

## MASSACHUSETTS/RHODE ISLAND TU AND THE SEA-RUN BROOK TROUT INITIATIVE



How many people know that there are wild brook trout in southeastern Massachusetts, or know that they may be passing over a brook trout stream on their way to and from work? Most of the people from the South Shore suburbs of Boston, or Cape Cod, or those living in the South Coast cities of Fall River and

New Bedford would be surprised to learn that southeastern Massachusetts was once a popular trout fishing destination. During the 19<sup>th</sup> Century, anglers traveled to Massachusetts from as far off as New York, Philadelphia and Washington D.C. to fish for our native brook trout.

### America's First Sport Fishery

The most sought after brook trout were the trout that lived in coastal streams. These trout spend part of each year in saltwater and are known as **sea-run brook trout or salters**. Prized for their flavor, size and strength, salter brook trout became the focus of America's first sport fishery. During the 1800's, exclusive fishing clubs had sprung up on the more famous of the Massachusetts salter streams. The Agawam River, Monument River, and the Mashpee River all hosted clubs whose members were among the Nation's wealthiest and most influential people.

The "glory Days" of America's first sport fishery were short lived. By the mid-nineteenth Century, coastal Massachusetts was becoming an industrial juggernaut, a process that greatly accelerated to meet the needs of the Union Army during the Civil War. The state's rivers increasingly became regarded as valuable sources of power... at great cost to anadromous fisheries. By the end of the Civil War, many of the wealthy anglers were abandoning our salter streams to follow their angling version of Manifest Destiny (and the brook trout) west to New York's Catskills and

Adirondacks, or they ventured north to the lakes and rivers of the Maine Woods.

### **Theodore Lyman**

By 1867 the severe declines in its anadromous fisheries prompted Massachusetts to appoint a three man Fisheries Commission. Today, the 1867 Fisheries Commission is credited as being the forerunner of the modern Massachusetts fish and wildlife agency, MassWildlife.



One of the Commissioners, Theodore Lyman, undertook a study of the salter streams of Wareham and Plymouth. A Harvard trained biologist, Lyman, quickly ascertained the causes for the declines in

salter brook trout runs. Dams were one cause, and Lyman worked to force dam owners to install fish passage devices. Another cause was the burgeoning growth in cranberry agriculture. Cranberry farmers were reducing many trout streams to irrigation ditches. Given the attitudes of the time, there was little that Lyman could do to stop the cranberry growers, but if he could not save the streams he could try to save the trout.

### **Massachusetts First Trout Hatchery**

With the help of his friend, Samuel Tisdale, Lyman began building the state's first fish hatchery at Maple Springs, a small stream on Tisdale's property in Wareham. While searching for suitable brood stock for the new hatchery, Samuel Tisdale took Lyman to one of the region's better salter streams, Red Brook. Lyman was so smitten by the small, spring fed brook with its fat, salter brook trout, that he soon after bought a house and land alongside Red Brook's salt marsh. In the process he generated a passion for protecting Red Brook that was passed on to successive generations of the Lyman family. The Maple Springs hatchery would soon burn in one of the frequent conflagrations that periodically ravaged (and rejuvenated) the region's pitch pine forest, but, thanks to Theodore Lyman, Red Brook's trout would continue to survive in their natal stream. By the 1970's the Lymans had acquired 638 acres along Red Brook, land holdings that protected almost three quarters of the stream's 4.5 mile length.

### **The Long Decline**

By the middle of the 20<sup>th</sup> Century, it was becoming obvious that the science of fish culture could not save or re-establish salter brook trout runs in Massachusetts. Brook trout eggs from Cape Cod's most renowned stream, the Mashpee River, were frequently used to rejuvenate the domestic brook trout of the state hatchery in Sandwich, but it soon became apparent that hatchery rearing very quickly eliminated the wild traits that governed sea-run brook trout behavior and survival. Theories were concocted to explain the seaward migrations of salter brook trout. Chief among them was that salter streams became overcrowded with brook trout forcing seaward migration - but when thousands of hatchery brook trout were placed in the Quashnet River, their movements were random, and they failed to survive.

The decline in salter runs in Massachusetts was very clearly, as Theodore Lyman had observed in 1867, directly connected to the loss of trout supporting stream habitat. In several cases, such as the Monument River, which became the Cape Cod Canal, the stream itself was lost to "progress".

### **The Lymans and Red Brook**

By 1954 the native brook trout population in Red Brook had declined to such an extent that the Lymans (Theodore Lyman's grandsons, Charles and Henry) had begun stocking the stream with hatchery reared trout to provide fishing for themselves and their friends. Writing in the Lyman fishing journal, Charles Lyman cited the use of DDT as a cause for the precipitous drop in native trout numbers. But the Lyman Journal, a document spanning over 100 years at Red Brook, also shows that the number of salters being caught began to drop in the 1930's, beginning a downward trend that continued into the 1990's.

