

Northeast

Species Summaries

LISTING STATUS: red (ESA listed as Threatened or Endangered), yellow (not ESA listed but federal sensitive species or state species of concern (majority of states), green (not listed in majority of states)

CURRENT RANGE: red (10 percent or less), yellow (11 -25 percent), green (>25 percent)

HISTORICAL RANGE: red (<1,000 miles), yellow (1,000-10,000 miles), green (>10,000 miles)



Brook Trout (Northeast)

Category	Status	Explanation
Listing status	Green	Species of Special Concern (NJ)
Current range	Green	Northeast is stronghold of current distribution
Historical range	Green	Widely distributed historically in the region, over 58 million acres
Climate change	Yellow	Warmer temperatures and increased flooding in streams may influence populations
Energy development	Green	Not much threat from proposed development
Non-native species	Yellow	Naturalized populations are spreading and bait-bucket introductions continue to occur
Water demand	Yellow	Hydropower and dams inhibit salter life history
Data issues	Yellow	Some uncertainty due to many unsampled waters, and much uncertainty on salter brook trout distribution

Sunapee Trout\Blueback Char

Category	Status	Explanation
Listing status	Yellow	Species of Concern (NH, VT, ME)
Current range	Red	Occupies only about 14 lakes and ponds
Historical range	Red	Historical distribution in US is small and sporadic
Climate change	Yellow	Warmer lake temperatures may render some occupied lakes unsuitable
Energy development	Green	Not much threat from proposed development
Non-native species	Red	Non-native lake trout, Atlantic salmon, and smelt
Water demand	Green	Not much of a threat
Data issues	Green	Good information about limited distributions

Lake Trout

Category	Status	Explanation
Listing status	Green	Not listed
Current range	Yellow	Has been widely stocked in the northeast for sportfishing
Historical range	Green	Great Lakes basin, and somewhat uncertain distribution in the northeast due to early, undocumented stockings. Native to a few glacial refugia lakes in Montana
Climate change	Yellow	Warmer lake temperature may render some lakes unsuitable, in some cases due to temperature interactions with nutrients
Energy development	Green	No known threats
Non-native species	Red	Atlantic salmon, smelt and other introduced fishes
Water demand	Green	Many lake trout lakes have water control structures
Data issues	Green	Most populations have good monitoring data

Brook Trout (*Salvelinus fontinalis*)

The brook trout is a char native to north-eastern North America from the Canadian Maritimes to northern Labrador and Quebec, including Ungava and Hudson Bays. In addition to the Great Lakes and Driftless Area, the native distribution of brook trout in the United States occurs from Maine south down the Appalachian Mountains to northern Georgia. Brook trout populations in the northeast most commonly inhabit streams and ponds. However, populations with access to the sea can exhibit anadromy whereby some individuals, often called “salters” or “sea-run” brook trout, migrate to estuaries (or open ocean) to feed during late-spring to early summer. During the 1800s, exclusive fishing clubs were established on famous salter streams. The Monument and Mashpee rivers in Massachusetts and the Carmans and Connetquot rivers in New York all hosted clubs whose members were among the nation’s wealthiest and most influential people. The legendary “world record” brook trout was almost certainly an anadromous individual caught by the leading American statesman Daniel Webster in 1827 on Long Island’s Carmans River.

Brook trout in the northeast generally are faring better than their brethren to the south, but they have still declined (1). Anthropogenic land uses have resulted

in stream warming and deteriorated habitat, causing population declines. Population fragmentation due to [road culverts](#) and other barriers has likely caused local extirpations (2). Given the need to move between fresh and salt water, the construction of dams, road crossings and other impassable anthropogenic structures likely had a disproportionate effect on the decline of salter brook trout, where they are only known to occupy a fraction of their historical habitat (3). For example, in Maine the access to riverine habitat by river herring is only 20 percent of historical levels because of dams, many of which were built on coastal streams used also by salters. Competition with and predation by non-native fishes have also been cited as reasons for declines. Lastly, because brook trout can obtain larger sizes due to the prey resources in saltwater environments, anadromous brook trout have been harvested for both subsistence and sport since European colonization.

Sunapee Trout/Blueback Char (*Salvelinus alpinus oquassa*)

The [Sunapee trout](#) (sometimes called silver char) and blueback char (often called blueback trout) are two forms of the same subspecies of Arctic char that historically occurred in Maine, Vermont and New Hampshire. They were once

thought to be two separate subspecies. The Sunapee trout has been extirpated from Vermont and New Hampshire, including from Sunapee Lake – its namesake. The blueback char now occurs in about 10 lakes in Maine (4). Blueback char were a main prey species of brook trout in the Rangeley Lakes (headwaters of the Androscoggin River), comprising a unique predator-prey relationship between those two salmonids. However, bluebacks were extirpated from the Rangeley Lakes in the early 1900s. Like most Arctic char, the Sunapee trout and blueback char primarily occupy deep cold lakes and ponds and have been occasionally reported from saltwater. Maine contains the southern-most distribution of this Arctic char subspecies, but it has been stocked outside its native waters, including in Idaho (5).

