

## New World Silverside (Family Atherinopsidae) Diversity in North Carolina

Atherinopsidae is a small family comprising six species in North Carolina (Table 1). The common name, silversides, refers to a distinct silver stripe on the side, which often reflects sunlight like a mirror when these fishes turn near the water surface (Rohde et al. 2009). Silversides are generally delicate, slender, laterally compressed, and translucent (Rohde et al. 2009). Maximum length is approximately 125 mm (5 inches) and most silversides live only one year.

**Table 1. Species of silversides 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>Labidesthes sicculus</i> - Brook Silverside	<i>Menidia beryllina</i> - Inland Silverside
<i>Labidesthes vanhyningi</i> - Southern Brook Silverside	<i>Menidia extensa</i> - Waccamaw Silverside
<i>Membras martinica</i> - Rough Silverside	<i>Menidia menidia</i> - Atlantic Silverside

Waccamaw Silverside is often referred to as skipjack or glass minnow because of its translucency. But, each species has an American Fisheries Society-accepted common name (Page et al. 2013) and a scientific (Latin) name (Table 1; Appendix 1).

Silversides may be found from Hot Springs in Madison County to Hatteras Village in Dare County occurring in fresh and salt water environments, but are most abundant inhabiting our coastal rivers, estuaries, and offshore (Tracy et al. 2020; [NCFishes.com](http://NCFishes.com)).

Rough Silverside, Inland Silverside, and Atlantic Silverside are found along the coast, but Inland Silverside has also been found as far upstream as near Elizabethtown (Cape Fear basin), near Greenville (Tar basin), and near Murfreesboro on the Meherrin River (Chowan basin) and was recently found in Lake Norman (Tracy et al. 2020). The Waccamaw Silverside is endemic to Lake Waccamaw, Columbus County and is found nowhere else in the world. It was described by Hubbs and Raney in 1946. Because of its limited distribution and potential anthropogenic impacts upon its habitat and water quality, Waccamaw Silverside is listed as Federally Threatened (Krabbenhoft et al. 2005; NCAC 2017; NCNHP 2020; NCWRC 2017).

Until 1995 no species of *Labidesthes* were known to occur in North Carolina. Southern Brook Silverside is a recent, natural, immigrant to North Carolina from South Carolina. It was first discovered in North Carolina in 1995 in the Waccamaw River, Waccamaw basin (Moser et al. 1998). Since then, it has naturally dispersed into Lake Waccamaw, where it now co-occurs with the Waccamaw Silverside, in the Waccamaw River, and throughout the Lumber, lower Yadkin, and lower Cape Fear basins. In North Carolina, Southern Brook Silverside is now at the northern limit of its range along the Atlantic slope in North Carolina (Werneke and Armbruster 2015).

Similar to Southern Brook Silverside, Brook Silverside is also a recent, natural, immigrant to North Carolina after swimming upstream from Tennessee. It was first discovered in North Carolina in 2012 by North Carolina Wildlife Resources Commission staff in the mainstem of the lower French Broad River in Madison County, French Broad basin (Tracy et al. 2020). So far, this is its only known occurrence in the state (Map 2).

Key characteristics for their proper identification include the shape of the snout; scale textures; positioning of the origin of the spinous dorsal fin in relation to the origin of the anal fin; the number of anal fin rays; and their geographical distribution. However, several species can co-occur within the same habitats at the same time, such as Inland Silverside and Atlantic Silverside, rendering field identifications a challenge.

**Identification Key to the Freshwater and Marine Species of New World Silversides (Family Atherinopsidae) in North Carolina**

- 1a. Snout triangular when viewed from above, snout length longer than width of the eye. Lateral scale series about 75. Predorsal scales about 33. Anal fin rays 21-24. Found in freshwater .....2
- 1b. Snout rounded when viewed from above, snout length shorter than or equal to width of the eye. Lateral scale series 34-50. Predorsal scales 14-23. Anal fin rays 14-24. Found in coastal, estuarine, and marine waters (except Inland Silverside which has been recently found in Lake Norman) .....3
- 2a. Mid-lateral stripe tapers anterior of the first dorsal fin to a point behind the dorsal insertion of the pectoral fin. Ratio of thoracic length to abdominal length greater than 2. Only known from the lower French Broad River in Madison County (Figure 1) ..... Brook Silverside, [\*Labidesthes sicculus\*](#)
- 2b. Mid-lateral stripe does not taper, usually expanding, to insertion of pectoral fin in advance of the first dorsal fin. Ratio of thoracic length to abdominal length less than 2. Current range includes lower Yadkin and Cape Fear basins, throughout the Lumber basin, and in and downstream from Lake Waccamaw in the Waccamaw basin (Figure 1) ..... Southern Brook Silverside, [\*Labidesthes vanhyningi\*](#)



**Figure 1. Top – Brook Silverside; Bottom – Southern Brook Silverside. Brook Silverside photograph courtesy of the North American Native Fishes Association.**

- 3a. Posterior margins of scales finely scalloped and rough to the touch. Dorsum peppered with melanophores. Rostral sensory system present with pits, pores, depressions, or tubes. Lateral axillary scale of pelvic fin well developed, greater than or equal to 1/3, usually greater than or equal to 1/2 length of fin. Origin of spinous dorsal fin anterior to anal-fin origin (Figures 2 and 3). Basal third of soft dorsal and anal fins heavily scaled .....Rough Silverside, [\*Membras martinica\*](#)
- 3b. Posterior edge of scales smooth. Rostral sensory system absent, lacking pits, pores, or tubes. Lateral axillary scale of pelvic fin absent or poorly developed, less than or equal to 1/4 length of fin. Origin of spinous dorsal fin anterior to or posterior to origin of anal fin (Figure 2). Base of soft dorsal and anal fins with few or no scales .....4