In 1985 Henry and Charles Lyman asked Dwight Webster of Cornell University to assess Red Brook and make recommendations. Webster listed sedimentation as one of Red Brook's biggest problems.





## TU at Red Brook

In 1988, Henry and Charles Lyman began discussing the restoration of Red Brook with Francis Smith, the Chairman of the MA/RI Council of Trout Unlimited. Smith's and Trout Unlimited's success at restoring brook trout by



improving habitat on a long stretch of the Quashnet River, helped to convince the Lymans that TU was a good choice for carrying on their stewardship of Red Brook. An agreement between TU and the Lyman's Red Brook Trust was brokered by a young environmental lawyer, Charles Gauvin, who was then working pro bono for TU. The agreement would, over time, deed the 638 acre Red Brook property to Trout Unlimited.

Beginning in 1990, TU members undertook a series of projects on Red Brook directed at stream bank stabilization and sediment control. By 1993 the MA/RI Council of TU had established a **Red Brook Fund**,

appointed a **Red Brook Project Director**, and held the first **Red Brook Family Day** fundraiser at Red Brook. A 1996 electro-fishing survey of a stretch of Red Brook by MassWildlife fisheries biologist, Steve Hurley, captured 84 brook trout. Many of the trout were young of the year, proof that brook trout were successfully reproducing in Red Brook. At the request of Hurley and TU members, Henry Lyman ended the practice of stocking Red Brook with domestic brook trout.

By 1999, Charles Gauvin, now President and CEO of Trout Unlimited, had decided that property management on the scale required by Red Brook would distract the MA/RI Council of TU from its primary mission of coldwater fisheries conservation. As a result, Gauvin and Henry Lyman contacted a well known Massachusetts land trust, **The Trustees of Reservations**, to see if they would be interested in the Red Brook property. The Trustees proposed that the Red Brook Trust land be divided into the 210 acre **Theodore Lyman Reserve** to be owned by the Trustees and a 428

acre **Red Brook Wildlife Management Area** owned by MassWildlife. In 2001 a **Memorandum of Agreement** signed by TU, TTOR and MassWildlife set up joint management of the Lyman Reserve by the three parties with a special emphasis on the restoration of Red Brook's salter brook trout.

### **Salter Genetics**

In 2005 the results of a genetic study of the brook trout of five salter streams was published by TU member and fisheries biologist, Brendan Annett. In many respects, Brendan's study was a cooperative effort involving MassWildlife's Steve Hurley and TU volunteers. The study had been partially funded by a TU Embrace-A-Stream grant and donations from TU chapters from across Massachusetts and Rhode Island. TU members and Steve Hurley helped Brendan collect samples. One of the streams in the study was Red Brook. Three of the other study streams were on Cape Cod, and one stream was on Long Island, N.Y. What the study revealed was of vital importance for salter brook trout restoration. The study showed that the trout population of each stream was **genetically unique** to its stream and readily identifiable from the trout of the other streams, even when the streams were in close proximity to each other.



Even more surprising, the trout in the study were distinct genetically from domestic brook trout, though thousands of hatchery trout had, in the past, been stocked into some of the streams. The message was clear: salter brook trout populations in the southern part of their range are **stream specific**, genetically unique fish that, in all likelihood, cannot be replaced. Brendan Annett's

findings have given a new urgency to Trout Unlimited's effort to preserve and restore salter brook trout populations, not just in Massachusetts, but throughout their range.

## The Restoration of Red Brook

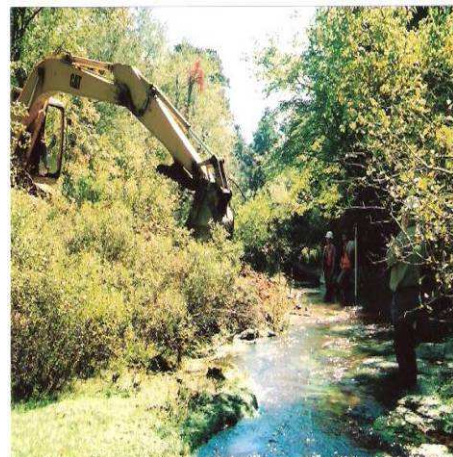
### Dam Removal at Red Brook

Late in 2004, Trout Unlimited applied for and received priority status for Red Brook from **Mass. Riverways**, the stream restoration arm of MassWildlife. Priority status gave the Red Brook management team the benefits of technical and financial assistance from Riverways. Funding from Riverways was used to hire a firm that



specializes in stream restoration for the purpose of evaluating Red Brook and generating a set of design plans for Red Brook's restoration. The finished restoration plans revolved around the removal of four dams from the reach of Red Brook that is just above tidewater, along with the placement of large, woody debris (logs and root wads) into the stream to enhance trout habitat. While the dams, consisting of two earth berm and wood sluiceways and two concrete sluiceways, had been open since 1998, they still **impounded** the brook enough for the stream channel upstream from each dam to fill with sediment; also, the floors of the sluiceways impeded up and downstream fish movement, especially during low water.

