

Anchovy (Family Engraulidae) Diversity in North Carolina
By the NCFishes.com Team

Engraulidae is a small family comprising six species in North Carolina (Table 1). Their common name, anchovy, is possibly from the Spanish word *anchova*, but the term's ultimate origin is unclear (<https://en.wiktionary.org/wiki/anchovy>, accessed December 18, 2020). North Carolina's anchovies range in size from about 100 mm Total Length for Bay Anchovy and Cuban Anchovy to about 150 mm Total Length for Striped Anchovy (Munroe and Nizinski 2002).

Table 1. Species of anchovies found in or along the coast of North Carolina.

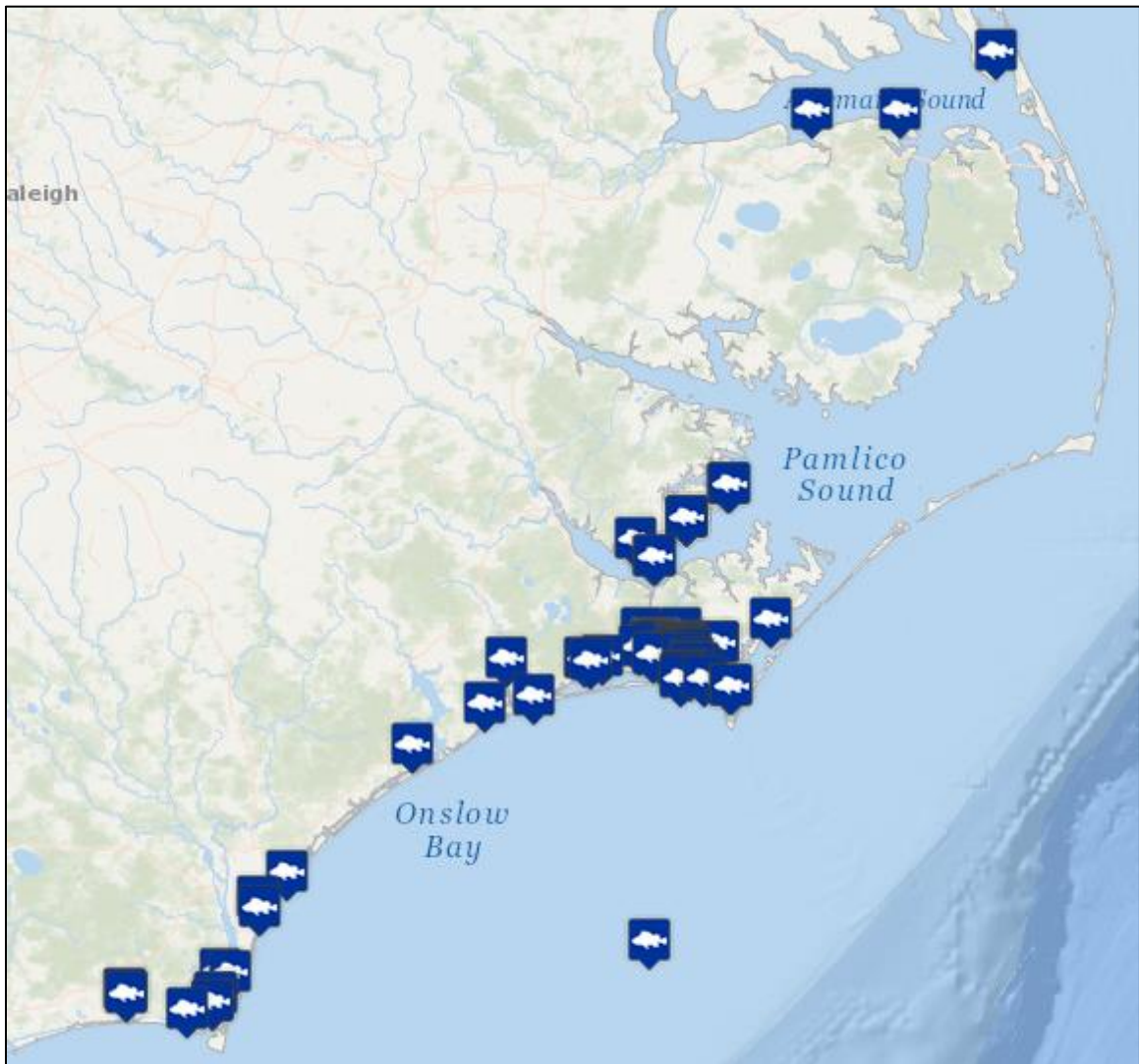
Scientific Name/ American Fisheries Society Accepted Common Name	Scientific Name/ American Fisheries Society Accepted Common Name
<i>Engraulis eurystole</i> - Silver Anchovy	<i>Anchoa mitchilli</i> - Bay Anchovy
<i>Anchoa hepsetus</i> - Striped Anchovy	<i>Anchoa cubana</i> - Cuban Anchovy
<i>Anchoa lyolepis</i> - Dusky Anchovy	<i>Anchoviella perfasciata</i> - Flat Anchovy

