

Trout and Salmon (Family Salmonidae) Diversity in North Carolina
By the NCFishes.com Team

There are four species of trout and salmon in North Carolina (Table 1; NCFishes.com; Tracy et al. 2020). [Please note: Tracy et al. (2020) may be downloaded for **free** at:

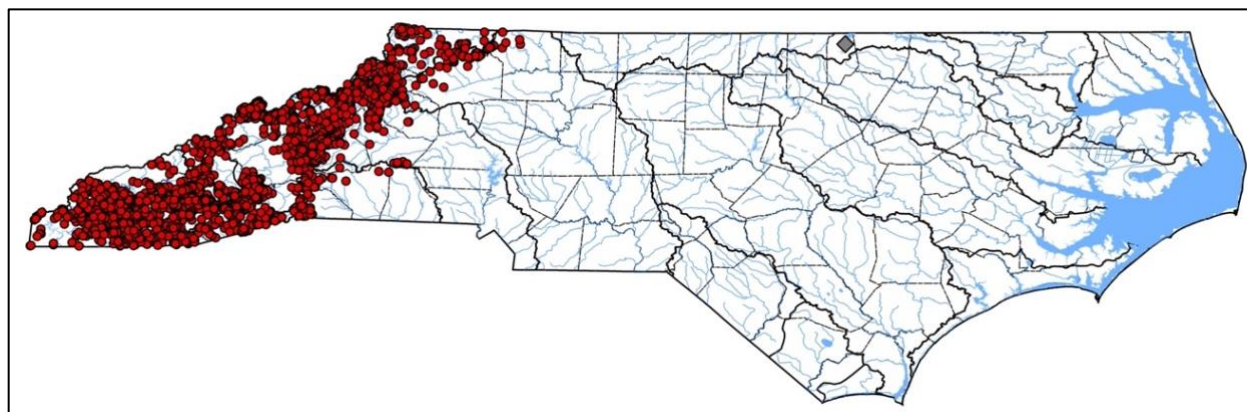
<https://trace.tennessee.edu/sfcproceedings/vol1/iss60/1.>] Unlike most fish species found in North Carolina’s waters, the Family Salmonidae are known collectively and commonly as just trout. However, one can hear people call Brook Trout “brookies, speckled trout, or specks”. Their four common names – Rainbow, Brown, and Brook trout, and Sockeye Salmon are the American Fisheries Society-accepted common names (Page et al. 2013) and each of the scientific (Latin) names actually means something (please refer to The Meanings of the Scientific Names of Salmonidae, page 7). However, in North Carolina and elsewhere Sockeye Salmon populations that are not anadromous (i.e., not migrating from the ocean to fresh water to spawn because they are land-locked populations) are called Kokanee.

Table 1. Species of trout and salmon found in North Carolina.

Scientific Name/ American Fisheries Society Accepted Common Name	Scientific Name/ American Fisheries Society Accepted Common Name
<i>Oncorhynchus mykiss</i> - Rainbow Trout	<i>Salmo trutta</i> – Brown Trout
<i>Oncorhynchus nerka</i> – Sockeye Salmon	<i>Salvelinus fontinalis</i> – Brook Trout

