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A NEW JOINT VENTURE ASPIRES TO SUSTAIN AND BUILD HEALTHY BROOK TROUT POPULATIONS, INCLUDING OUR OWN SOUTHERN APPALACHIAN STRAIN.

**B**rook trout, sometimes called specks, are the only trout native to the eastern United States, and can be found from the mountain streams of northern Georgia to the lakes of Maine. Although North Carolina is near the southern edge of the fish's range, our state boasts the largest number of brook trout populations remaining in the southeastern United States. For our purposes, a "population" of brook trout is a group of individuals that are reproductively isolated from other groups.

More than 500 such populations have been documented in western North Carolina. Many of these are the native Southern Appalachian-strain brook trout ("Tar Heel Treasure," July 2004) that have endured in North Carolina since the last ice age more than 10,000 years ago. To date, 133 distinct populations of Southern Appalachian brook trout have been found in all of the 14 major river drainages in western North Carolina. Southern Appalachian brook trout are also native to southern Virginia, Tennessee, Georgia and South Carolina.

This unique resource has been severely affected by human changes to the landscape. Most brook trout populations in North Carolina were lost near the turn of the 20th century as a result

## RETURN OF THE NATIVE?

of large-scale logging and land-clearing activities. These activities cleared the streams of trees, which warmed the water and introduced sediment that smothered the fragile brook trout eggs.

Also at this time, rainbow trout (from the western United States) and brown trout (from Europe) were introduced to restock the depleted streams. Today, agriculture, wide-scale residential development, commercial logging and road construction continue to have impacts on remaining brook trout populations. As a result, the fish are now found in less than 80 percent of their historic range in North Carolina.

Declining brook trout populations are not unique to North Carolina. Similar declines have been experienced in every state throughout the fish's eastern range. Agencies responsible for the protection of brook trout, including the N.C. Wildlife Resources Commission, realize that the disturbances from human activities likely will lead to further losses, unless significant conservation actions are undertaken on a range-wide scale.

Written by Doug Besler

The Southern Appalachian-strain brook trout is North Carolina's only native trout and is typically found only in small headwater streams.

In June 2004, representatives from more than 50 state and federal fish and wildlife management agencies, nongovernmental organizations and academia met to discuss the opportunity for a cooperative approach to the conservation of brook trout in the eastern United States. It was the group's consensus that there was an opportunity to form the Eastern Brook Trout Joint Venture (EBTJV, [www.easternbrooktrout.org](http://www.easternbrooktrout.org)) as a pilot project under the National Fish Habitat Action Plan ([www.fishhabitat.org](http://www.fishhabitat.org)).

### An Eastern Partnership

The goal of the EBTJV is to sustain healthy populations of brook trout that are capable of

