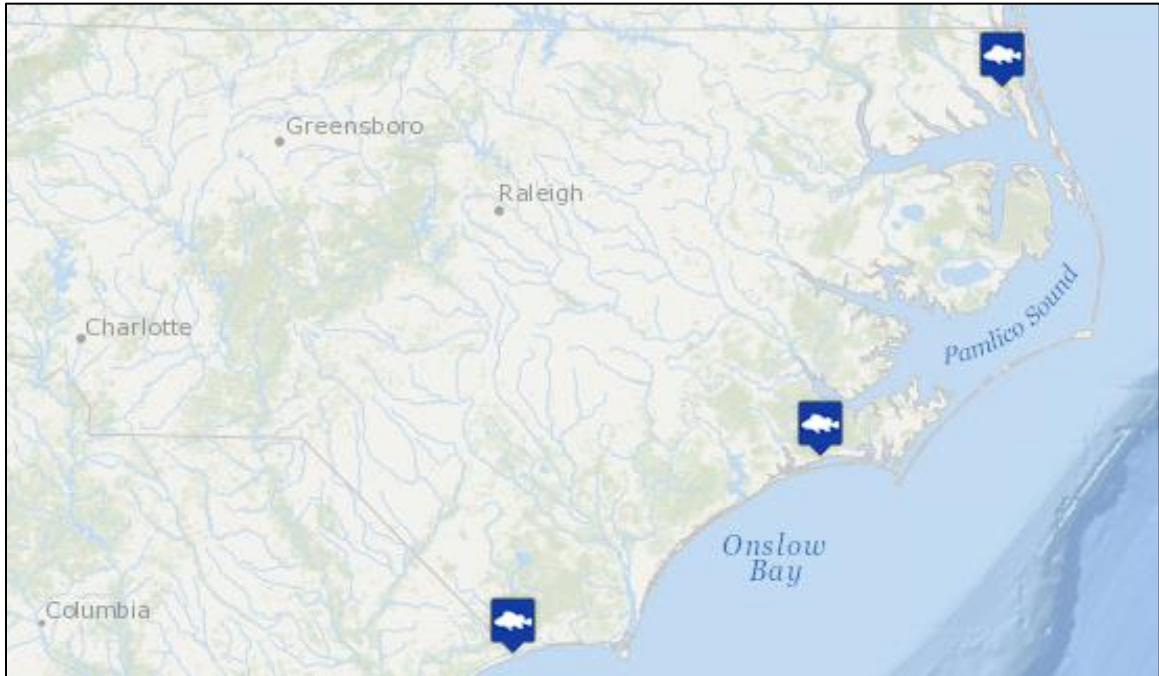
Map 8. Distribution of Lyre Goby, *Evorthodus lyricus*. Map originally appeared in Tracy et al. (2020).



Map 9. Distribution of Highfin Goby, *Gobionellus oceanicus*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021. Note: one locations is beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



Map 10. Distribution of Naked Goby, *Gobiosoma bosc*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021.



Map 11. Distribution of Seaboard Goby, *Gobiosoma ginsburgi*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021.



Map 12. Distribution of Dwarf Goby, *Lythrypnus elasson*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021. Note: location is beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



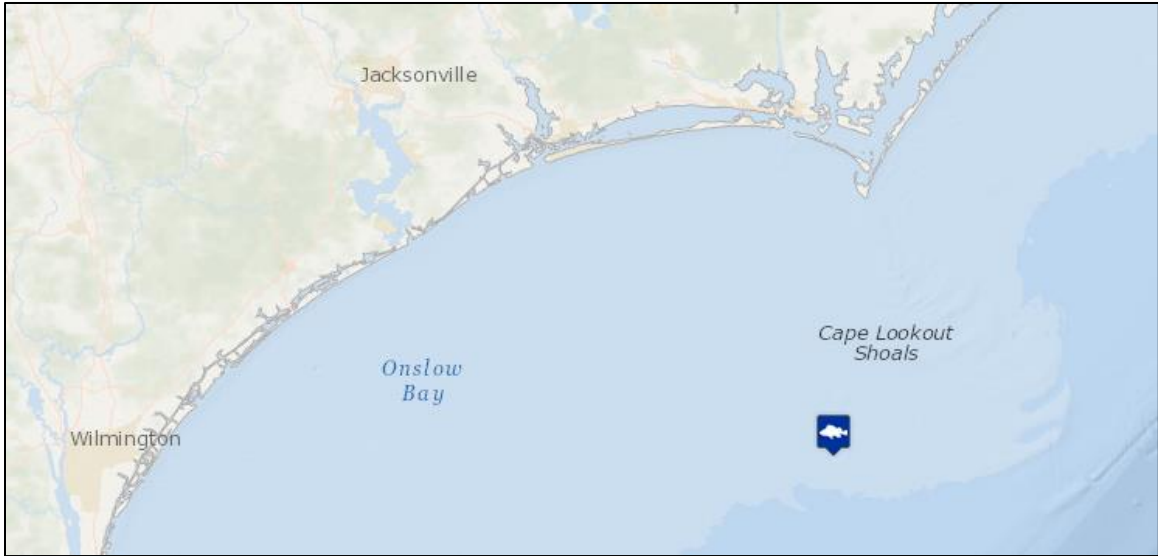
Map 13. Distribution of Convict Goby, *Lythrypnus phorellus*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021. Note: a couple of locations are beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



Map 14. Distribution of Bluegold Goby, *Lythrypnus spilus*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021. Note: a couple of locations are beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



Map 15. Distribution of Green Goby, *Microgobius thalasinus*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021.