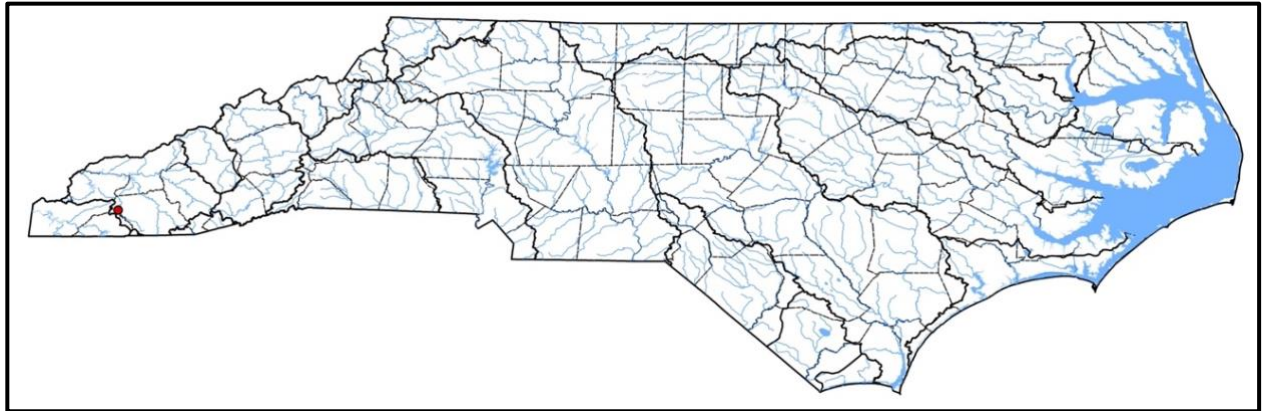
North Carolina’s only indigenous (native) species of trout is the Brook Trout, specifically the Southern Appalachia strain, and it was historically found throughout the Appalachian Mountains on both sides of the Eastern Continental Divide (NCWRC undated). With the onset of largescale industrial logging resulting in the habitat and water quality degradation of many mountain streams, the Northern strain of Brook Trout, Rainbow Trout, and Brown Trout were introduced in the 1870s and 18880s to offset the dwindling populations and numbers of Southern strain Brook Trout. In the later 1950s-early 1960s Sockeye Salmon were stocked in Nantahala Lake.

Rainbow Trout was first stocked as a sportfish in the late 1870s-early 1880s in suitable waters across North Carolina in the French Broad, Linville, Johns, Catawba, Broad, Green, Yadkin, Pigeon, and Dan rivers (Tracy et al. 2020). [Note: see Supplemental Maps 1-3, page 8, showing North Carolina’s 100 counties, 21 river basins, and 4 physiographic regions.] Today, Rainbow Trout, wild (naturalized) and stocked populations, are found throughout all Mountain basins and in the montane reaches of Atlantic slope basins, including the Roanoke, Yadkin, Catawba, Broad, and Savannah (Map 1).



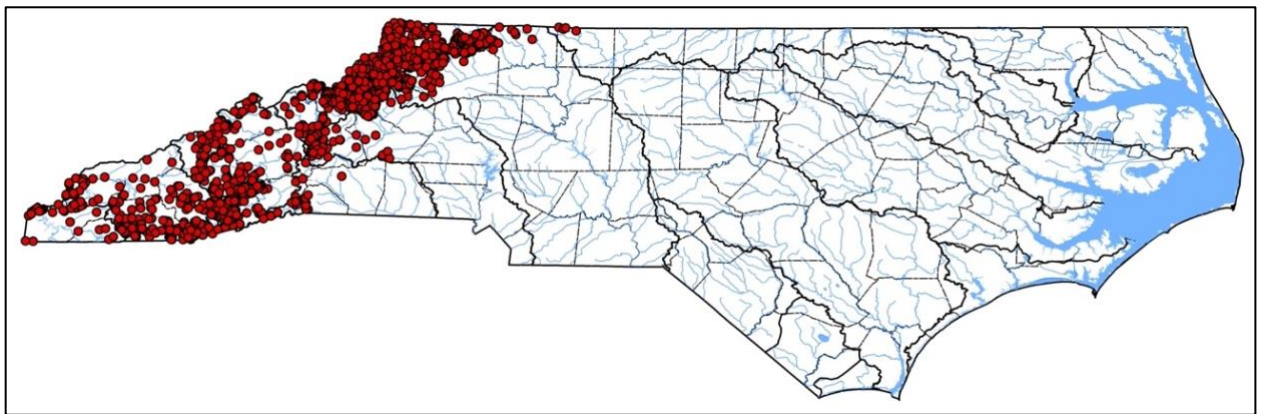
Map 1. Distribution of Rainbow Trout, *Oncorhynchus mykiss*. Map originally appeared in Tracy et al. (2020). [Note: When a species was known to occur within a basin, but vouchered material was not present, the occurrence was designated with a gray diamond in the approximate middle of the basin.] Map originally appeared in Tracy et al. (2020).

Sockeye Salmon was stocked in 1959 and the 1960s as a forage fish for Rainbow Trout and as a sportfish in the Nantahala Lake (Little Tennessee basin) where it persists today (Map 2; Tracy et al. 2020). The population in Nantahala Lake is not self-sustaining and persists only through periodic stockings by the North Carolina Wildlife Resources Commission.