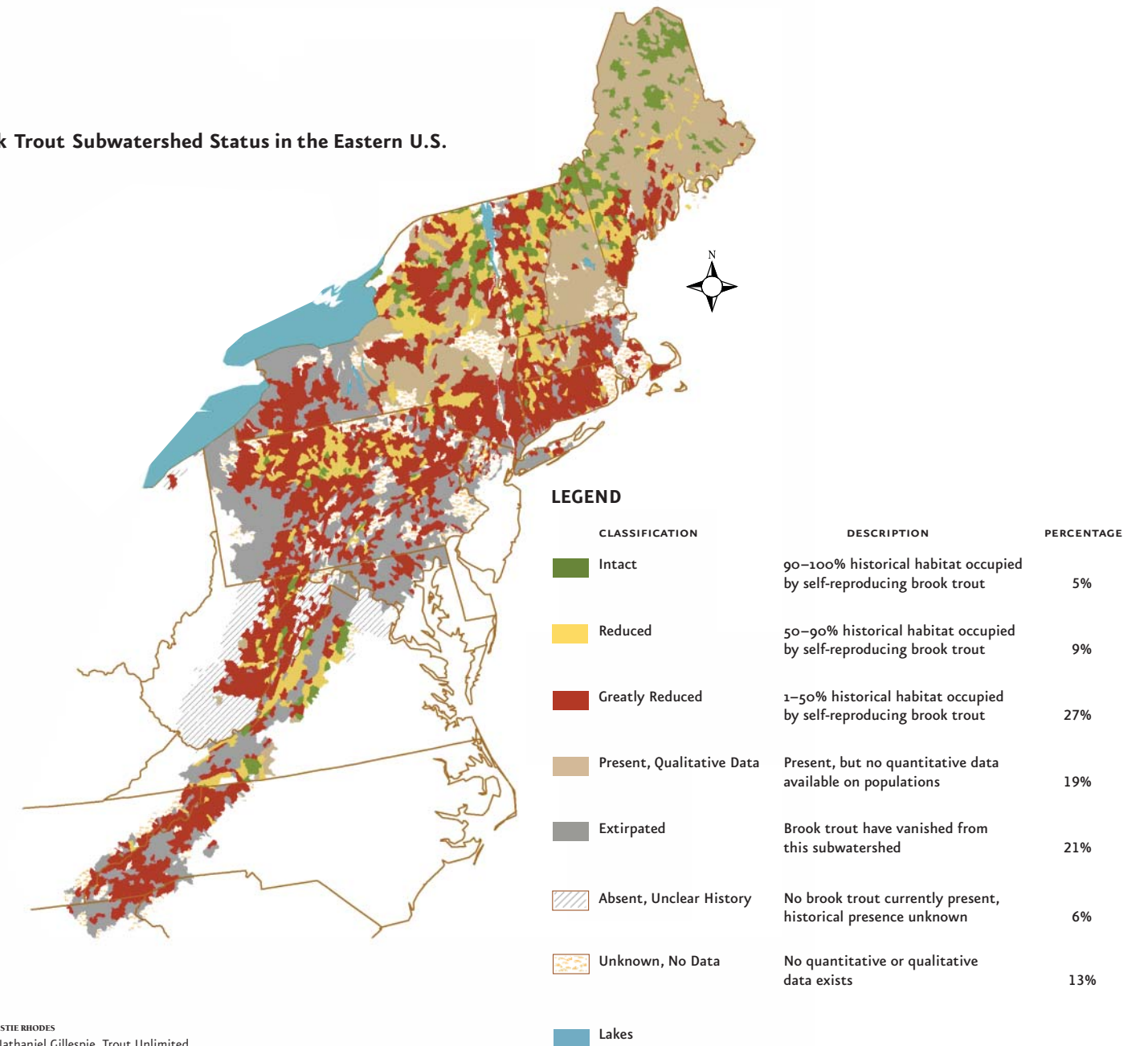
supporting angling. This partnership approach is justified because, as stated before, brook trout are declining across the eastern United States, and reasons for the declines are similar throughout the range. Populations of brook trout in many cases span state borders; as a result, various state and federal agencies have management responsibility for their well-being. It is our hope that this partnership approach will produce positive changes for brook trout that groups or agencies could not accomplish individually.

The first step in this partnership was to determine the status of brook trout populations across their eastern range, a task which had never before been attempted. This assessment systematically looked at the status and threats facing brook trout on a watershed-by-watershed and state-by-state basis. After 5,563 watersheds were examined, the assessment dramatically showed how many populations have been lost across their entire range.

Approximately 95 percent of the watersheds where brook trout historically thrived have been affected by humans to the extent that populations are now moderately or severely reduced. Most of the pristine brook trout habitat left in the eastern United States is located in the vast wilderness of Maine. In North Carolina, like most of the eastern United States, brook trout are now found only in small headwater streams where undisturbed forested habitat remains.

The EBTJV assessment also examined reasons for the decline of brook trout and found that the number one threat was poor land management associated with agriculture.

### Brook Trout Subwatershed Status in the Eastern U.S.



MAP BY KRISTIE RHODES  
Source: Nathaniel Gillespie, Trout Unlimited



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Practices such as clearing riparian areas of trees or allowing livestock unrestricted access to streams destabilize the stream bank, increase erosion and introduce sediment into the stream. In addition, introductions of non-native fish such as rainbow trout, which were stocked in large numbers in the southeastern United States beginning in the late 1800s, or smallmouth bass, which currently are being spread into brook trout lakes and rivers in the northeastern United States, were ranked as the top biological threat.

In North Carolina, commission biologists examined historic trout sampling records and current distribution data and concluded that brook trout no longer occur in 36 percent of the watersheds they formally occupied and are

severely reduced (by more than 50 percent) in most of the watersheds they currently inhabit. The majority of brook trout populations in North Carolina are now found in the Pisgah and Nantahala national forests and the Great Smoky Mountains National Park. Populations on these publicly owned lands are relatively stable because of their locations in protected forested watersheds. However, even these populations face environmental threats from acid rain, global climate change and competition from rainbow trout and brown trout that now occupy most of the brook trout's former range.