Map 16. Distribution of Rusty Goby, *Priolepis hipoliti*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 02/22/2021. Note: location is beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).

Highfin Goby and Naked Goby occasionally stray into fresh waters (Maps 9 and 10; Tracy et al. 2020), but spend most of their lives in estuarine or marine waters. Three species, River Goby, Freshwater Goby, and Lyre Goby, can also be found in freshwater habitats (Maps 1, 6 and 8). Lyre Goby and Freshwater Goby have been found in the Cape Fear River basins as far upstream as near Riegelwood (Tracy et al. 2020). [Note: see Supplemental Maps 1-3, page 25, showing North Carolina’s 100 counties, 21 river basins, and 4 physiographic regions.]

Most gobies range in size from about 40 mm to about 80 mm (1.8 inches – 3.2 inches, respectively). However, like all things, there are exceptions at both ends of the spectrum. In North Carolina the three

smallest gobies are in the genus *Lythrypnus* (Dwarf Goby, Convict Goby, and Bluegold Goby) - they are only 20-25 mm (0.8 inch – 1 inch, respectively) in length. At the other end are five species that range in size from 150 mm to 500 mm (6 inches – 20 inches, respectively) – those are some big gobies! These five species are: 1) Violet Goby to 500 mm (about 20 inches), 2) Highfin Goby and River Goby to 300 mm (about 12 inches), and 3) Lyre Goby and Emerald Goby to 150 mm (about 6 inches) (Murdy and Hoese 2002).

Their occupied habitats are also variable, depending upon the species from shallow depths nearshore to offshore at depths more than 91 meters (about 330 ft.) in the case of Rusty Goby (Kells and Carpenter 2014). Most species can be found in coastal river mouths, in estuaries and bays with muddy, sandy, or grassy bottoms, or amongst submerged vegetation and oyster beds, or atop rock and rubble bottoms. One species, Sponge Goby, as its name implies, is associated with sponges. Species associated with coral reefs and rocky areas include Bridled Goby, Spotted Goby, Yellowprow Goby, Bluegold Goby, Convict Goby, and Rusty Goby (Kells and Carpenter 2014).

River Goby is our only nonindigenous species. It was unknown from North Carolina until a single specimen was discovered in a fish kill in 1996 from Burnt Mill Creek in Wilmington. In 2015, an apparently self-sustaining population was discovered in a stormwater retention pond in Morehead City in Carteret County (White Oak basin). This population has been present for at least four years, despite some mortalities from cold temperatures. In 2017 another population was discovered in an unnamed creek near the Visitors Center in Morehead City (Scott A. Smith, pers. comm.). All three locations (Map 1) are near North Carolina's two shipping ports and this species may have been introduced from the release of ballast water (Tracy et al. 2020).

Because of their lack of commercial or recreational importance, none of the species is a federally- or state-listed species (NCAC 2017; NCNHP 2020; NCWRC 2017).

One final piece of North Carolina goby trivia: In 1907 Dr. Hugh M. Smith published the 453 page "*The Fishes of North Carolina*" (Smith 1907). This was North Carolina's first truly baseline study of the fishes across the entire state. In it, Smith detailed 345 fresh and saltwater species, all described by other ichthyologists, except one species. Smith described that species, a goby: *Microgobius holmesi* and gave it the common name of Holmes' Goby (Figure 1). It was named after Professor J. A. Holmes, former State Geologist and former director of the North Carolina Geological and Economic Survey, who had requested that Smith produce a popular guide to the fishes of North Carolina. The species was known from a single specimen collected in 1904 from Uncle Israel Shoal in Beaufort Harbor. Unfortunately, this species and the other species of *Microgobius*, *M. eulepis* Eigenmann & Eigenmann, that Smith listed as occurring also in Beaufort Harbor at the same shoal, were later synonymized by Birdsong (1981) with *Microgobius thalassinus* and today are known as Green Goby.