The most upstream dam, Robbins Dike, was removed in 2006. **Funding came from American Rivers and Mass Riverways**, assistance in the form of labor and earth moving machinery was donated by **A.D. Makepeace Company**, owners of the Century Bogs at the





headwaters of Red Brook. TU volunteers worked with TTOR staff and Riverways staff to replant the restored site.

### **Harry's Preserve Dam**

Working down from Robbins, the next dam, Harry's Preserve, was removed in late summer of 2008. Funding for this second phase of Red Brook's restoration came from American Rivers, Mass Riverways and the **U.S. Fish and Wildlife Service**. Once again, assistance came from the A.D. Makepeace Company in the form of heavy equipment and operators. Logs and root wads were placed in Red Brook and TU volunteers worked alongside TTOR and Riverways staff to re-vegetate the restored stream banks.



**Phase 3**, the removal of two concrete flume structures located near the head of tide, is slated to begin in the late summer of 2009.

Commitments for phase 3 funding have come from American Rivers, USFW, TU and Mass Riverways. A.D. Makepeace will be donating heavy equipment and labor. Habitat improvement through the placement of

woody debris will be handled by TTOR staff and TU volunteers as an ongoing project.

## A Summary

The year 2009 marks the beginning of twenty one years of TU involvement at Red Brook. The past twenty years



represents over **15000 volunteer hours** spent accomplishing a variety of tasks that range from fundraising to stream monitoring. Grant writing, consensus building, magazine and countless newsletter articles, meetings to hammer out agreements, public hearings, TU meetings, and planning meetings, all in addition to monthly work parties make up the many hours volunteered by TU

members for Red Brook. Most of these volunteer hours have been donated by members of the **Southeastern Mass. Chapter of TU**. Since 2001 the MA/RI Council has contributed \$40,000 to the Trustees of Reservations for the upkeep of the Lyman Reserve. Beginning in 1993, Red Brook Family Day, the MA/RI Council's annual fundraiser held at Red Brook each Sept., has raised an average of \$2500 a year for the Red Brook Fund. Almost all of the labor and donated raffle prizes came from TU volunteers.

## A Future for Salter Brook Trout

During the summer of 2008, while PIT tagging brook trout as part of an effort to track the movements of salters in Red Brook, Steve Hurley and his crew captured **527 brook trout**. This was the same stretch of Red Brook where Hurley had captured 84 brook trout back in 1996. Obviously, habitat improvements are paying off for native brook trout, not just in Red Brook, but also the Quashnet River where TU stream improvements have brought about a similar **exponential increase** in brook trout numbers.



The years of work on the Quashnet and Red Brook have illustrated a simple truth: **the continued decline of our salter brook trout populations is not inevitable.**

Brendan Annett's genetic



study has shown us another, darker truth: if the salter population of a coastal stream is lost, its unique genetic adaptation is removed from the brook trout gene pool forever. If brook trout have been extirpated from the majority of the coastal streams in Massachusetts that once supported them, the resulting loss of genetic diversity, and subsequently, adaptability is hard for us to imagine. To paraphrase the words that Nick Karas wrote in his detailed tribute to this American char, '**Brook Trout**', 'There is a moral obligation not to let a variation of a species become extinct due to indifference. There is also a scientific obligation: the need to maintain the **large and varied gene pool** so vital to the health and survival of a species. As environments change, the species and individuals within a species that survive are those with the greatest genetic ability to adapt to these changes'. Put another way, if brook trout are going to **survive global warming**, they are going to need all of the genetic variability that they can muster. We have a moral and scientific obligation to save and, if need be, restore our remaining salter brook trout, and as Red Brook has shown, the way to do that is to protect and restore their streams.

### **Threats and Promise**

Of all of the coastal streams on Cape Cod and in southeastern Massachusetts that once supported sea-run brook trout, **only nine salter streams** are known to still support proven sea-run populations. Aside from Red Brook, there are three streams on Cape Cod and five streams that are tributaries of the Westport River. Brook trout survive in other coastal watersheds, but their access to a marine environment is often blocked by old dams or degraded water quality.



**Of the nine salter streams, only three streams, the Mashpee River, the Quashnet River, and Red Brook are sufficiently protected by surrounding conservation lands.** The other streams are extremely vulnerable to various types of land development. The Westport River tributaries,

in particular, with their dependence upon fragile, headwater wetlands, are at risk. The Westport streams are characterized by low flows and high

water temperatures during summer. **Thermal pollution** from poorly designed water retention basins, lawns, driveways and roads along with well water withdrawals from supporting aquifers will most certainly, if allowed, sound the a death knell for Westport's salter populations.