We are not aware of any other common names applied to this family, except for calling all of them anchovies. But as we have learned, each species has its own scientific (Latin) name which actually means something (please refer to The Meanings of the Scientific Names of Anchovies, page 9) along with an American Fisheries Society-accepted common name (Table 1; Page et al. 2013).

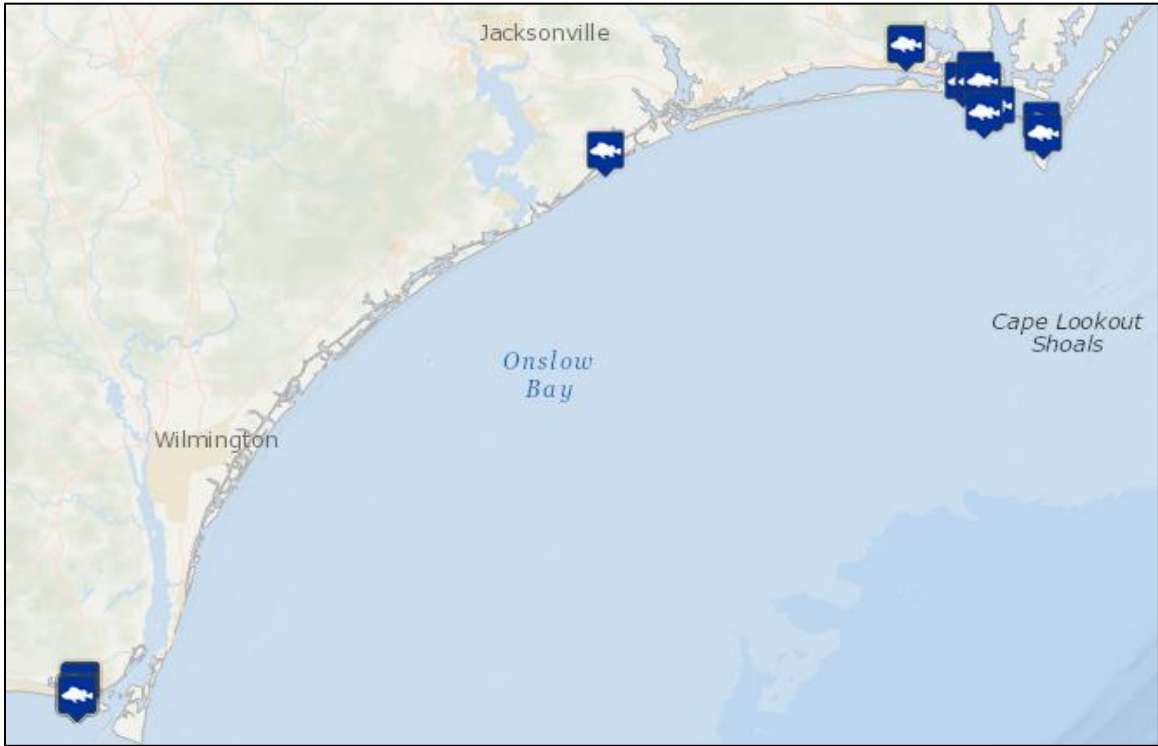
Anchovies from large schools of fishes that feed on zooplankton. In North Carolina they may be found in all coastal basins, nearshore, and offshore (Tracy et al. 2020; [NCFishes.com](https://ncfishes.com) [Please note: Tracy et al. (2020) may be downloaded for free at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss60/1>.] All species are found in saltwater environments (Maps 1-6), but Bay Anchovy is a seasonal freshwater inhabitant in our coastal rivers as far upstream as near Lock and Dam No. 1 and Castle Hayne (Cape Fear basin), Jacksonville (White Oak basin), New Bern (Neuse basin), Williamston (Roanoke basin), and Cannon Ferry (Chowan basin) (Map 3) (Tracy et al. 2020) [Note: see Supplemental Maps 1-3, page 10, showing North Carolina's 100 counties, 21 river basins, and 4 physiographic regions.] No anchovies are found further west than these known locales.