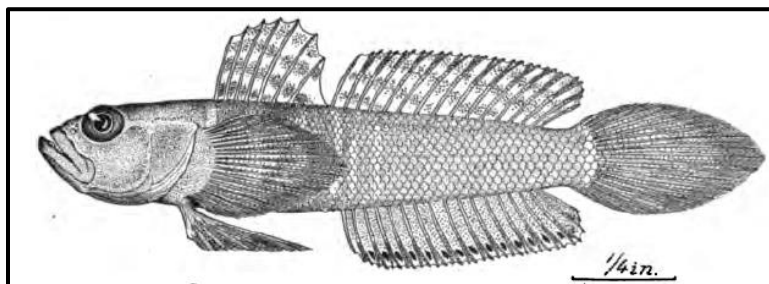


Figure 1. *Microgobius holmesi*, Smith 1907, Holmes' Goby. Illustration from Smith (1907).

The identification of gobies is relatively straight-forward, but may benefit from the use of a dissecting compound microscope. Key characteristics for their proper identification include color and color patterns, length of dorsal fin, shape of the tongue, presence or absence of scales, scales cycloid or ctenoid, lateral scale row counts, dorsal fin, pectoral fin, and anal fin ray counts, dorsal fin spine counts, length of dorsal

fin rays, and shape of caudal fin (please refer to the Identification Key to the Freshwater and Marine Gobies (Family Gobiidae) in North Carolina).

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 Freshwater and Marine Gobies (Family Gobiidae) in North Carolina¹

(Please refer to NCFishes.com for pictures and identifying characteristics all species)
(Adapted from Ross and Rohde (2004))

- 1a. Pelvic fins united by a shallow membrane or united but with innermost rays markedly shorter than fourth ray (Figure 1)..... Spotted Goby, *Coryphopterus punctipectophorus*
- 1b. Pelvic fins completely united to form a round sucking disc.....2



Figure 1. Spotted Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/gallery/specie/4122>, accessed 02/21/2021.

- 2a. Dorsal fins long and continuous; body elongate and slender; dark chevron-like markings on sides; eyes very small (< 10% of head length) (Figure 2) Violet Goby, *Gobioides broussonnetii*
- 2b. Dorsal fins separated; body stout; no chevron markings on sides; eyes larger3



Figure 2. Violet Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/3014>, accessed 02/21/2021.

- 3a. Upper pectoral-fin rays almost entirely free (Figure 3); front of tongue notched Frillfin Goby, *Bathygobius soporator*
- 3b. Upper pectoral-fin rays broadly united; tongue sometimes slightly indented but not notched4

¹ *Bollmannia* sp. This goby (NCSM Catalogue No. 35970) was collected by trawl off the southern North Carolina coast in September 2001 at a depth of 63–85 m. The torso was damaged during collection; therefore, the identification was somewhat tentative. The specimen has pores on the head and pre-opercle, body with ctenoid scales, dorsal-fin counts of VII (first 3–4 elongated), 13, anal-fin rays 12, pelvic rays 15, divided and long (reaching to about the eighth anal ray). Regardless of which of the three species of western Atlantic *Bollmannia* is represented by this specimen, Shelf Goby, *B. eigenmanni* (Garman, 1896), Ragged Goby, *B. communis* Ginsburg, 1942, or White-eye Goby, *B. boqueronensis* Evermann and Marsh, 1899, it is a significant range extension. The reported ranges of this specimen was omitted from the key because of some uncertainty in the identification (Ross and Rohde 2004).



Figure 3. Frillfin Goby.

- 4a. Shoulder (under gill cover) with 2–3 distinct fleshy lobes; lateral scales rows > 57 (Figure 4)
River Goby, *Awaous banana*
- 4b. No lobes on shoulder girdle; lateral scales, if present, usually < 57 (except some *Microgobius carri*
 and *Gobionellus oceanicus*)5



Figure 4. River Goby.

- 5a. Body without scales, except possibly two small scales at base of caudal fin6
- 5b. Body mostly covered with scales (except reduced to only caudal area in *Evermannichthys*)9
- 6a. Two small ctenoid scales at base of caudal fin; body with six or seven white bars that are wider on
 lower half of body than on upper half; lateral line usually with elongate dark spots (Figure 5)
Seaboard Goby, *Gobiosoma ginsburgi*
- 6b. No scales anywhere; body bars, if present, not as above7



Figure 5. Seaboard Goby.

- 7a. No body bars; yellow stripe from eye to caudal fin (pale in preserved specimens) (Figure 6); yellow rectangle from tip of snout to interorbital..... Yellowprow Goby, *Elacatinus xanthiprora*
- 7b. Body bars present; no yellow stripes on body or head8



Figure 6. Yellowprow Goby. Photograph courtesy of the Smithsonian Tropical Research Institute's Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/2505>, accessed 02/21/2021.

- 8a. Dorsal rays 13; anal rays 12; 9–11 body bars of even widths (Figure 7); no elongate dark spots on lateral line; posterior tips of pelvic-fin rays not reaching one-half distance to anal fin..... Naked Goby, *Gobiosoma bosc*
- 8b. Dorsal rays 12; anal rays 10; pale body with narrow, mostly interrupted, almost splotched bars (Figure 8); midlateral series of dashes; posterior tips of pelvic-fin rays reaching anusCode Goby, *Gobiosoma robustum*



Figure 7. Naked Goby.