The Sunapee trout and blueback char in the northeastern US have been most impacted by non-native species introductions. The Sunapee trout was extirpated from Sunapee Lake in the early 1950s after lake trout were introduced, leading to hybridization. The blueback char was extirpated from the Rangeley Lakes (around 1900) after landlocked Atlantic salmon and rainbow smelt were introduced. Because the subspecies requires cold water in deep lakes, pollution of some lakes led to oxygen depletion and

extirpations there. Overfishing was also a problem in some lakes after fishing techniques became more efficient (e.g., use of gill nets). Recent efforts have been made in Maine to re-establish populations of Sunapee trout and blueback char, where non-native lake trout and smelt have been eradicated.

Lake Trout (*Salvelinus namaycush*)

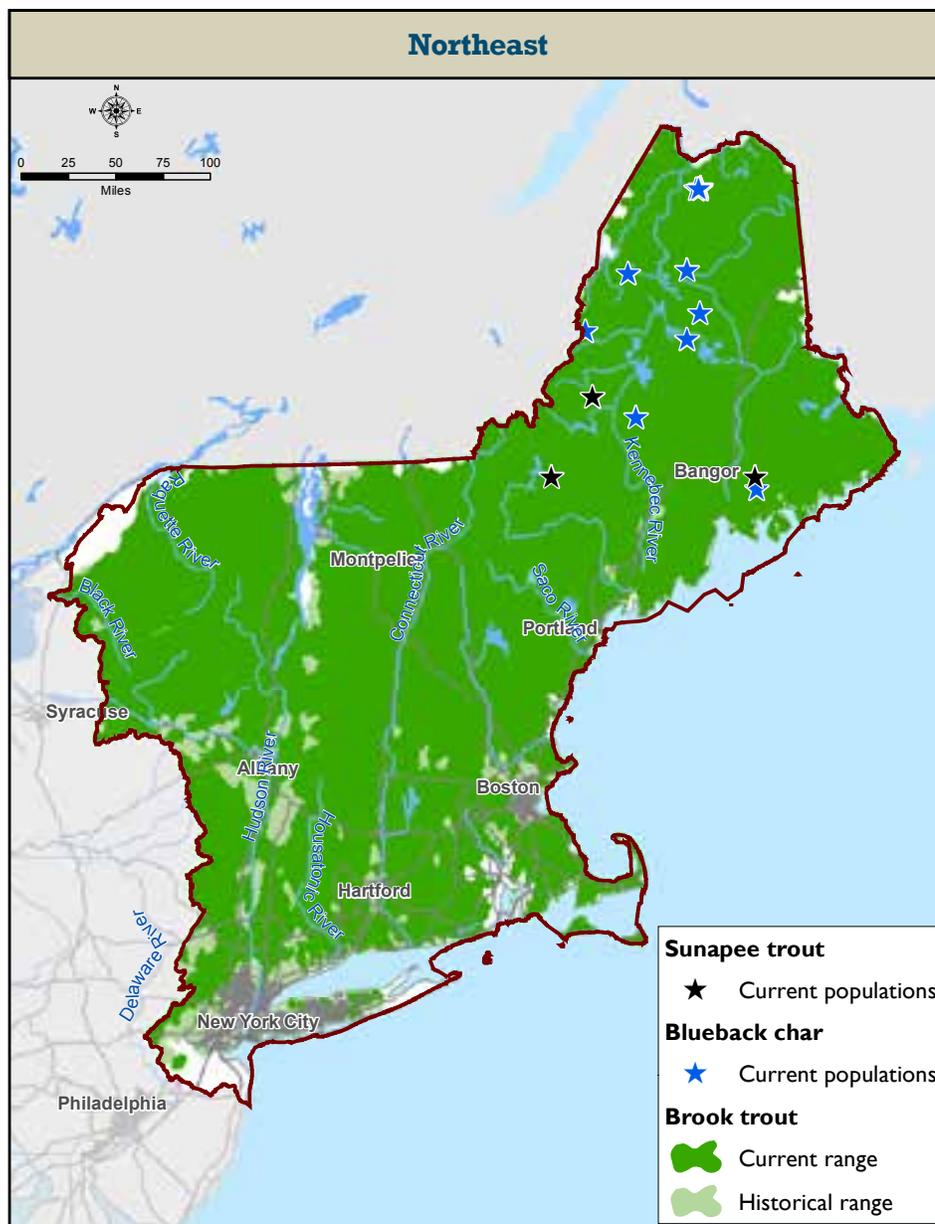
While primarily restricted to the Great Lakes basin (but also Montana), lake trout are native to some parts of New England as well (~100 lakes in Maine)(6). Because they are an excellent food fish and attain large sizes, lake trout have always been a popular sport fish. They have been cultured and

