

# Eastern Brook Trout

# Species *in* PERIL

By Lisa Barno, Chief, Bureau of Freshwater Fisheries and Pat Hamilton, Principal Fisheries Biologist



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## HE BROOK TROUT,

our official state fish and the only trout species native to New Jersey waters, has the distinction of being a valued sport fish, an important water quality indicator, and is inextricably linked to our natural heritage. Their brilliant coloration and distinctive markings make them stand out among all other freshwater fishes.

Wild brook trout currently inhabit over 120 small streams cradled in the forested hills and mountains of north Jersey, and one stream in south Jersey. These wild populations are maintained through natural reproduction rather than by the stocking of hatchery-reared trout. The presence of naturally reproducing brook trout populations in the most densely populated, urbanized state in the nation may surprise those not familiar with New Jersey's diverse natural resources. Yet sadly, there are far fewer today than in the past. Until recently, the full extent of what has been lost, and more important—what is at risk—was not truly understood.

### Distribution and Decline

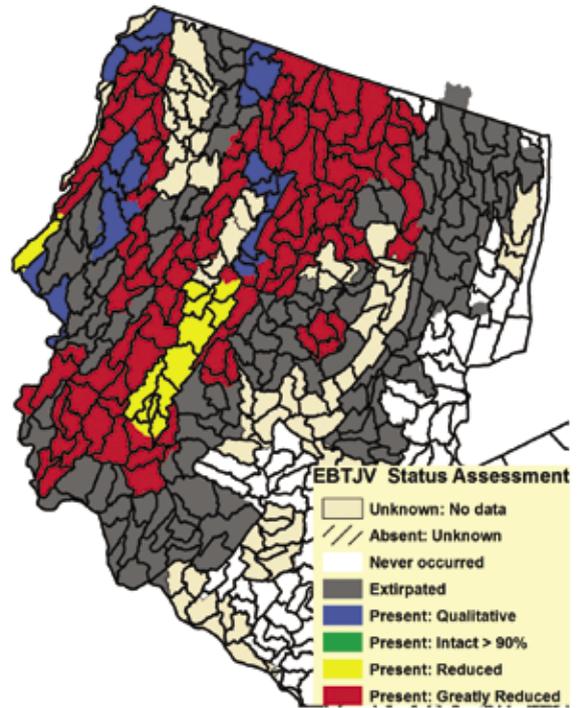
Once occupying almost 200 of the state's 900 subwatersheds, brook trout today survive here in less than half their original range<sup>1</sup>. Populations once abundant across the northern and central portions of the state have been reduced to small, fragmented remnants. Today, only one possibly-intact subwatershed remains where brook trout are believed still to occupy at least 90 percent of that

particular historical habitat. In another 18 percent of the subwatersheds, brook trout occupy less than 50 percent of their original habitat.

Perhaps most alarming is evidence that brook trout are completely extirpated from 94 subwatersheds in New Jersey, resulting in a loss of over 62 percent of its original range statewide. This is the largest loss recorded by any state within the brook trout's native range. An additional 76 New Jersey subwatersheds are classified as "Unknown" since brook trout are not present in these areas but their historic presence is uncertain.

Declining Eastern Brook Trout populations extend well beyond New Jersey. From Maine to Georgia, brook trout have completely vanished from more than 20 percent of their historic eastern range<sup>1</sup>. In 45 percent of subwatersheds where self-sustaining populations were present, brook trout occupy less than half of their historical habitat. The majority of historic, large-river brook trout populations no longer support self-sustaining populations. All lake populations have been eliminated save for a few strongholds in Maine. Currently, only five percent of the populations are considered to be intact throughout this trout's native range.

Brook Trout Distribution in New Jersey 2006



### Habitat Harbinger

The brook trout's decline goes well beyond the loss of a species. Brook trout are the pickiest when it comes to cold, clean water, and when it comes to habitat standards, they are elitists. Their tolerance for nothing but the best makes them a most valued indicator species. Declining brook trout populations serve as a warning that the entire ecosystem's health is at risk.

*(Continued on page 8)*

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Brook Trout Classifications	Number of Subwatersheds	Percentage of Subwatersheds
Intact (> 90% habitat occupied)	1	< 1 %
Reduced (50 – 90 % habitat occupied)	14	6 %
Greatly Reduced (< 50 % occupied)	44	18 %
Present, Qualitative data	19	9 %
Extirpated	94	38 %
Absent, Unclear history	76	30 %

## Eastern Brook Trout

### Native Brook Trout Genetics

It was feared that New Jersey's genetically-unique wild brook trout populations were irretrievably lost through interbreeding with hatchery-reared brook trout, whose genetic origin differs from our native fish. A recently-completed study, by Pat Hamilton, examined the genetics of a subset of New Jersey's brook trout using 13 microsatellite markers developed by Dr. Tim King of the U.S. Geological Survey Leetown Science Center in West Virginia. Twenty-two wild brook trout populations inhabiting headwater streams in four major river drainages – plus one hatchery population – were surveyed.