Figure 8. Code Goby. Photograph courtesy of the Smithsonian Tropical Research Institute's Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/13409>, accessed 02/21/2021.

- 9a. Dorsal fin with seven spines..... 10
- 9b. Dorsal fin with usually < seven spines (5–7 in *Evermannichthys*) 12

- 10a. Lateral scale rows 50–62; scales mostly ctenoid; body with golden lateral stripe from nape through caudal fin (lost in preservation) (Figure 9); dorsal spines elongated in larger specimens; no black spots on median fins Seminole Goby, *Microgobius carri*
- 10b. Lateral scale rows 44–54; scales mostly cycloid; body without lateral yellow stripes; dorsal spines slightly to greatly produced in males; median fins variously spotted 11



Figure 9. Seminole Goby, male. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/4379>, accessed 02/21/2021.

- 11a. Body without prominent stripes or blotches (Figure 10); lateral cephalic sensory canal (just behind orbits) with two pores; large males with only slightly produced dorsal spines; mouth gape strongly inclined Green Goby, *Microgobius thalassinus*
- 11b. Body with large dark blotches (Figure 11); lateral cephalic sensory canal with three pores; large males with dorsal spines 2–5 produced; mouth gape moderately inclined Clown Goby, *Microgobius gulosus*



Figure 10. Green Goby.

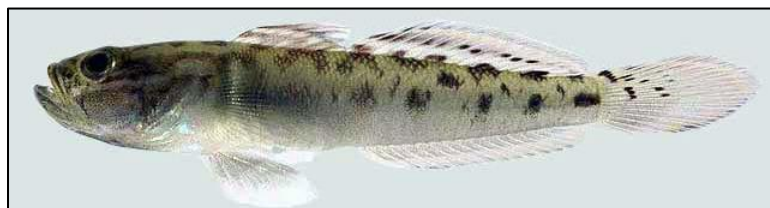


Figure 11. Clown Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/4386>, accessed 02/21/2021.

- 12a. No pores in lateral line system on head; body robust but short (maximum size usually < 23 mm Standard Length, and lateral scale rows 25–28) 13
- 12b. Pores present in lateral line system on head (sometimes difficult to see or missing in *Evermannichthys* - usually visible on the interorbit); lateral scale rows usually > 29 (except *C. glaucofraenum* where lateral scales equal 25–26 and *Evermannichthys*) 16

- 13a. Nape, top of head, chest, and pectoral-fin base completely covered with scales (Figure 12)
Rusty Goby, *Priolepis hipoliti*
- 13b. Top of head, nape, chest, and pectoral-fin base naked 14



Figure 12. Rusty Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/5423>, accessed 02/21/2021.

- 14a. Body usually uniformly pigmented, lacking bands, bars, or stripes (Figure 13)
 Dwarf Goby, *Lythrypnus elasson*
- 14b. Body with bands, bars, and/or stripes 15



Figure 13. Dwarf Goby, male. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/9712>, accessed 02/21/2021.

- 15a. Two dark spots (one above other, ventral one larger) on pectoral-fin base; spots on cheek usually in 3–4 rows; dark bands on body divided by pale central stripes (Figure 14); dorsal spines not prolonged Convict Goby, *Lythrypnus phorellus*
- 15b. Single dark spot on pectoral-fin base occupying nearly entire width of base; no spots on cheek; body bands with fine dark lines down their centers; first two dorsal spines prolonged (Figure 15) ...
 Bluegold Goby, *Lythrypnus spilus*



Figure 14. Convict Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/9731>, accessed 02/21/2021.



Figure 15. Bluegold Goby. Photograph courtesy of the Smithsonian Tropical Research Institute's Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/4205>, accessed 02/21/2021.

- 16a. Body naked except for three longitudinal rows of ctenoid scales between posterior end of anal fin and caudal fin base; two dorsal fins widely separated (Figure 16).....
 Sponge Goby, *Evermannichthys spongicola*
- 16b. Body completely covered with scales; dorsal fins close together 17

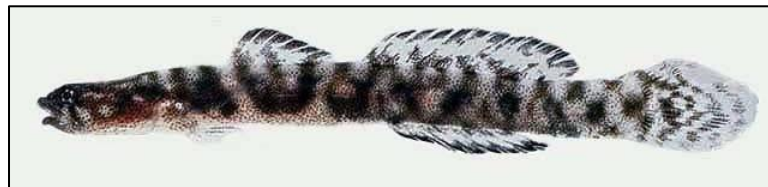


Figure 16. Sponge Goby. Photograph courtesy of the Smithsonian Tropical Research Institute's Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/2789>, accessed 02/21/2021.