introduced widely where suitable habitat (cold, deep lakes) exists. Many earlier introductions around the turn of the 19th Century went undocumented and so native distribution of the species in the Northeast is not known precisely (6). Protection of spawning areas, fishing regulations and control of illegal introductions of fishes are a primary management strategy used to preserve known native stocks of lake trout in the Northeast.

Regional Trends

Relative to other regions in the United States, the Northeast is blessed with water. But some populations and species of coldwater fishes are nonetheless threatened.

One of the biggest threats to native trout in the Northeast is the introduction and spread of non-native species. Historical fisheries management was often focused on diversifying fishing opportunities for anglers, resulting in the introduction of various species from other regions in the United States and across the world.



Historical and current distributions of native trout and char in the Northeast Region.

One of the biggest threats to native trout in the Northeast is the introduction and spread of non-native species. Historical fisheries management was often focused on diversifying fishing opportunities for anglers, resulting in the introduction of various species from other regions in the United States and across the world. While some of these introductions were deliberate, other introductions have been unintentional. For example, the use of baitfish has led to the transfer of species across drainage basins, because bait fish that are collected from one drainage are often used by anglers in a different drainage; this becomes problematic when anglers dump their bait after fishing. In addition, baitfish have also been unintentionally introduced with stocking of other sportfishes (baitfish regulations are being implemented in some states to curb the further spread of non-natives). Still other introductions of non-native species have been by anglers intending to create their own fishery. By way of these mechanisms, non-native [yellow perch](#), [white perch](#), [chain pickerel](#), [northern pike](#), [muskellunge](#), [smallmouth bass](#), [largemouth bass](#) and brown trout populations now compete with or prey on native brook trout. Introductions of landlocked [Atlantic salmon](#) and [rainbow smelt](#) have led to the demise of some Sunapee and blueback populations. Even lake trout have been impacted by non-native species introductions. The presence of introduced species also prohibits reintroduction of natives like blueback char unless expensive chemical

treatments (e.g., rotenone) are used to eliminate non-native fishes.

Human population growth will continue to threaten fishes in the Northeast. Species like brook trout have already been shown to be very unlikely to inhabit watersheds with greater than 20 percent urban land cover (7). The world population is expected to reach 9.6 billion by 2050 and the US population is expected to reach 400 million by this date. This population growth will lead to increased urbanization of watersheds to the detriment of coldwater fishes. While major strides have been made in improving water quality in urbanized watersheds, increased human development will still cause water quality issues in some places. For example, the [Carmans River](#) on Long Island has seen a continual rise in nitrate levels that now exceed water quality criteria. Similarly, in coldwater lakes pollutants can lead to anoxic conditions near lake bottoms – the haunts of many lake trout populations.

As in all other regions, climate change is expected to impact aquatic systems in the Northeast. Rising temperatures will shrink coldwater habitat occupied by stream-dwelling brook trout and warm some lakes and ponds rendering them unsuitable for brook trout, Sunapee trout, blueback char and lake trout. As habitat shrinks, populations will become fragmented. But climate change is also expected to bring more frequent, high-intensity precipitation that will lead to increased flooding (although precipitation projections are less certain than temperature projections). Increased flooding can lead to increased channel scour and sediment delivery into stream channels (8). These increased storm intensities have also influenced infrastructure such as road culverts that often are incapable of passing large floods. Luckily, flooding over the last five years caused by events such as Hurricane Irene have prompted municipalities to initiate programs to evaluate culverts and bridges for their capacity to pass large floods and to update or replace them. These efforts will improve fish passage and aquatic connectivity and should benefit native trout.

SUCCESS STORY:

Red Brook – A History of Salter Brook Trout Restoration

Streams and rivers on Cape Cod, Massachusetts, historically harbored anadromous brook trout fisheries upon which exclusive fishing clubs were established in the 1800s. However, by the mid-19th Century, industrialization had resulted in dammed and degraded streams and the decline of brook trout. This prompted the establishment of a fisheries commission (now MassWildlife) to address declines in anadromous fisheries, including the famed salter brook trout fisheries. Commissioner Theodore Lyman purchased land on Red Brook, where he proceeded to protect the stream and its anadromous brook trout. By the 1970s the Lyman family had acquired almost 640 acres along 75 percent of Red Brook proper.