The identification of anchovies is relatively straight-forward, but often requiring the use of a compound microscope. Key characteristics for their proper identification include the length and shape of the maxillary bone; length and positioning of the pseudobranch; and positioning of the anus relative to the anal fin origin and pelvic fin tips (please refer to the Identification Key to the Species of Anchovies (Family Engraulidae) in North Carolina.

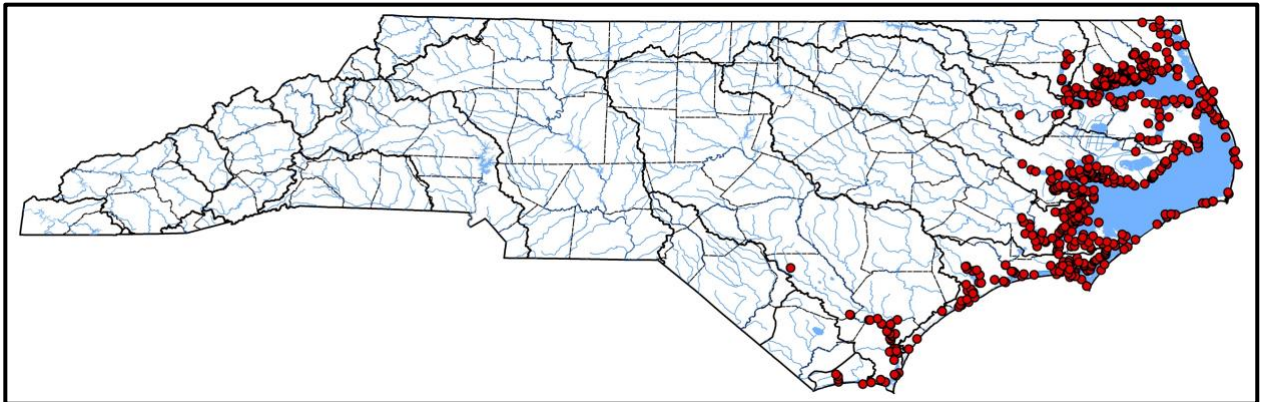
If you have troubles with your identifications, just send us (<https://ncfishes.com/contact/>) an e-mail and include as many quality digital photographs as you can along with all the pertinent locality descriptors so that we will know from where the fish came.



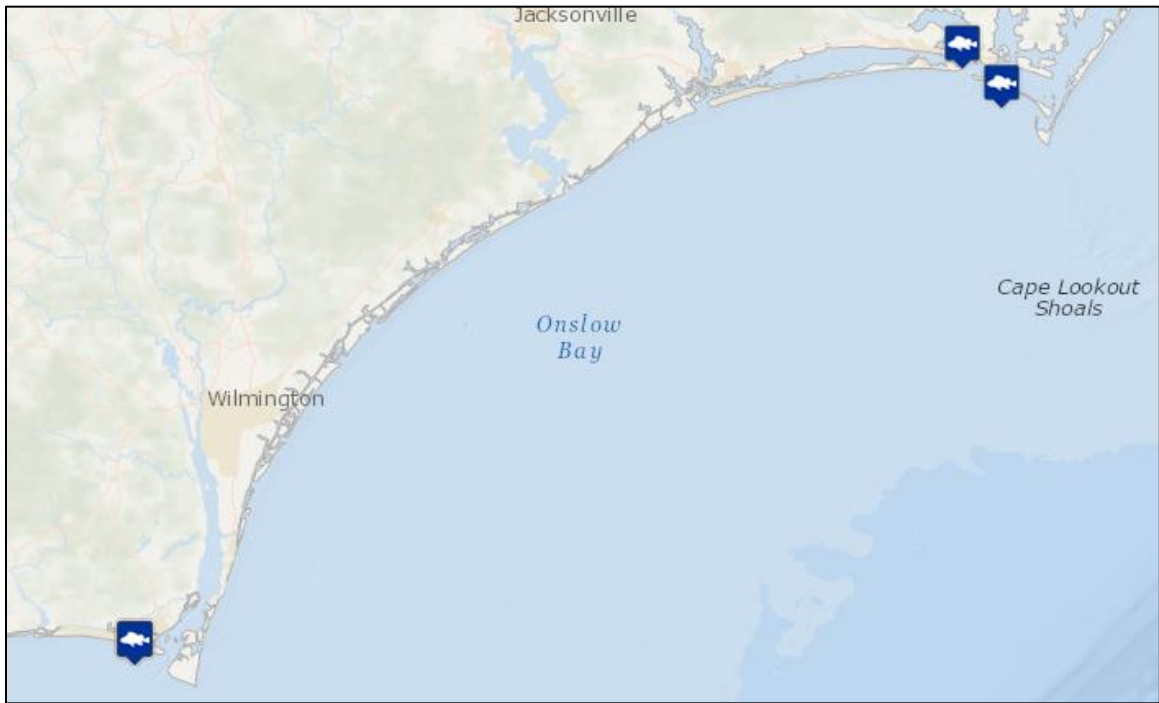
Map 1. Distribution of Striped Anchovy, *Anchoa hepsetus*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 12/17/2020. Note: one location is beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