This study revealed that New Jersey's wild populations have unique genetic identities. Even more exciting is convincing evidence that some Garden State brook

trout populations are descendants from the original brook trout colonizers present after the last glacial ice sheet receded more than 10,000 years ago. The existence of these ancestral populations, dubbed heritage brook trout, is important for conservation efforts of this native species.

### Unique Legacy

Heritage brook trout populations were found in five of eight streams within the Passaic River watershed (the Preakness, Burnt Meadow, Havemeyer, Hibernia brooks and a tributary of Crooked Brook) plus six of seven streams in the Raritan River watershed (Flanders Brook, Krueger's Creek, Turkey Brook, a S/Br. Raritan River tributary, Hacklebarney Brook, and Oakdale Creek). The ancestry of brook trout from other streams in the Delaware River watershed (including Mason's Run in south Jersey) and

one stream in the Hudson River watershed was not as conclusive. One stream from the Passaic River watershed, Cooley's Brook, showed evidence of interbreeding with a non-native brook trout strain. Heritage brook trout represent an irreplaceable part of the natural resources in New Jersey and documentation of their presence is invaluable to Fish and Wildlife's efforts to conserve and manage this precious natural resource.

### Commitment to Restore

Documenting the status of brook trout in New Jersey and throughout the northeast was a result of the formation of the Eastern Brook Trout Joint Venture (EBTJV) in 2004. The EBTJV is a concerted effort among state and federal fish and wildlife agencies, conservation organizations and academic institutions with the goal to halt the brook trout's decline and restore fishable



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populations. The EBTJV is a geographically-focused, locally-driven, and scientifically-based effort to assess, protect, restore and enhance aquatic habitat throughout the range of the Eastern Brook Trout.

In the first 18 months after its formation, EBTJV partners completed a 16-state brook trout status assessment encompassing the entire historic eastern range. This huge, collaborative effort evaluated decades of data collected by state fish and wildlife agencies from which the partners developed a range-wide assessment of brook trout populations<sup>1</sup>. For many states, this is the first solid documentation of the brook trout populations' alarming decline.

(Continued on page 10)

### Key Findings from the Distribution, Status and Perturbations to Brook Trout Within the Eastern United States<sup>1</sup>

- ❏ Intact stream populations of brook trout (where wild brook trout occupy 90–100 percent of their historical habitat) exist in only five percent of subwatersheds.
- ❏ Wild stream populations of brook trout have vanished or are greatly reduced in nearly half of subwatersheds.
- ❏ The vast majority of historically-occupied large rivers no longer support self-reproducing populations of brook trout.
- ❏ Brook trout survive almost exclusively as fragmented populations relegated to the extreme headwaters of streams.
- ❏ Non-native fish rank as the largest biological threat to brook trout.

<sup>1</sup>2005 Hudy, Thieling, Gillespie, and Smith. Distribution, Status and Perturbations to Brook trout within the eastern United States. Final Report: *Eastern Brook Trout Joint Venture*



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# Eastern Brook Trout

## Stress Effects

The assessment identified key stressors likely to have played a role in this species' decline. At the subwatershed level, biologists identified high water temperature, poor agricultural land management, urbanization (including sedimentation from roads and inundation from dams) with resulting stream fragmentation, exotic species (especially exotic trout species) and poor riparian habitat management as top reasons for the loss of self-sustaining brook trout populations. Watersheds surrounded by land with greater than 18 percent disturbance from human usage usually can no longer support wild brook trout.<sup>1</sup>

## Work in Progress

The EBTJV continues its mission to protect and restore brook trout via the completion of a range-wide conservation strategy. Funding is sourced for restoration projects to return brook trout to their native waters. Public outreach increases awareness of the brook trout's dilemma. Additional information and updates on the Venture's work are available at [www.EasternBrookTrout.org](http://www.EasternBrookTrout.org)