In 1988, a Red Brook Trust was established that eventually deeded the Lyman properties to Trout Unlimited, who then began restoring Red Brook's habitat and salter brook trout. In 2001, an agreement signed by Trout Unlimited, The Trustees of Reservations and MassWildlife set up joint management of the former Lyman properties (now Theodore Lyman Reserve and Red Brook WMA) with a focus on salter brook trout restoration. To date, Red Brook restoration has included fish passage and dam removal projects, cranberry bog restoration, vegetation rehabilitation, instream habitat enhancements and streambank restoration. Research and monitoring has also helped to understand brook trout genetics and trout movements in Red Brook, including the documentation of anadromous behavior. Red Brook represents a proven, multifaceted approach to salter brook trout restoration that integrates land protection, restoration, research, monitoring and strong partnerships, an approach that should provide a useful template for salter brook trout restoration in coastal streams from Maine to Long Island, New York.

Ron Merly and a salter brook trout.
Photo: Nutmeg TU.



Red Brook restoration.

SUCCESS STORY:

Nash Stream – A Multi-Faceted, Watershed Scale Restoration Effort

BY JAMES MACCARTNEY, TROUT UNLIMITED

The Nash Stream Restoration Project is a collaborative, multi-year effort initiated in 2005 to restore river processes and improve habitat quality, habitat connectivity and ecosystem health to benefit native brook trout, Atlantic salmon, and other fishes. What triggered this restoration effort was a catastrophic dam failure that altered the stream channel and damaged fish habitat. To date, seven road culverts have been replaced with natural-bottom structures that span the stream channel. Three culverts have been removed entirely and their roads have been decommissioned. These culvert remediation projects reconnected tens of miles of previously inaccessible habitat for native

fish species and other aquatic organisms. Over five miles of mainstem habitat on Nash Stream were also restored and large wood replenishment was conducted on two perennial tributaries to Nash Stream. This restoration project is one of the largest in the Northeast and Nash Stream was recently named one of the “Waters to Watch” by the National Fish Habitat Partnership.

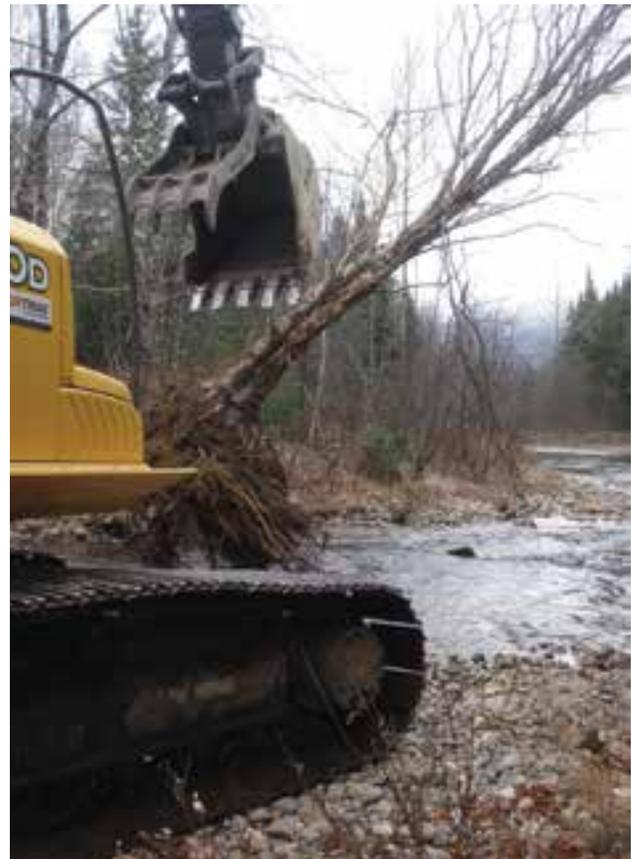
Has all of this reconnection and restoration work improved fishing opportunities in Nash Stream? Fish survey data collected by New Hampshire Fish and Game Department indicate that the work in Nash Stream and its tributaries is having a dramatic and beneficial effect on the native fish community; both

fish abundance and age class diversity are improved where restoration work has been completed. Emerson Brook, a tributary to Nash Stream, has been the focus of instream wood restoration and now has six times the number of brook trout compared to streams where no restoration has been done.

So, what’s next? Over the next two years, the project will restore riverine processes and habitat on 2.4 additional miles of the Nash Stream mainstem. Wood will be added to nine tributaries and two problem culverts will be replaced. The project ultimately will restore over nine miles of mainstem and three miles of tributary habitat and reconnect over six miles of tributaries.



Long Mountain Brook culvert replacement. Photo: J. MacCartney



Nash Stream wood replenishment. Photo: J. MacCartney