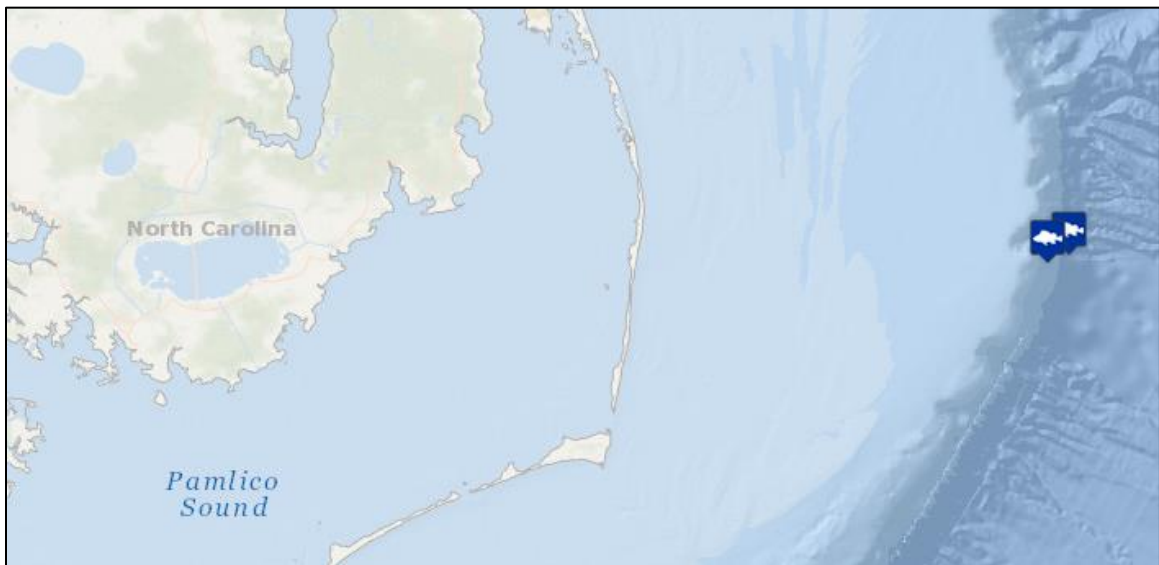
Map 2. Distribution of Dusky Anchovy, *Anchoa lyolepis* . Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 12/17/2020.



Map 3. Distribution of Bay Anchovy, *Anchoa mitchilli*. Map originally appeared in Tracy et al. (2020).



Map 4. Distribution of Cuban Anchovy, *Anchoa cubana* . Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 12/17/2020.



Map 5. Distribution of Flat Anchovy, *Anchoviella perfasciata*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 12/17/2020. Note: locations are beyond “North Carolina” waters (> 13.8 miles = 22.2 km, and 12 nautical miles).



Map 6. Distribution of Silver Anchovy, *Engraulis eurystole*. Map based upon vouchered specimens at the North Carolina Museum of Natural Sciences; accessed 12/17/2020.

Identification Key to the Species of Anchovies (Family Engraulidae) in North Carolina

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

(Illustrations courtesy of Munroe and Nizinski (2002))

- 1a. Maxilla short, tip blunt, not reaching or just reaching anterior margin of preopercle (Figure 1)2
- 1b. Maxilla long, tip pointed, reaching onto or beyond preopercle (Figure 1).3

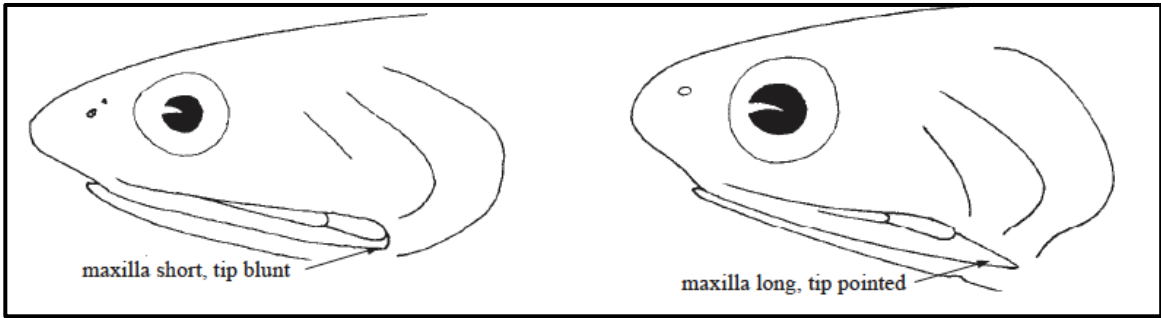


Figure 1. Left – Maxilla with a short, blunt tip; Right – Maxilla with a long, pointed tip.