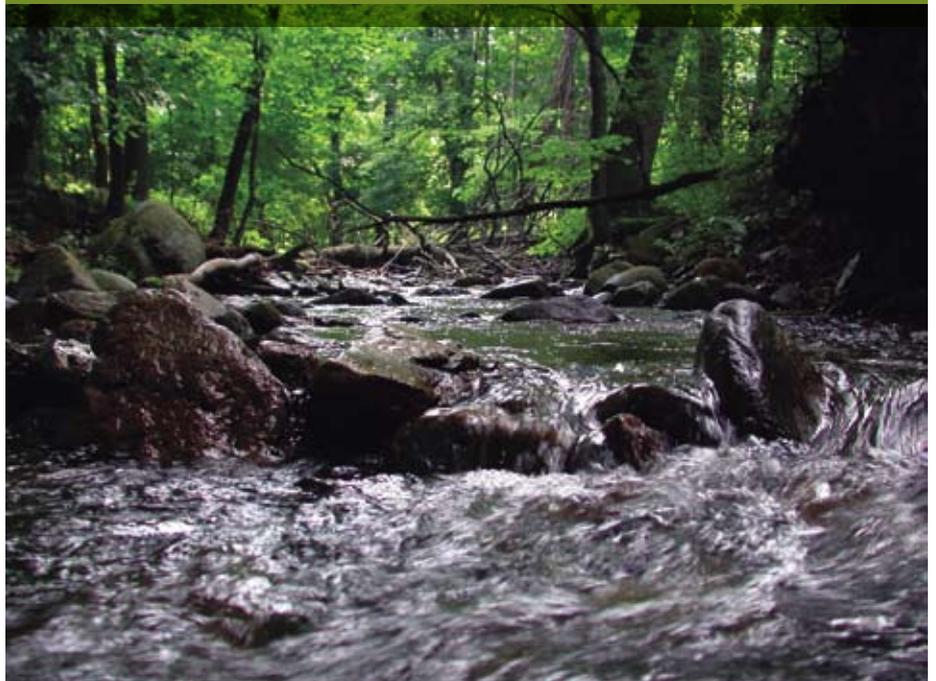
The brook trout's role as an indicator species of a healthy ecosystem is perhaps the most important reason for concern about this species' long-term survival. The brook trout's decline reveals the price we pay for unwise management of our watersheds and the failure to protect vital riparian corridors. Restoring brook trout populations will require a concerted effort among anglers, landowners, watershed organizations, plus local, state and federal governments. The brook trout's long-term survival depends on each and every one of us. 

## The Eastern Brook Trout Joint Venture:<sup>1</sup>

- ❧ Fish and Wildlife agencies from 17 states
- ❧ Federal support from U.S. Geological Survey, U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service and Office of Surface Mining
- ❧ Conservation Organizations including Association of Fish and Wildlife Agencies, Trout Unlimited, Izaak Walton League of America, Trust for Public Land and the Nature Conservancy
- ❧ Academic institutions including Conservation Management Institute at Virginia Tech and James Madison University
- ❧ The nation's first pilot project under the National Fish Habitat Initiative ([www.fishhabitat.org](http://www.fishhabitat.org)).

<sup>1</sup>2005 Hudy, Thieling, Gillespie, and Smith. Distribution, Status and Perturbations to Brook trout within the eastern United States. Final Report: *Eastern Brook Trout Joint Venture*

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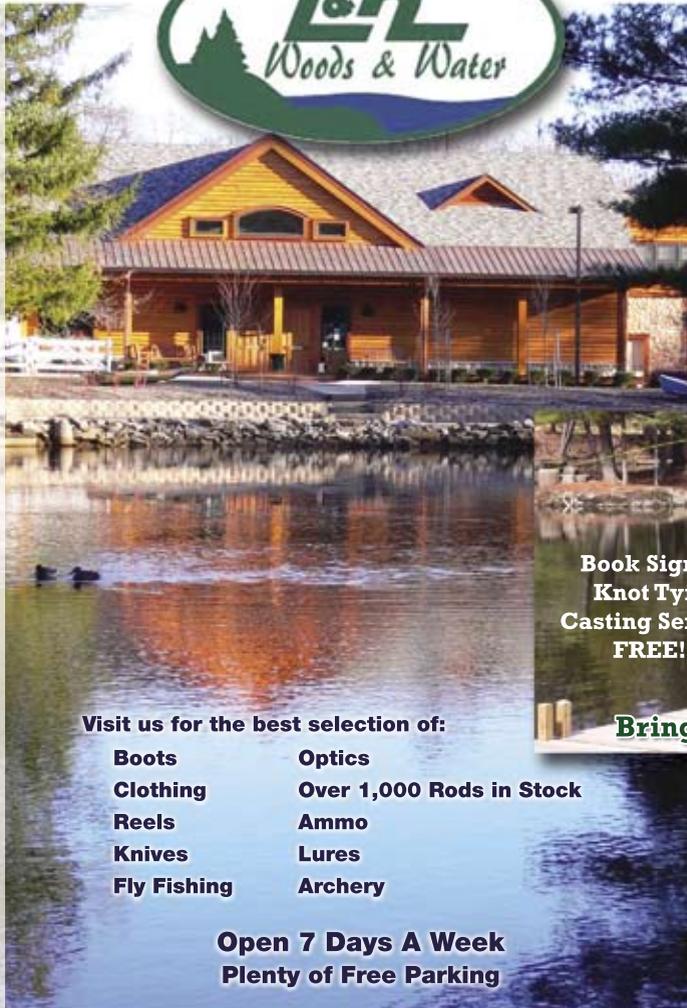


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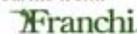
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