- 17a. Opercle entirely or partially covered with scales..... 18
- 17b. Opercle naked 20
- 18a. More than 60 lateral scale rows; posterior tips of pectoral-fin rays not reaching anus; eye diameter < one-half upper jaw length; prominent dark spot on trunk below first dorsal fin (Figure 17)
Highfin Goby, *Gobionellus oceanicus*
- 18b. Fewer than 40 lateral scale rows; posterior tips of pectoral-fin rays reaching anus; eye diameter > one-half upper jaw length; no dark trunk spot but shoulder spot present or absent 19



Figure 17. Highfin Goby.

- 19a. Prominent shoulder spot (gold in life) (Figure 18); dorsal spines not elongated; dark subocular bar; no blotches on caudal fin base Goldspot Goby, *Gnatholepis thompsoni*
- 19b. No shoulder spot; dorsal spines elongated in mature males; no subocular bar; two dark blotches on caudal fin base (Figure 19) Lyre Goby, *Evorthodus lyricus*

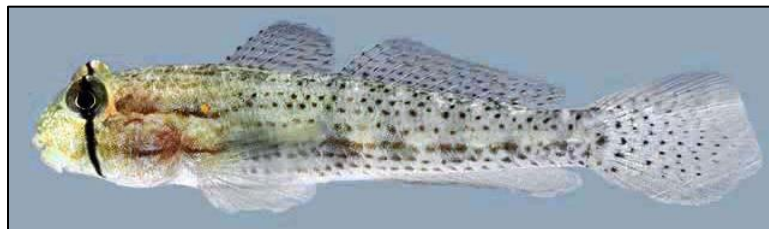


Figure 18. Goldspot Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/2978>, accessed 02/21/2021.



Figure 19. Lyre Goby.

- 20a. Caudal fin rounded or truncate; usually < 28 lateral scale rows; body nearly transparent; prominent black spot above opercle (Figure 20).....Bridled Goby, *Coryphopterus glaucofraenum*
- 20b. Caudal fin pointed; usually > 28 lateral scale rows; body not usually transparent; no black spot above opercle..... 21



Figure 20. Bridled Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/2046>, accessed 02/21/2021.

- 21a. Dorsal and anal-fin rays usually 11 and 12, respectively; distinct shoulder spot present (sometimes faded in preservative)..... 22
- 21b. Dorsal and anal-fin rays usually 12 and 13, respectively; shoulder spot usually absent (present in *C. stigmaticus*) 23

- 22a. Predorsal area always with scales; head and body with many black-encircled, cream-colored spots (Figure 21); lateral scale rows 39–46; large canine teeth in both jaws Emerald Goby, *Ctenogobius smaragdus*
- 22b. Predorsal area almost always naked (a few scales occasionally present); no large black-encircled spots on head or body (Figure 22); lateral scale rows 27–35; canine teeth smaller Darter Goby, *Ctenogobius boleosoma*

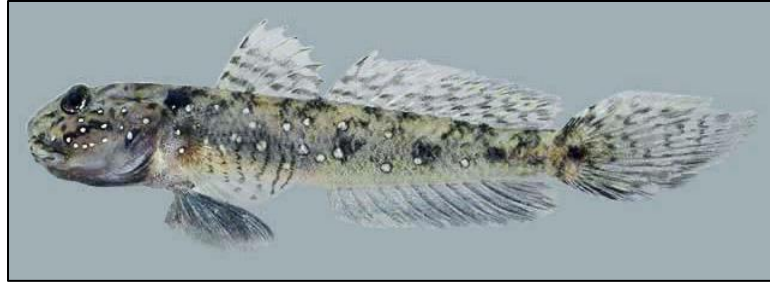


Figure 21. Emerald Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/2137>, accessed 02/21/2021.



Figure 22. Darter Goby.

- 23a. Three or five distinct vertical bars on lower cheek (Figure 23); no suborbital bar; small dark shoulder spot present; narrow, vertical, yellow (pale in preservative) bars present on body Marked Goby, *Ctenogobius stigmaticus*
- 23b. No bars on lower cheek; suborbital bar present or absent; shoulder spot absent (or faint in some *C. shufeldti*); no yellow body bars 24



Figure 23. Marked Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/13400>, accessed 02/21/2021.

- 24a. Pectoral-fin rays usually 15 or 16; predorsal area always naked; thin suborbital bar present (sometimes faint); dash-like markings present along body midline (Figure 24); 29–34 scales in lateral series Dash Goby, *Ctenogobius saepepallens*
- 24b. Pectoral-fin rays 17 or 18; predorsal area (just anterior to dorsal origin) usually with some scales; suborbital bar absent, but with stripe crossing cheek from upper jaw to opercle; large blotches (usually five) present along body midline (Figure 25); 31–40 scales in lateral series
..... Freshwater Goby, *Ctenogobius shufeldti*



Figure 24. Dash Goby. Photograph courtesy of the Smithsonian Tropical Research Institute’s Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/13397>, accessed 02/21/2021.