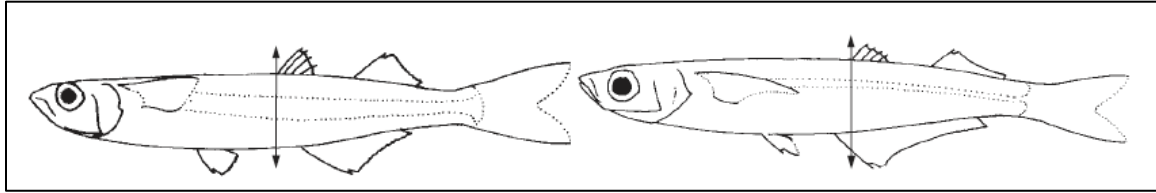


Figure 2. Left – Origin of spinous dorsal fin anterior to anal fin origin; Right – Origin of spinous dorsal fin posterior to anal fin origin. Illustrations courtesy Chernoff (2002).

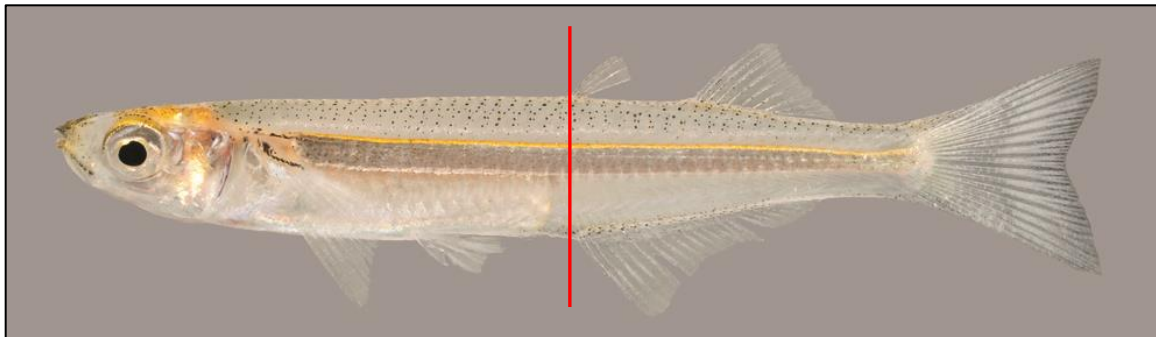


Figure 3. Rough Silverside with red bar showing the origin of the spinous dorsal fin anterior to anal fin origin. Photograph by Zachary Randall, Florida Museum (UF 238456), courtesy of the U.S. Geological Survey (Fuller 2020).

- 4a. Origin of the spinous dorsal fin slightly anterior to or over anal fin origin. Body very slender; depth going 7.0-8.0 times into the Standard Length. Lateral scale series 40-44 (range 40-50). Anal fin rays 19-21. Range restricted to Lake Waccamaw and to the Waccamaw River immediately down-stream from the lake (Figure 4) ..... Waccamaw Silverside, [Menidia extensa](#)
- 4b. Origin of the spinous dorsal fin anterior to or posterior to anal fin origin. Body moderately slender; depth going 4.8-6.0 times into the Standard Length. Lateral scale series 34-38 (range 34-40). Anal fin rays 15-18 or 22-24. Not found in Lake Waccamaw .....5



Figure 4. Waccamaw Silverside.

- 5a. Origin of spinous dorsal fin over or posterior to anus (Figure 5). Anal fin rays 22-24 (range 21-24). Scale rows on nape 18-20 (range 17-20).....Atlantic Silverside, [Menidia menidia](#)
- 5b. Origin of spinous dorsal fin anterior to vertical through anus (Figure 6). Anal fin rays 15-18 (range 15-19). Scale rows on nape 14-16 (range 14-17) .....Inland Silverside, [Menidia beryllina](#)

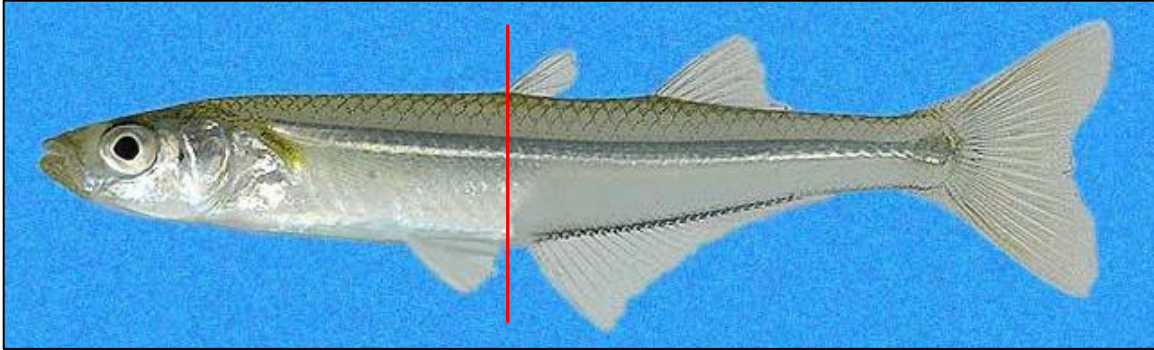


Figure XXX. Atlantic Silverside with red bar showing the origin of the spinous dorsal fin over or anterior to anus. Photograph courtesy of the Smithsonian Tropical Research Institute's Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/4339>, accessed 02/18/2021.



Figure 6. Inland Silverside with red bar showing the origin of the spinous dorsal fin anterior to vertical through anus. Photograph by Zachary Randall, Florida Museum (UF 237973), courtesy of the U.S. Geological Survey (Fuller et al. 2020).