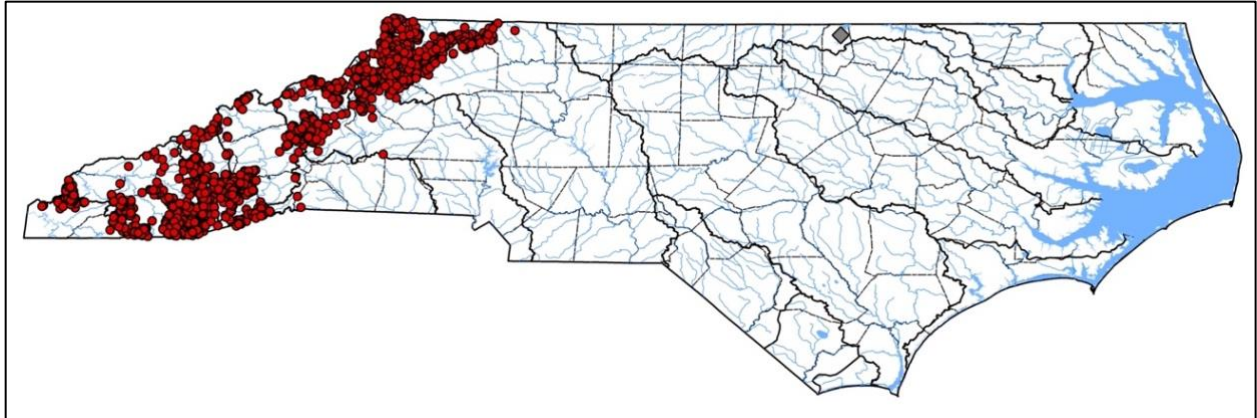
Map 2. Distribution of Sockeye Salmon (Kokanee), *Oncorhynchus nerka*. Map originally appeared in Tracy et al. (2020).

Brown Trout has been widely stocked as a sportfish since the late 1880s and is now found as wild (naturalized) and stocked populations throughout all Mountain basins and in the montane reaches of Atlantic slope basins, including the Roanoke, Yadkin, Catawba, Broad, and Savannah (Map 3; Tracy et al. 2020).



Map 3. Distribution of Brown Trout, *Salmo trutta*. Map originally appeared in Tracy et al. (2020).

Brook Trout is found in all Mountain basins and in the headwater montane streams of the Savannah, Yadkin, and Catawba; it has also been stocked into the Broad and Roanoke basins where it is not indigenous (Map 4; Tracy et al. 2020). However, today most wild populations are now restricted to clear, cold, well-oxygenated, high elevation, high gradient and turbulent streams beneath a canopy of rhododendron, Eastern Hemlock, Yellow Poplar, and other native trees of the Appalachian Mountains.



Map 4. Distribution of Brook Trout, *Salvelinus fontinalis*. Map originally appeared in Tracy et al. (2020).

Most wild Brook Trout in our most remotest streams, are only about 130 to 200 mm (5 to 8 inches) in length, although hatchery reared and stocked Brook Trout may approach about 700 mm (27 inches). Rainbow and Brown trout can get as big as about 825 mm (32 inches) and the North Carolina record for the largest Kokanee caught (see Figure 2 in the accompanying Identification Key to the Trout and Salmon (Family Salmonidae) in North Carolina) was about 610 mm (24 inches) in length.

Because all the species in the Family Salmonidae are classified and managed as game species by the North Carolina Wildlife Resources Commission (NCWRC 2020), none are considered imperiled in North Carolina (NCAC 2017; NCNHP 2020; NCWRC 2017). For more specific information on North Carolina's trout species, please see: <https://www.ncwildlife.org/Learning/Species/Fish/Trout> or any of the North Carolina Wildlife Resources Commission sport fish profiles (NCWRC 2010a; NCWQRC 2010b; NCWRC 2010c; NCWRC undated).

The identification of trout and salmon is relatively straight-forward. Key characteristics for their proper identification include the presence (and location) or absence of spots on the body and fins and pigmentation patterns on the pectoral, anal, and adipose fins (please refer to the Identification Key to the Trout and Salmon (Family Salmonidae) 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 Trout and Salmon (Family Salmonidae) in North Carolina

(Please refer to NCFishes.com for pictures and identifying characteristics all species)
(Identification Key adapted from Menhinick (1991); Rohde et al. 2009))

- 1a. Body and fins with distinct spots (Figure 1). Anal rays 9-12. Gill rakers fewer than 20. Not restricted to Nantahala Reservoir.....2
- 1b. Body and fins with no distinct spots (Figure 2). Anal rays 13-19. Gill rakers 30-50. Restricted to Nantahala Reservoir..... Sockeye Salmon (Kokanee), *Oncorhynchus nerka*



Figure 1. Brown Trout showing body and dorsal fins with spots.



