

Native Brook Trout Restoration at Great Smokies

Distribution of native brook trout (*Salvelinus fontinalis*) in the Southeast has undergone major shrinkage since 1900 (Seehorn, 1978). One of the best documentations of this decline is in Great Smoky Mountains NP (GRSM), and an excellent, detailed report of attempts there to eradicate the non-native rainbow trout from native brook trout streams appears in the *Proceedings* of the Wild Trout IV Symposium held at Yellowstone NP Sept. 18-19, 1989.

The paper, by Stephen E. Moore and Gary L. Larson, describes how, prior to establishment of the park in 1936, the area was extensively logged and brook trout disappeared from downstream segments of many streams in logged watersheds (Powers 1929). Rainbow trout (*Oncorhynchus mykiss*) were introduced into these stream segments and into other streams inhabited by brook trout beginning about 1910

poorly understood, (Larson and Moore, 1985) the results of the extensive testing described in the article seem to demonstrate clearly that rainbow trout have a negative effect on native brook trout.

Initial restoration work by Moore et al. (1983, 1986) did not appear to eradicate rainbow trout. These results did show that the density of adult rainbow trout was reduced to less than 1/100 m² in one field trip (consisting of 3 electrofishing passes) in some streams, but additional effort was required in others. This variation in success was due to the complexity of the stream channels, which affected the efficiency of the electrofishing. Nonetheless, the results indicate the backpack electrofishing technique can be used to control density of rainbow trout. In fact, eradication is feasible in small streams.

Reclamation by electrofishing is labor-intensive and time-consuming (Moore et al. 1983). A 2-person crew expends about 1-person day fishing a 100-m section of stream 3 times. Use of large crews and multiple shocking units increases capture rate, but does not appear to reduce labor costs. (Larson et al. 1986).

The experience Moore and Larson report with the backpack electrofishing technique suggests that several precautions should be considered before undertaking a restoration project. First, streams must be on an appropriate size to make the effort worthwhile. If large streams are targeted for restoration then other techniques should be explored. Second, the project should be adequately funded because several years of effort may be required to control non-native fish populations. Third, the targeted restoration area should be upstream from a known barrier to fish immigration, otherwise non-native fish may immigrate upstream into the restored section.

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Vern Hippensteal's artwork, from *Protecting Biological Diversity in the National Parks* (see mention in *Southeast Regional Highlights*).

(King 1937). Park management later supplemented these stockings from rearing facilities in the park to provide recreational angling.

The general view was that brook trout would recover its former range as the forests recovered. But early work by King (1937) suggested that rainbow trout populations were expanding into brook trout waters, thereby further reducing the distribution of brook trout. Although surveys in the 1950s (Lennon 1967) did not show much change in brook trout distribution relative to King's initial observations, later surveys by Jones (1978) and Kelly et al. (1980) clearly demonstrated a substantial decline.

The gravity of the problem prompted NPS to initiate a series of studies between 1975 and 1981 to evaluate rainbow trout encroachment into brook trout streams and to determine the feasibility of eradicating rainbow trout from selected isolated streams, using the backpack electrofishing technique. Moore's and Larson's paper summarizes the results of these studies and reports on a recent investigation that evaluated success of the restoration program.

Although the encroachment process is difficult to document due to complex and dynamic abiotic and biotic interactions, and although the mechanisms are

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