Figure 25. Freshwater Goby.

Glossary

(Adapted from Jenkins and Burkhead (1940) and Rohde et al. (2009))

Ctenoid Scales – Thins, light, flexible scale with numerous small backward-pointing “teeth” on the outer edge

Cycloid Scales – Thin, light, flexible scale lacking small, rear-pointing teeth

Hypural Plate – Expanded bone that form the support for the caudal fin rays. The endo of the plate usually appears as a crease across the caudal peduncle

Lateral Cephalic Sensory Canal (Cephalic Lateralis) – The system of canals on the head; at intervals the canals have pores that open to the exterior; canals contain sensory organs that detect displacement of water; sonar-like division of the nervous system

Subocular Bar – A vertical or slightly oblique dark bar beneath the eye; often termed a suborbital bar

Standard Length (SL) – Distance from the anteriormost point on a fish to the posterior end of the bony caudal fin base (hypural plate)

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The Meanings of the Scientific Names of Gobies

Adopted from the ETYFish Project by Christopher Scharpf and Kenneth J. Lazara,
accessed February 21, 2021, <http://www.etyfish.org/>

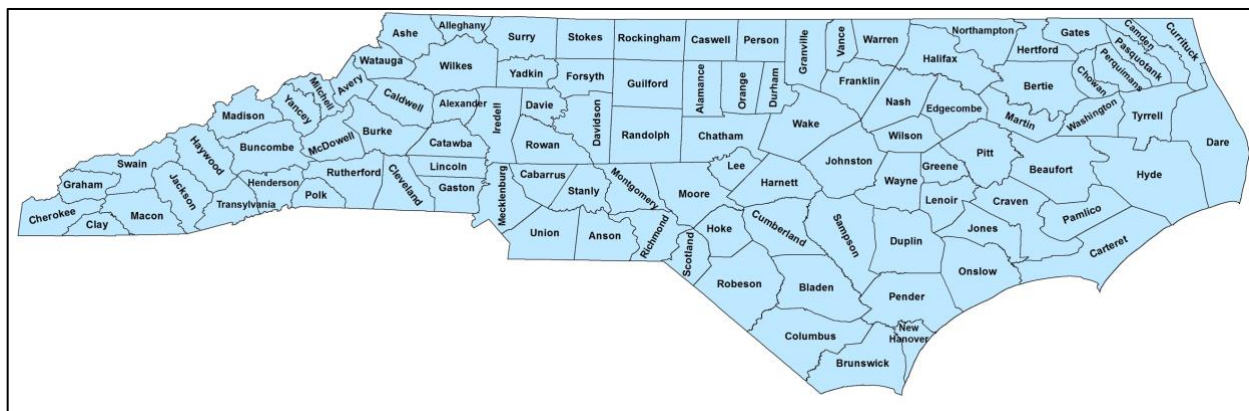
Family GOBIIDAE Cuvier 1816, Gobies

- i. ***Awaous Valenciennes 1837*** - latinization of *awao* or *awaou*, local name of *A. ocellaris* in Tahiti
 - a. ***Awaous banana (Valenciennes 1837)*** - latinization of *banane*, its local name in the Dominican Republic
- ii. ***Bathygobius Bleeker 1878*** - *bathy*, deep, allusion not explained nor evident (probably does not refer to water depth since Bleeker proposed genus for *B. petrophilus*, which he collected by hand from coral rocks); *gobius*, goby
 - a. ***Bathygobius soporator (Valenciennes 1837)*** - sleeper, referring to its local name in Martinique (type locality), presumed to be related or similar to the sleeper gobies of *Eleotris* and *Dormitator* (Eleotridae)
- iii. ***Bollmannia Jordan 1890*** - *-ia*, belonging to: Jordan's late colleague, naturalist Charles Harvey Bollman (1868-1889), "whose untimely death while engaged in the exploration of the rivers of Georgia, took place while this paper was passing through the press" (Bollmann died of dysentery contracted while collecting fish in the swamps of Waycross, Georgia, USA)
- iv. ***Coryphopterus Gill 1863*** - *corypho-*, top; *pterus*, fin, referring to "distinct" dorsal fins of *C. glaucofraenum*: "the first with six spines, all flexible, the third generally longest, the sixth remote; second oblong, generally increasing backwards, and with most of its rays having an anterior simple and a posterior forked branch; the last ray free"
 - a. ***Coryphopterus glaucofraenum Gill 1863*** - *glaucus*, hoary blue; *fraenum*, bridle, referring to a straight blue line crossing cheek, continuing, after interruption, to operculum
 - b. ***Coryphopterus punctipectophorus Springer 1960*** - *punctum*, spot; *pecto-*, pectoral; *phorus*, carrying, referring to spot on base of pectoral fin
- v. ***Ctenogobius Gill 1858*** - *cteno*, comb, referring to its "pectinated" scales; *gobius*, goby
 - a. ***Ctenogobius boleosoma (Jordan & Gilbert 1882)*** - *bole*, dart; *soma*, body, but here referring to its "remarkable resemblance" to the North American percid *Etheostoma (Boleosoma) olmstedii*
 - b. ***Ctenogobius saepepallens (Gilbert & Randall 1968)*** - *saepe*, often or frequently; *pallens*, pallid, referring to its "usually" pallid appearance
 - c. ***Ctenogobius shufeldti (Jordan & Eigenmann 1887)*** - in honor of American surgeon-zoologist (and later outspoken white supremacist) Robert Wilson Shufeldt (1850-1934), who collected type. See Scharpf (2017) and <https://ia802604.us.archive.org/28/items/americasgreatest00shuf/americasgreatest00shuf.pdf> for more information regarding his racist views.
 - d. ***Ctenogobius stigmaticus (Poey 1860)*** - marked, presumably referring to four black vertical bands, three on cheek and one on operculum
- vi. ***Elacatinus Jordan 1904*** - spindle-like, allusion not explained, possibly referring to fusiform body of *E. oceanops*
 - a. ***Elacatinus xanthiprora (Böhlke & Robins 1968)*** - *xanthus*, yellow; *prora*, prow, referring to yellow mid-rostral stripe