### The Private Lands Problem

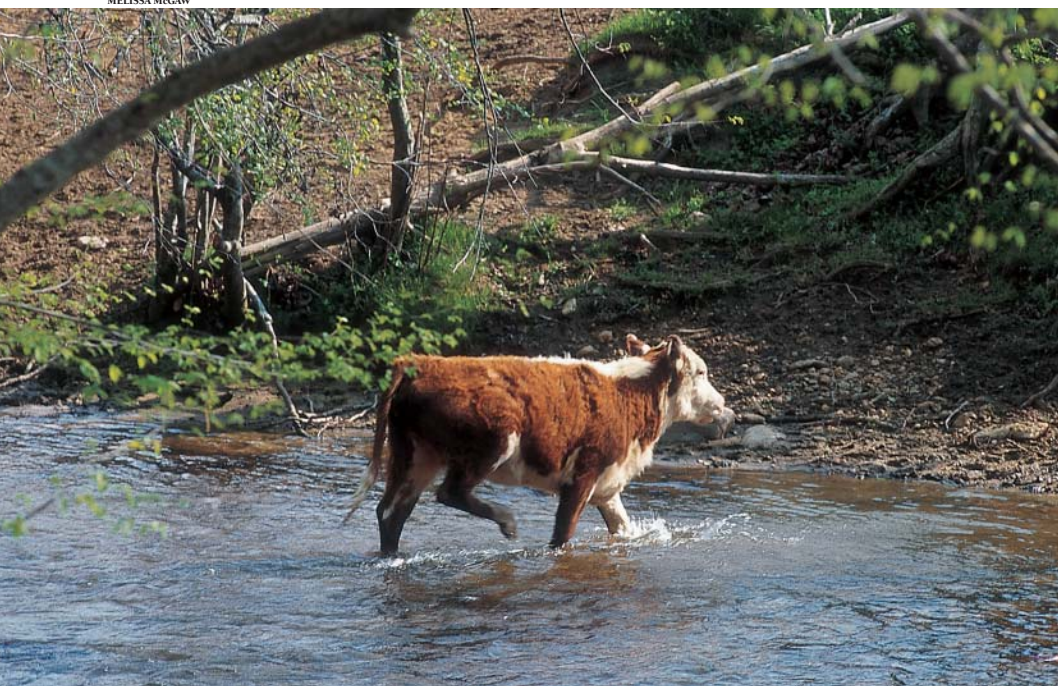
The distribution and status of brook trout

on private lands in North Carolina remain largely unknown. Populations on private lands face additional threats from agriculture, commercial logging, road construction and extensive residential development. Unfortunately, a significant number of these populations are being lost every year. Before we can begin to protect, enhance or restore brook trout in North Carolina, we must know their current distribution. It has been estimated that there are approximately 150 additional populations of brook trout located on private lands in North Carolina that have never been documented or genetically identified. It is our goal to complete this assessment and genetic work in the next five years. Landowners can assist the commission with this project by allowing

Poor land management practices associated with agriculture, such as letting cattle wander into streams, are the top threats to brook trout populations.



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biologists access to property so surveys can be completed.

Following the status assessment, the next task undertaken by the EBTJV was the development of range-wide, regional and statewide brook trout conservation strategies, which are designed to stem loss and facilitate recovery of the species. Range-wide strategies were developed for threats that are common among all states, such as acid rain or impacts from agriculture. Regional strategies are focused on issues that are important to unique ecological areas, such as acid mine drainage in the coal-producing region of the mid-Atlantic. Statewide strategies focus on threats and solutions that are locally important.

To that end, a brook trout conservation strategy for North Carolina was developed jointly by the commission, the U.S. Forest Service, the Blue Ridge Parkway, the Great Smoky Mountains National Park, Trout Unlimited and the Federation of Fly Fishers. This conservation plan lists goals and strategies deemed necessary to protect, enhance and restore populations of brook trout in North Carolina. Our state's conservation strategies are centered on six priorities: 1) brook trout population assessment; 2) stream habitat protection; 3) restoring brook trout populations and their habitat; 4) protecting brook trout genetic diversity; 5) providing educational outreach; and 6) creating recreational fishing opportunities. Several of these

priorities—assessment, habitat protection and protecting genetic diversity—are of immediate importance.

Ultimately, protecting brook trout habitat is the key to the perpetuation of the species. State agencies, such as the N.C. Department of Environment and Natural Resources, have authority to enforce current environmental laws and regulations that are designed to minimize human impact on brook trout and their habitats. Most environmental laws and regulations, however, apply only to specific areas (a large residential development) or situations (discharge from an industrial plant).