### A Westport Brook Trout

Looking beyond the intact salter streams, we find that several of the coastal watersheds that historically supported salter runs still have brook trout populations, usually in their headwaters. It is possible that were stream continuity to be restored, dams removed and culverts repaired, these brook trout might once again find their way to the bays and estuaries that historically were the marine habitat of salter populations. One of these streams, the Eel River in Plymouth, is about to undergo a major restoration that will improve stream habitat for the Eel River's brook trout population. The Jones River in Kingston is another watershed that holds out the possibility of a restored salter run. Tributaries to the Taunton



River, the North River, the Wareham River and the Weweantic River all have wild brook trout populations that could benefit from further study, protection, and reconnection with the main stem of their rivers.

Yet another opportunity exists where streams that have lost their brook trout are being restored to bring back diadromous fisheries, chiefly herring and eels. The Town

Brook that flows through downtown Plymouth to enter the harbor near Plymouth Rock is an example. Although Town Brook's salters suffered extinction shortly after the Pilgrims arrived, it is possible that with restored habitat wild brook trout, albeit introduced, might one day spawn in Town Brook for the first time in almost 400 years.

The Coonamessett River and the Childs River are Cape Cod streams that have recently, within the past decade, lost their brook trout. While both of these former salter streams were damaged by cranberry farming, most of their riparian lands have now reverted to town ownership, a situation that may lend itself to restoration and the reintroduction of wild brook trout to their waters.

Angeline Brook, Westport



## Reasons for a Sea-Run Brook Trout Initiative

The Quashnet River and Red Brook have shown us that salter populations can be restored from the brink of extinction. In some respects, however; the survival of the salter brook trout is a testament to their toughness, a

hardiness honed by the waxing and waning of several ice ages. Brook trout have witnessed periods when the globe was warmer than it is today, and they've seen long stretches of time when New England was buried under a mile of ice. The big question that we need to ask ourselves is: **Have our actions compromised the brook trout's ability to endure future climate change?** While we are at it, we should also ask if our actions have compromised our own ability to endure climate change. I believe that the obvious answer to both questions is yes. **The losses that brook trout have suffered to date are entirely due to human induced environmental degradation**, a situation with potentially grave consequences for both humans and brook trout. As was previously stated, we have a moral and scientific obligation to our wild brook trout and their watersheds. We should also keep in mind that the time may soon come when we will once more be living locally, not by choice, but by necessity. If this should happen, we, like the brook trout, will need the natural systems that both of our species depend upon to be in good working order.

Putting questions about our future survival aside, we should expand our efforts to **'protect, reconnect, and restore'**, our salter populations beyond the two TU projects (the Quashnet and Red Brook) previously mentioned, if for no other reason than we will be richer for it. As Aldo Leopold pointed out, many of us need wildlife. Trout Unlimited volunteers have been working on two salter streams for over thirty years simply because they need wild brook trout, and to have wild trout you need wild streams.

What follows are some general recommendations for the MA/RI Council that would further the cause of, not only, a sea-run brook trout initiative, but a statewide brook trout initiative. Obviously, these are not solely my recommendations. Some of these recommendations have already been adopted by the Council. Warren Winders, SEMA Chapter of TU

1. **Find funding for a paid brook trout coordinator and/or paid Council CEO for the MA/RI Council.**



2. **Integrate with land trusts, sportsmen groups, environmental organizations, watershed alliances where coldwater resources are involved. Alert groups to CFRs in their area.**
3. **Develop educational materials that explain Trout Unlimited's vision and goals in Massachusetts and Rhode Island.**
4. **Develop and disseminate material that identifies TU achievements in Massachusetts and Rhode Island. Press conferences, media interviews and articles, internet.**
5. **Support coldwater resource friendly legislation (In stream flow protection)**
6. **Create a warehouse where chapters can share project related tools and resources.**

#### **A sea-run brook trout agenda**

1. **Identify and assess all coastal brook trout streams**
2. **Prioritize threats and develop strategies to mitigate threats to the most imperiled populations. For example: work with NRCS and bog owners to find solutions to problems caused by 'run of river' cranberry operations existing on coldwater fisheries resources. TU could help growers find funding and help with permitting of projects.**
3. **Develop educational materials for and identify potential allies, funding sources and political entities (concoms, selectmen, state and federal agencies) that might be helpful.**
4. **Develop working relationships with other conservation groups, land trusts and state agencies.**
5. **Advocate for adequate government funding of restoration related state and federal agencies.**
6. **Work with MDFW to identify restoration projects.**
7. **Seek funding through grants, endowments, gifts**
8. **Create a museum/library at the Lyman Red Brook house dedicated to the Lyman family history at Red Brook and the region's salter brook trout fishery.**