- 2a. Pseudobranch short, length less than eye diameter (Figures 2 and 3)
 Flat Anchovy, *Anchoviella perfasciata*
- 2b. Pseudobranch long, length greater than eye diameter (Figures 2 and 4)
 Silver Anchovy, *Engraulis eurystole*

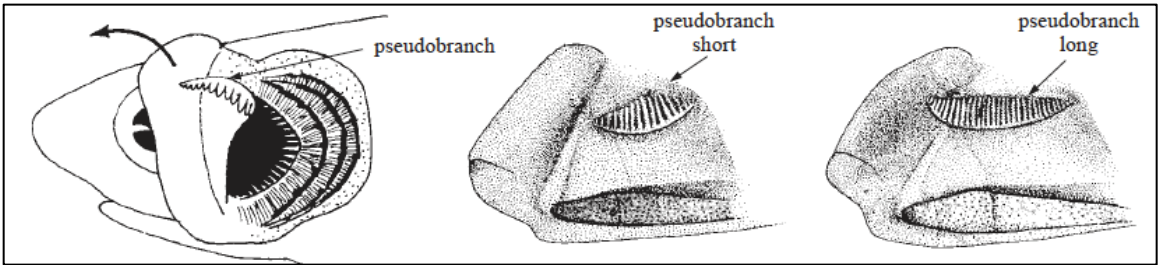


Figure 2. Left – Location of pseudobranch with gill cover folded forward; Center – Pseudobranch not reaching inner face of operculum; Right – Pseudobranch ending onto inner face of operculum.

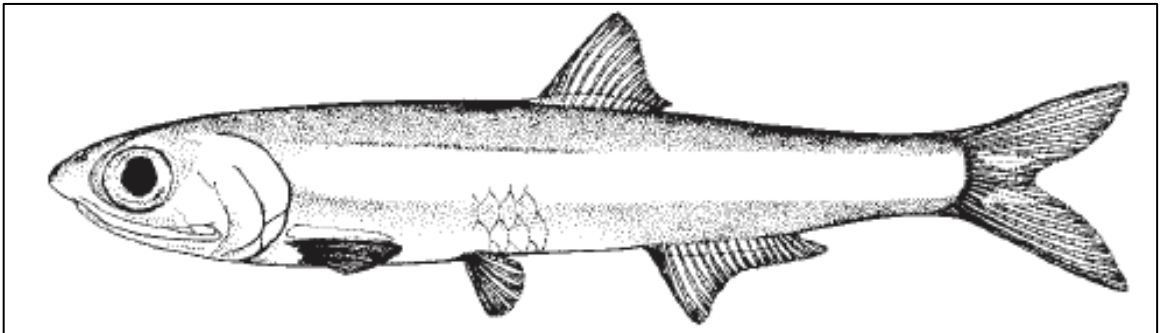


Figure 3. Flat Anchovy.

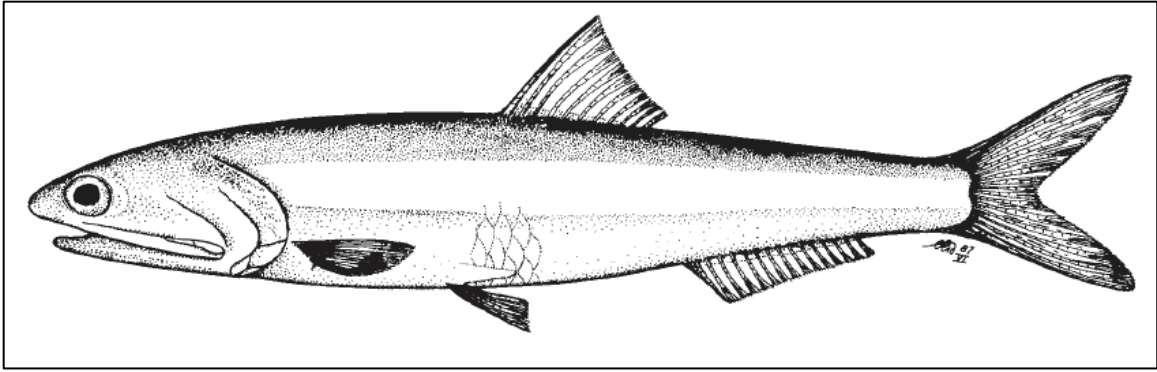


Figure 4. Silvery Anchovy.