Sediment in streams is the single largest threat to water quality in North Carolina and is usually the reason brook trout populations are lost. Large-scale habitat protection, which stabilizes stream banks and reduces erosion, is significantly lacking on private land in most areas where brook trout are found. It is widely accepted in the scientific community that vegetated stream buffers are the most effective way to protect stream habitat and water quality. It is our goal to promote the establishment of vegetated stream buffers along all trout streams in North Carolina.

#### Cattle and Trout

Many low-tech solutions exist that can dramatically improve brook trout habitat and water quality. For example, one of the most effective strategies is to fence livestock from streams and allow the riparian areas to revegetate with trees. The National Resource Conservation Service offers federal cost-share programs to assist landowners with livestock fencing projects that protect stream habitat and still provide livestock access to water ([www.nrcs.usda.gov](http://www.nrcs.usda.gov)). Landowner support for environmental regulations, particularly in western North Carolina, can be difficult to obtain; therefore, support from the population at large, municipalities and legislators is critical. Part of the EBTJV goal is to establish and foster relationships with groups such as landowners, developers and municipal governments, which typically are not engaged with management agencies.

One way environmentally minded landowners can become involved in the EBTJV is by formally protecting brook trout streams or watersheds. A goal of the EBTJV is to educate and inform landowners about programs and opportunities available to them. Some of

these opportunities include conservation easements, access easements, state and federal conservation protection programs, and donating or selling land to conservation land trusts. Many of these programs offer financial or tax incentives to landowners. In addition, new programs must be initiated that take into account protecting brook trout habitat with the realization that development in the mountains of western North Carolina will continue.

One successful example is a large residential community (over 6,000 acres) that is currently being developed with a significant amount of the property (about 30 percent) in a conservation easement. Although the amount of property in the conservation easement is large, this developer realizes that the key to this “green” development is marketing the protection of the wild trout streams on the property. By working cooperatively with private consultants and the commission, the developer has agreed to allow limited public angler access to several miles of trout streams in the development, including two brook trout streams.

This type of development provides angler access to trout streams that would normally be available only to development property owners, provides the developer multiple marketing benefits and keeps the commission actively engaged in the management of the resource. As development in the mountains of western North Carolina is likely to increase, “green” developments represent an opportunity for successful partnerships between developers and resource protection agencies.

Southern Appalachian brook trout have become increasingly important since they were first recognized as the native brook trout strain in North Carolina in the 1990s. It is a goal of the EBTJV to conserve the genetic diversity of the remaining Southern Appalachian brook trout populations in North Carolina. The commission has stocked millions of rainbow, brown and brook trout (northern strain) in North Carolina streams since the 1940s and has no doubt contributed unintentionally to the decline of Southern Appalachian brook trout. New technologies, however, allow agencies the opportunity to continue to provide stocked trout fisheries for angler enjoyment while protecting wild populations of brook trout.

The commission is currently conducting research examining the feasibility of



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producing sterile trout that would be stocked in all Hatchery Supported and Delayed Harvest streams (approximately 750,000 trout per year). This would allow the commission to continue the long-standing tradition of providing stocked trout fisheries; however, this change would eliminate the chance that any stocked trout could reproduce in streams that contain Southern Appalachian brook trout. In addition, the commission now requires individuals to have permits to stock any public waters of North Carolina ([www.ncwildlife.org](http://www.ncwildlife.org)). This permit process will help ensure that the public will not unintentionally introduce non-native trout into brook trout streams. Landowners should consider stocking private ponds with sterile trout, which are now commercially available, to minimize impacts if those trout escape into nearby streams.

The human population in the eastern United States is likely to increase substantially in the next 50 years, and we can expect more disturbances to the landscape that will negatively affect brook trout populations. The future and success of the EBTJV are critically linked to the support it will receive from anglers, the public, municipalities and state and federal legislators. Whether you want to fish for Southern Appalachian brook trout, believe in the preservation of this unique species or demand clean water, brook trout should be important to you. ♦

*Doug Besler is the coldwater research coordinator for the N.C. Wildlife Resources Commission's Division of Inland Fisheries.*

Brook trout have inhabited North Carolina mountain streams since the last ice age more than 10,000 years ago.

ULTIMATELY, PROTECTING BROOK TROUT HABITAT IS THE KEY TO THE PERPETUATION OF THE SPECIES. STATE AGENCIES, SUCH AS THE N.C. DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, HAVE AUTHORITY TO ENFORCE CURRENT ENVIRONMENTAL LAWS AND REGULATIONS THAT ARE DESIGNED TO MINIMIZE HUMAN IMPACT ON BROOK TROUT AND THEIR HABITATS.