

## Status of Brook Trout in the Southeast

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Distribution of brook trout in the southeast is limited primarily to a relatively narrow band along the Appalachian mountain range, terminating a few miles north of Dahlonega, Georgia. For the most part, at least in the more southern extremities, brook trout are limited to very small head-water streams above 2500' in elevation. Populations of rainbow and brown trout in these same areas range as low as 1200 feet elevation. Most existing populations are isolated from downstream rainbow and brown trout by waterfall or other physical barriers.

As a general rule, brook trout distribution has steadily declined over the past 50 years. The decline has been very slight in most states over the past 10 years with at least two states showing minor increases in range and standing crops. It appears that invasion by rainbow trout is the biggest threat to brook trout in the southeast.

The majority of native streams lie on National Forest or Park Service lands.

The following tabulation presents status of native brook trout population by individual states:

### West Virginia

Approximately 200 native brook trout streams totalling 564 miles and 383 surface acres.

Significant increase in standing crops and minor increase in mileage over the last 10 years due to better control of development projects.

### Virginia

1,183 miles pure brook trout stream; 61 miles mixed brook and brown; 141 miles mixed brook and rainbow; 25 miles mixed brook, brown, and rainbow.

Very minor loss of brook trout water due primarily to invasion by rainbow.

Tennessee (excluding Great Smoky Mountains Park)

62 streams totalling approximately 113 miles. All but 16 streams totalling 18 miles lie on National Forest lands.

Significant loss of approximately 50 miles in last 10 years due primarily to invasion by rainbow trout and development projects.

North Carolina (excluding Great Smoky Mountains Park)

259 streams totalling approximately 300 miles.

Estimated loss of 5-10% stream mileage to rainbow invasion over last 10 years.

Losses appear to be decreasing and population stabilizing.

Great Smoky Mountains Park

125 miles of pure brook trout water.

No estimate of mixed populations.

Estimate 10-20 miles lost to invasion by rainbow in last 10 years.

South Carolina

9 streams totalling approximately 15 miles.

Population appears to be stabilized with a possible very slight decrease.

Georgia

65 streams totalling 86 miles.

Six streams totalling 14.6 miles renovated (rainbow and brown removed) during last 10 years.

Two miles lost to rainbow invasion during same period.

Maryland

Approximately 100 miles pure brook trout water and 10 miles mixed brook and brown.

Estimate little if any change in distribution over past 10 years.

Brook trout water located primarily north of Baltimore and Fredericksburg in Baltimore County (mountains and piedmont).

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

R-8

REPLY TO: 2610 Cooperative Relations

OCT 03 1978

SUBJECT: Brook Trout Study

TO: Trout Committee



Here are the condensed results of the Brook Trout Study that several states participated in. There is a summary sheet for each phase of the study, which included blood chemistry analysis and meristic data to determine taxonomic status of the Brook Trout, and age and growth data for these same fish. Due to the length of the written report, I plan to reproduce copies only for those states containing Brook Trout waters.

Sincerely,

*Monte E. Seehorn*  
MONTE E. SEEHORN  
Chairman  
Trout Committee

Enclosures

## Summary

Based on a sample of 739 fish from 34 stream populations in 8 states, there is no evidence of a subspecies of brook trout in the southeastern United States. Data from 11 meristic and 15 morphometric characters were used in the analysis.

A cluster analysis using selected data did not produce groups of geographically similar streams. Many geographically separated streams showed high indices of similarity. For example, the two samples from Utah (stocked) and the sample of native fish from WS clustered with fish from streams in the Smokies, VA, GA, and W VA.

The number of pyloric caeca was generally less in fish from GA, TN, NC, and the Smokies than in fish from PA, W VA, UT, and WS. Although there is a trend of southern fish to have fewer pyloric caeca than northern and western fish, this character can not be used for an accurate separation of fish between watersheds or populations.

## Summary

Based on a sample of 1204 fish from 35 separate populations in 9 states, there is no evidence of a subspecies of brook trout in the southeastern United States. From 16 enzymes examined, 29 genetic loci were identified and used for estimating genetic similarities.

There is no established index or criterion for identifying strains or races from electrophoretic data; therefore, this study could not specifically address the question of whether or not there is a "Southern Appalachian" strain of brook trout. It is possible that one or more strains are represented within the populations sampled, such as the fish from Rocky Fork Creek, Tennessee, those from the Smokies, and possibly others. Behavioral and physiological studies would need to be conducted to determine the existence of any strains or races.

Additional research is needed for better genetic understanding of the Rocky Fork Creek, Tennessee, population.

## Summary

Because brook trout scales are difficult to read, it is suggested that otoliths should be used in age and growth studies of this species. The technique developed is fairly simple, accurate, and requires little prior experience.

Based on all populations sampled, few brook trout survive beyond age III. The largest growth increment, 106 mm (range 78-132 mm), occurred during the first year of life. Other age class lengths were: age II, 133 mm (range 101-192 mm); age III, 163 mm (range 118-198 mm); age IV, 177 mm (range 135-232 mm); and age V, 186 mm (range 161-210 mm). Except for YOY fish, length at capture did not accurately reflect age in most streams due to considerable overlap of length ranges between consecutive ages. Males and females grew at approximately the same rate.

The location of a population within the brook trout distributional range could not be used as a criterion for predicting growth rate or maximum size. The most rapid growth was observed in populations from WI, VA, and GA, while the slowest growth was in populations from GSMNP, PA, and NC. YOY fish showed the greatest variation in length between populations. Populations with the fastest growing YOY fish also tended to have larger fish in the older age groups, but the differences were less pronounced for the older fish.

In general, sex ratios in the 32 populations were approximately equal. Some differences from a 1:1 ratio were seen in several GSMNP and W VA populations but neither sex consistently predominated over the other.

A need to manage each stream separately was indicated by significant growth differences between populations located in close proximity to each other.