Figure 2. Sockeye Salmon showing the absence of spots on body and fins. Photographs courtesy of Jake Rash, North Carolina Wildlife Resources Commission.

- 2a. Side with pale spots on a light background. Dorsum without worm-like markings. Front edge of pectoral fin not margined with white (Figure 1)3
- 2b. Side with pale spots on a dark background. Dorsum with a worm-like pattern. Front edge of pectoral fin margined with white (Figure 3)Brook Trout, *Salvelinus fontinalis*



Figure 3. Brook Trout. Photograph courtesy of Jake Rash, North Carolina Wildlife Resources Commission.

- 3a. Caudal fin covered with black spots. Side in life with a pinkish stripe. Adipose fin (fleshy, small fin that lacks rays and spines and is located on the dorsum, just before the caudal fin) black-edged. Anterior border of pelvic and anal fins without white front edge and with no black submarginal band (Figure 4)Rainbow Trout, *Oncorhynchus mykiss*
- 3b. Caudal fin lacking black spots. Side in life lacking a pinkish stripe. Side with scattered red spots surrounded by halos. Adipose fin pale edged. Anterior border of pelvic and anal fins with white front edge and black submarginal band (Figure 5) Brown Trout, *Salmo trutta*



Figure 4. Rainbow Trout.



Figure 5. Brown Trout.

References

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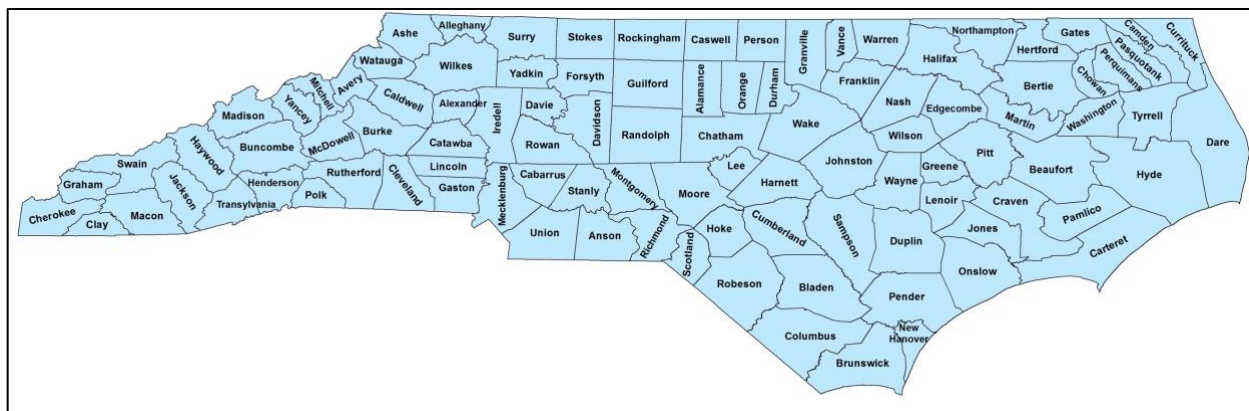
The Meanings of the Scientific Names of Trout and Salmon

Adopted from the ETYFish Project by Christopher Scharpf and Kenneth J. Lazara,
accessed February 27, 2021, <https://etyfish.org/salmoniformes/>

