

Trout and Salmon (Family Salmonidae) Diversity in North Carolina

There are four species of trout and salmon in North Carolina (Table 1; NCFishes.com; Tracy et al. 2020). 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 species has a scientific (Latin) name (Table 1; Appendix 1). 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 - c). 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 1880s 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). 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.

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 (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.

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 (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 (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.

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 2020a), 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 - c).

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.

Identification Key to the Species of Trout and Salmon (Family Salmonidae) in North Carolina

- 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.