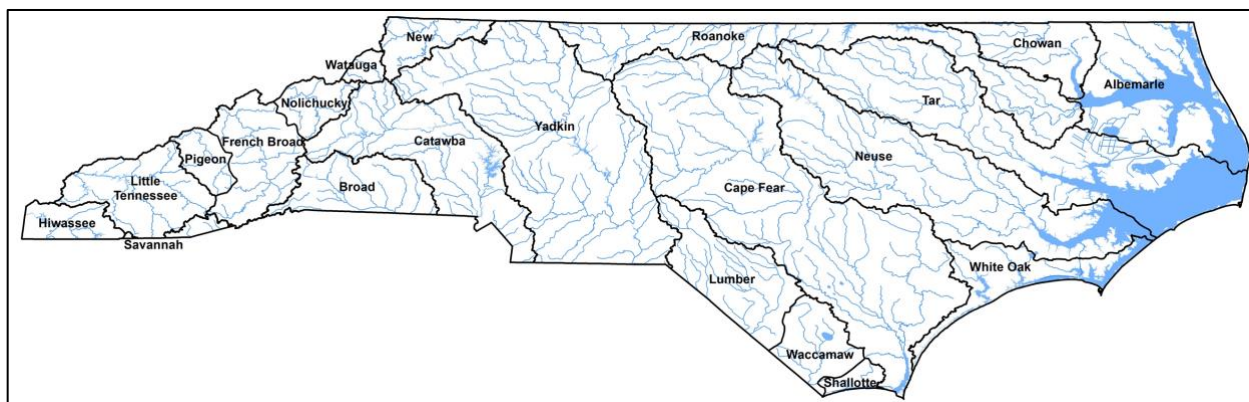
- vii. ***Evermannichthys Metzelaar 1919*** - *-ia*, belonging to: the “well-known” ichthyologist Barton Warren Evermann (1853-1932), for his “kind assistance”
- a. ***Evermannichthys spongicola (Radcliffe 1917)*** *spongi-*; sponge; *-cola*, dweller or inhabitant, referring to its habit of living inside the cavities of large cup-like sponges
- viii. ***Evorthodus Gill 1859*** - *eu-*, well; *orthos*, straight; *don*, tooth, allusion not explained, possibly referring to nearly horizontal teeth on lower jaw of *E. breviceps (=lyricus)*
- a. ***Evorthodus lyricus (Girard 1858)*** - pertaining to a lyre, allusion not explained, perhaps referring to filiform middle rays of first dorsal fin
- ix. ***Gnatholepis Bleeker 1874*** - *gnathos*, jaw; *lepis*, scale, allusion not explained, presumably referring to scales on head and cheek of *G. anjerensis*
- a. ***Gnatholepis thompsoni Jordan 1904*** - in honor of Joseph Cheesman Thompson (1874-1943), U.S. Navy medical officer (neurosurgeon), amateur zoologist-archaeologist, co-founder of the Zoological Society of San Diego, psychoanalyst, and Burmese cat breeder, who collected type
- x. ***Gobioides Lacepède 1800*** - *oides*, having the form of: *Gobius*, referring to previous placement of *Gobius* (now *Taeniooides*) *anguillaris* in that genus
- a. ***Gobioides broussonnetii Lacepède 1800*** - in honor of physician-naturalist Pierre Marie Auguste Broussonet (1761-1807), for his contributions to natural history, particularly his studies of the flora and fauna of Morocco [Lacepède apparently misspelled Broussonet's name, with an extra “n”; since this spelling is in prevailing usage, emendment is not recommended]
- xi. ***Gobionellus Girard 1858*** - diminutive of *Gobius*, probably referring to previous placement of its originally included species in that genus (and not referring to their size since these gobies are relatively large, 96-215 mm SL)
- a. ***Gobionellus oceanicus (Pallas 1770)*** - *icus*, belonging to: the ocean, based on nonbinominal name published by Gronovius (1763), type locality unknown, possibly from the western Atlantic
- xii. ***Gobiosoma Girard 1858*** - *gobius*, goby; *soma*, body, allusion not explained; Girard established this genus for *Gobius* that are “deprived of scales”
- a. ***Gobiosoma bosc (Lacepède 1800)*** - in honor of French naturalist Louis-Augustin Bosc d'Antic (1759-1828), whose manuscript provided the basis of Lacepède's description [presumably a noun in apposition, without the patronymic “i”]
 - b. ***Gobiosoma ginsburgi Hildebrand & Schroeder 1928*** - in honor of colleague Isaac Ginsburg (1886-1975), goby taxonomist, U.S. National Museum, who identified many gobies for the authors' monograph on fishes of Chesapeake Bay, and called attention to how this species differed from *G. bosc*
 - c. ***Gobiosoma robustum Ginsburg 1933*** - robust or full-bodied, referring to its “quite short and stocky” body
- xiii. ***Lythrypnus Jordan & Evermann 1896*** - *lythrum*, gore, referring to coral-red body of *L. dali*; *hypnos*, sleep, presumed to be related or similar to the sleeper gobies of *Eleotris* and *Dormitator* (Eleotridae)
- a. ***Lythrypnus elasson Böhlke & Robins 1960*** - Greek for smaller, being the smallest (12.9 mm SL) Atlantic species of the genus (at time of description)
 - b. ***Lythrypnus phorellus Böhlke & Robins 1960*** - diminutive of *phor*, thief, referring to its barred color pattern [we fail to see the connection between thieves and a barred color pattern, unless this is an oblique reference to “prisoner” and prison stripes]