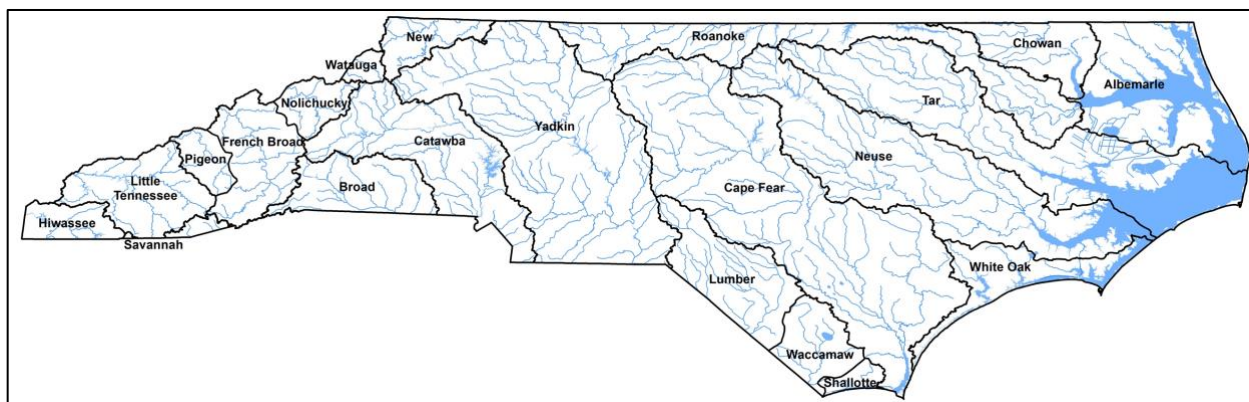
SALMONIDAE, Jarocki or Schinz 1822, Trout and Salmon

- i. ***Oncorhynchus Suckley 1861*** - *onkos*, hook; *rhynchus*, snout, referring to hooked lower jaw, or kype, of breeding males
 - a. ***Oncorhynchus mykiss (Walbaum 1792)*** - derived from *mykizha*, vernacular name for this species used in the Kamchatka Peninsula in the 16th century
 - b. ***Oncorhynchus nerka (Walbaum 1792)*** - Russian name for this species
- ii. ***Salmo Linnaeus 1758*** - ancient word for salmon, probably either of Celtic origin or from the pre-Indo-European Iberian of Aquitania (source: A. Andrews, "Greek and Latin terms for salmon and trout," *Transactions and Proceedings of the American Philological Association*, 86[1955]: 308-318)
 - a. ***Salmo trutta Linnaeus 1758*** - Latin word for trout, possibly derived from the Greek *troktes*, meaning nibbler
- iii. ***Salvelinus Richardson 1836*** - latinization of *säibling*, an old German word for char (Richardson credited the name to Nilsson 1832, who used it for the group "Salvelini")
 - a. ***Salvelinus fontinalis (Mitchill 1814)*** - living in or near springs; "He lives in running waters only," Mitchill wrote, "and not in stagnant ponds; and, therefore, the lively streams, descending north and south from their sources on Long-Island [New York, USA], exactly suit the constitution of this fish"

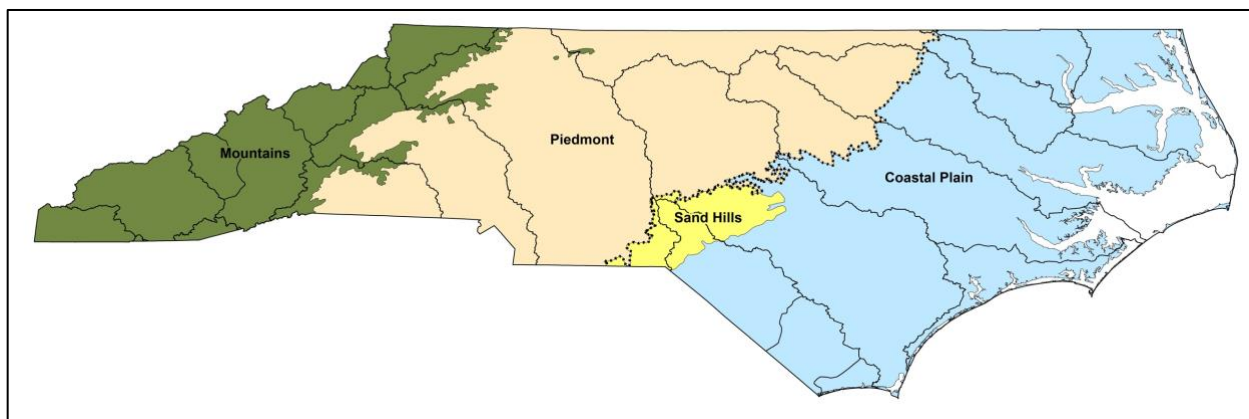
Supplemental Maps



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).