- 3a. Pseudobranch long, greater than eye diameter, extending onto inner face of operculum (Figures 2 and 5) Dusky Anchovy, *Anchoa lyolepis*
- 3b. Pseudobranch short, not extending onto inner face of operculum (Figure 2)4

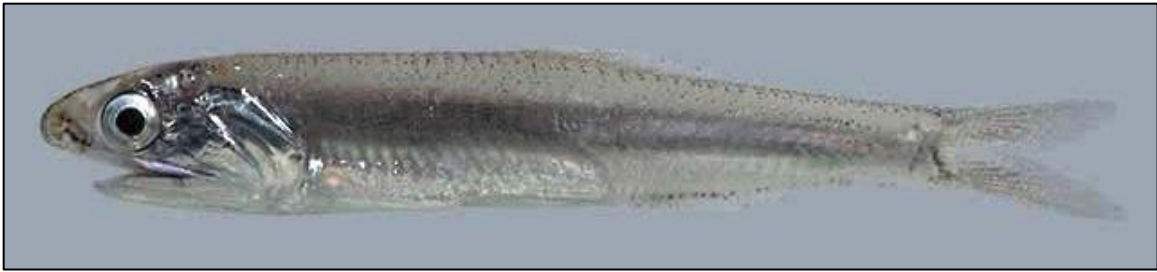


Figure 5. Dusky Anchovy. Photograph courtesy of the Smithsonian Tropical Research Institute's Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/848>, accessed December 17, 2020.

- 4a. Anus closer to anal fin origin than to pelvic fin tips (Figures 6 and 7) Striped Anchovy, *Anchoa hepsetus*
- 4b. Anus opening near to pelvic fin tips to anal fin origin (Figure 6).....5

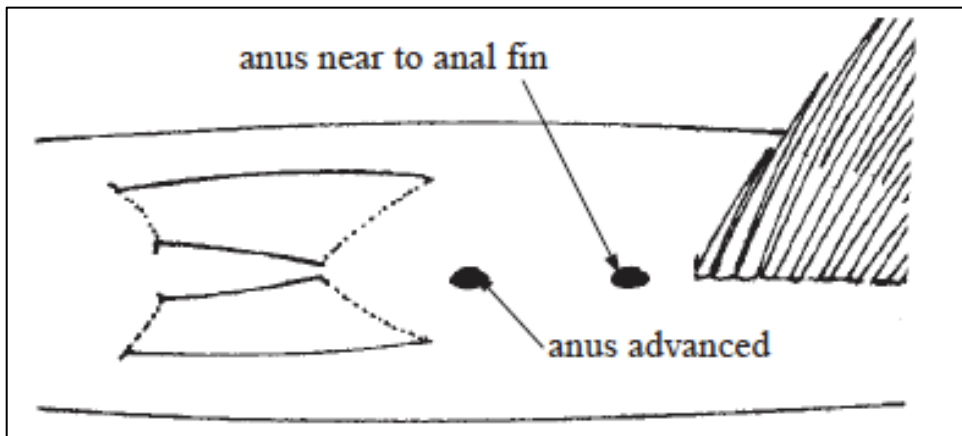


Figure 6. Location of anus relative to pelvic fin tips and anal fin origin.



Figure 7. Striped Anchovy

- 5a. Anal fin origin at vertical through dorsal fin origin (Figure 8) Bay Anchovy, *Anchoa mitchilli*
- 5b. Anal fin origin more posterior, at or near vertical through midpoint of dorsal fin (Figure 9)
 Cuban Anchovy, *Anchoa cubana*