- c. ***Lythrypnus spilus* Böhlke & Robins 1960** - spot or stain, referring to conspicuous dark spot on pectoral-fin base
- xiv. ***Microgobius Poey 1876*** - *micro-*, small, referring to size of *M. signatus* (described at 35-40 mm but reaches 60 mm TL); *gobius*, goby
- a. ***Microgobius carri* Fowler 1945** - in honor of Archie Carr (1909-1987), American herpetologist, ecologist and conservationist, to whom Fowler was “indebted” for Florida fishes (but not this one)
 - b. ***Microgobius gulosus* (Girard 1858)** - greedy or gluttonous, referring to its “large and very deeply cleft” mouth
 - c. ***Microgobius thalassinus* (Jordan & Gilbert 1883)** - sea-green, referring to translucent body “overlaid by brilliant green luster, which is formed by exceedingly minute close-set green points”
- xv. ***Priolepis Valenciennes 1837*** - manuscript name coined by Ehrenberg, etymology not explained, perhaps *prion*, saw and *lepis*, scale, referring to ctenoid scales on body
- a. ***Priolepis hipoliti* (Metzelaar 1922)** - “Named after its native collector” in Curaçao, Lesser Antilles

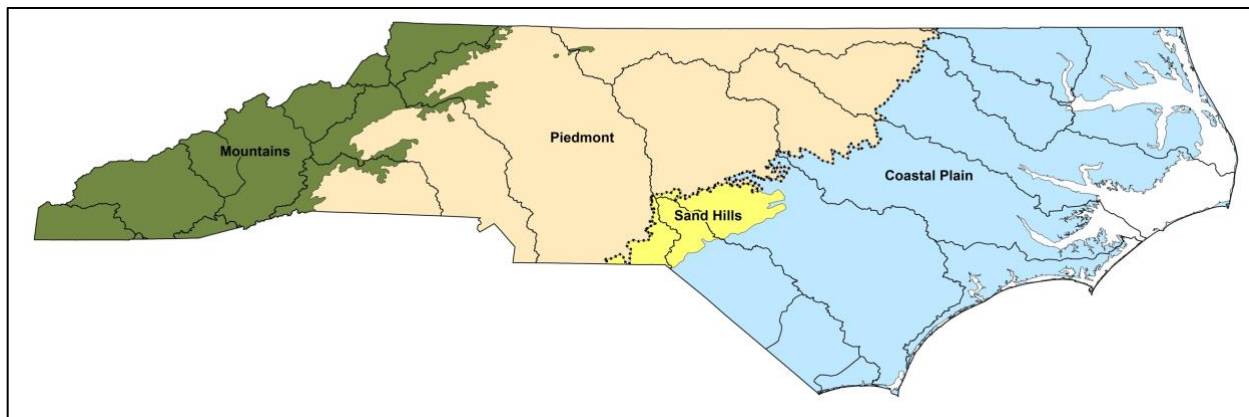
Supplemental Maps



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).