Figure 8. Bay Anchovy

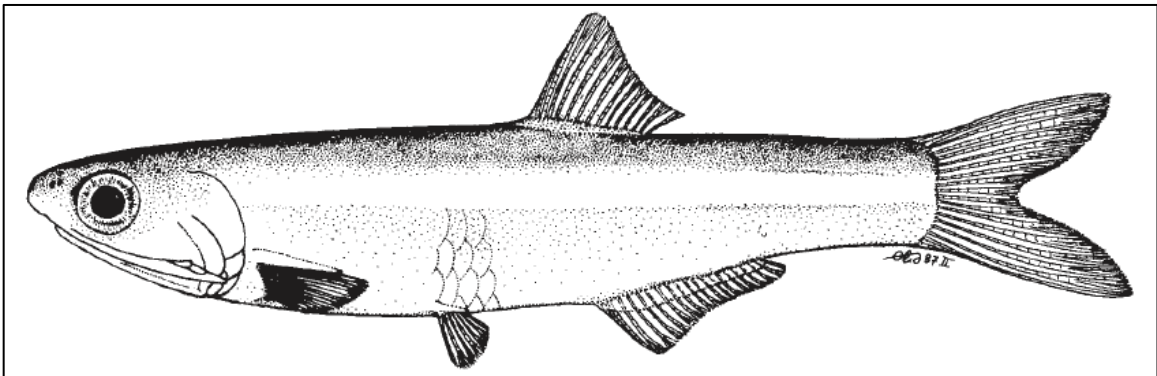


Figure 9. Cuban Anchovy.

Glossary

(Adapted from Rohde et al. (2009))

Maxilla – bone in the upper jaw that lies immediately above (or behind) and parallel to the premaxilla

Premaxillae – the most anterior paired bones in the upper jaw

Preopercle – the bone just anterior to the opercle, forming the posterior boundary of the cheek

Pseudobranch – a gill-like structure on the upper inner face of the gill cover

References

(Identification key adapted from Munroe and Nizinski (2002))

Munroe, T.A. and M.S. Nizinski (FAO 2002). 2002. Engraulidae. Anchovies. pp 764-794. Carpenter, K.E. (ed.). The living marine resources of the Western Central Atlantic. Volume 2. Bony fishes part 1 (Acipenseridae to Grammatidae). Food and Agriculture Organization of the United Nations, Rome, Italy. 4099p. (Available at: [FAO 2002](#)).

Page, L.M., H. Espinosa-Pérez, L.T. Findley, C.R. Gilbert, R.N. Lea, N.E. Mandrak, R.L. Mayden, and J.S. Nelson. 2013. Common and scientific names of fishes from the United States, Canada, and Mexico. 7th edition. American Fisheries Society, Special Publication 34, Bethesda, MD. 384p.

Tracy, B. H., F.C. Rohde, and G.M. Hogue. 2020. An annotated atlas of the freshwater fishes of North Carolina. Southeastern Fishes Council Proceedings No. 60. 198p. (Available at: <https://trace.tennessee.edu/sfcproceedings/vol1/iss60/1>).

The Meanings of the Scientific Names of Anchovies

Adopted from the ETYFish Project by Christopher Scharpf and Kenneth J. Lazara, accessed December 17, 2020, <http://www.etyfish.org/>

Family Engraulidae Gill 1861 – The Anchovies

Anchoa Jordan & Evermann 1927 - anchovy-like, indicating a “transition to *Anchovia*”

- i. ***Anchoa cubana* (Poey 1868)** - Cuban, referring to type locality off Cuba (but occurs in western central Atlantic from North Carolina, USA, to entire coast of Brazil)
- ii. ***Anchoa lyolepis* (Evermann & Marsh 1900)** - *lyo*, loose; *lepis*, scale, probably referring to deciduous scales
- iii. ***Anchoa hepsetus* (Linnaeus 1758)** - ancient Greek for any small fish that is boiled for human consumption (compared to other elongate fishes Linnaeus placed in the catch-all genus *Esox*, it is indeed small)
- iv. ***Anchoa mitchilli* (Valenciennes 1848)** - in honor of Samuel Latham Mitchill (1764-1831), naturalist, physician and U.S. Senator, who studied the fishes of New York Harbor

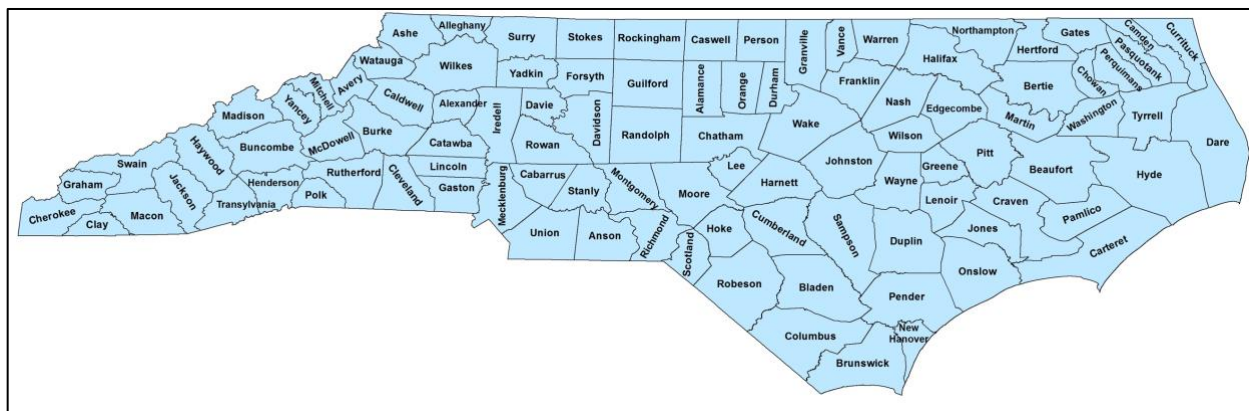
Anchoviella Fowler 1911 - diminutive of *Anchovia*, referring to small size of most species

- i. ***Anchoviella perfasciata* (Poey 1860)** - *per-*, very; *fasciatus*, banded, referring to broad band of “unpolished silver” (translation) along sides

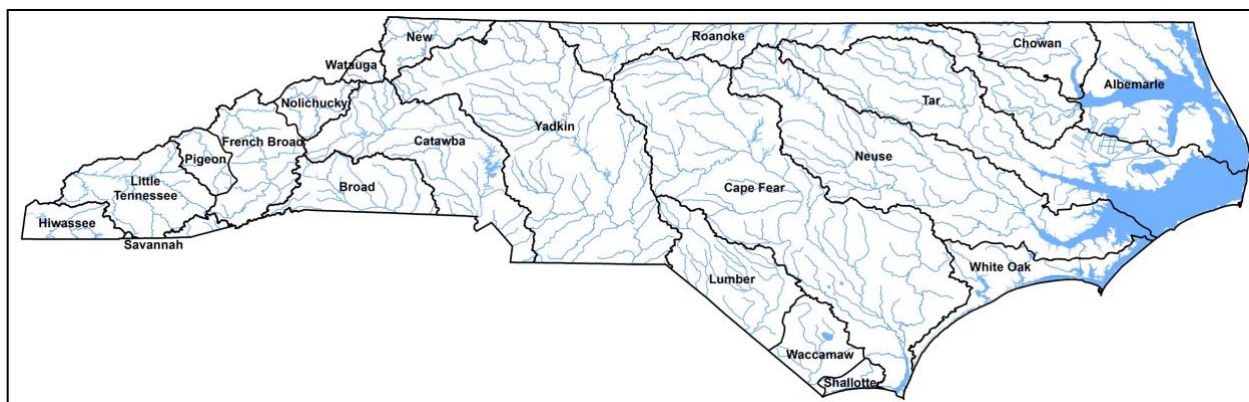
Engraulis Cuvier 1816 - ancient name for *E. encrasicolus*, common anchovy of Europe

- i. ***Engraulis eurystole* (Swain & Meek 1884)** - *eurys*, broad; *stole*, stole or band, referring to silvery lateral band

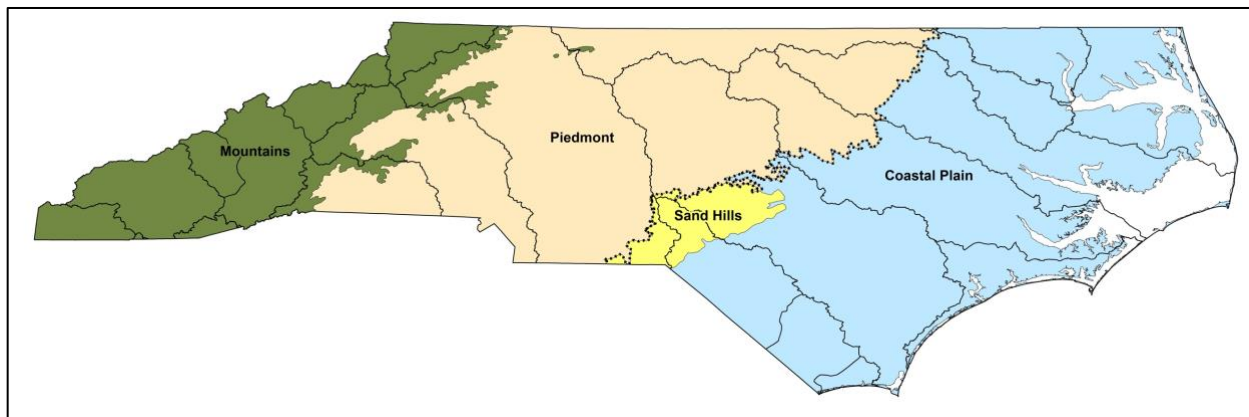
Supplemental Maps



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).