

The Salter



***The Quarterly Newsletter of the
Sea Run Brook Trout Coalition***

In This Issue:

Welcome!	1
Unicorns!	2
LI Fish Passage Modifications	7
Restoring Fresh Brook	8
EnTrust Foundation Grant	9
SRBTC Joins EBTJV	10
Stanley Brook Salters	11
A Day on the Carmans River	12
Brookies on Martha's Vineyard	13
Hurricane Sandy Breach	14

Issue 1

Spring 2013

Welcome to the Salter!

We would like to welcome SRBTC members to the inaugural issue of our quarterly newsletter, *The Salter*. We have named our newsletter *The Salter* in honor of the nickname that has been widely applied to sea run brook trout. Because of the time we have spent in getting our organization up and running and involved in sea run brook trout issues, it's taken us a bit of time to get a newsletter going. But from now on, on a quarterly basis, we'll be bringing you news of all of the exciting projects, events, and advocacy issues that SRBTC is involved in from Long Island to Maine.

The Salter will cover a variety of topics related to the protections and restoration of anadromous brook trout. In this issue you will hear about the scientific research, partially funded by SRBTC, on Red Brook and Buttermilk Bay on Cape Cod that is focused on understanding the migration patterns of salter brook trout. This work is uncovering how anadromous brook trout use our salt water estuaries as well as coastal streams. We also have an article by Prof. Andrew Whitely, a fisheries scientist from Umass who details his research on salters in Stanley Brook, ME. We'll also tell you about some of the advocacy issues SRBTC is involved in on Martha's Vineyard and Long Island including dam removal projects, river protection initiatives, and water quality protection efforts. Educational initiatives to increase public awareness of the sea run brook trout life history are another aspect of our mission and this issue of *The Salter* features a story about the recent educational "A Day on the Carmans River" initiative on Long Island that SRBTC participated in.

We hope that *The Salter* will help you to get a glimpse into what it is we do and how we do it. If you have suggestions of topics that you'd like to see us cover don't hesitate to let one of our Board members know. We are always happy to talk to those interested in sea run brook trout so don't hesitate to email or call us if you'd like to know more about SRBTC and what we do!

Unicorns! by Warren Winders, SRBTC

The first, and the only, time that I heard salters referred to as “unicorns” was in a discussion with my friend Nik Tyak. Nik had been working for NOAA for the summer where he had overheard the term “unicorn” used to describe a fish that seemed more myth than reality. Nik’s point was that there is a dearth of scientific knowledge about anadromous brook trout, a dearth that raises questions for those charged with the tasks of managing and restoring salter brook trout populations.

Thanks to the efforts of SRBTC, and its partners, that is now changing; but assuming that salters are a myth was not all that unreasonable, at least until the events of the last ten years. As recently as 1997, some influential fisheries experts were declaring that there were no native brook trout remaining in Massachusetts. Their reasoning was that any remaining native brook trout genes had to have been diluted and homogenized beyond the point of no return by more than a century of stocking hatchery reared brook trout into every body of water in the state.

Ryther’s Salter Brook Trout Research

Until the tagging research on salter behavior that is now being carried out by the USGS, UMass. Amherst, and the Mass. Div. of Fisheries and Wildlife, there had been only one modern inquiry into the behavior of salter brook trout in the southern part of their range; a study done in the mid 1950’s by John Ryther of the Woods Hole Institute. Ryther’s study encompassed several historic, Cape Cod salter streams that empty into estuarine bays in Vineyard Sound. While Ryther’s work provided some interesting insights into the adaptability of brook trout, it suffered from the lack of sufficient numbers of wild, coastal brook trout to study.



A brook trout from the tidewater reach of Red Brook

Among other things, Ryther discovered that brook trout adapt readily to the transition from freshwater to saltwater and back again, with no apparent need to smolt as do salmon. Color change in brook trout, to the silvery sheen associated with salters, is a product of reverse osmosis in saltwater and is caused by the build up of guanine in the scales that has been

expelled with salts. The longer the time in saltwater, the more apparent the sheen, with color change completed in about two weeks. Ryther also found that brook trout placed back into freshwater then

lost their silver coloration completely after two weeks.

Ryther had a theory that seaward movements in brook trout were caused by overpopulation of their streams. In an attempt to examine this theory, thousands of tagged Sandwich Hatchery strain brook trout were placed into the study streams. While the trout did move out to saltwater, the timings of their movements were random, as were the locations of the streams that they returned to. Ultimately, the experiment proved little more than *even hatchery brook trout* will use marine habitat when it is available to them.

Habitat Restoration and the Recovery of Salter Populations 1975 to the Present

The scanty wild brook trout numbers that John Ryther had to deal with for his research were the direct result of extreme habitat degradation in the Cape Cod streams that Ryther was studying. Beginning in the mid 1970's, members of Trout Unlimited began a long-term habitat improvement project on the Quashnet River, an effort that continues to this day. By 1990, Trout Unlimited was also working to restore habitat to Red Brook, another salter stream that had suffered significant damage during the 19th and 20th Centuries, resulting in a collapse of its salter population from the 1930's on. The short story is that the habitat work begun by TU, over a remarkably brief time, brought about a recovery of the wild brook trout in both streams - their respective populations are listed as being abundant today.

Significantly, the practice of stocking hatchery trout over the wild populations of both streams was terminated, with the result that the wild trout, now freed of the competition and predation from the hatchery introductions, began to thrive in the restored stream reaches. In both Red Brook and the Quashnet River, the brown trout that had been introduced to both streams soon vanished.

As the salter populations of Red Brook and the Quashnet increased, questions were asked about the heritage of the brook trout now thriving in those streams. Some suggested that these were simply the descendants of hatchery reared brook trout, and that we should not expect a return to salter behavior from the trout now repopulating the streams.

Annett's Research on Salter Brook Trout Genetics

Recent inquiry into the basis of salter behavior began in 2005 when Brendan Annett completed a genetic study of the trout in five salter brook trout streams. Remember that many authorities were declaring native brook trout in Massachusetts to be extinct. In a study of the trout from five salter streams that included the Quashnet and Red Brook, what Annett's research showed was that the brook trout of each stream were genetically unique from each of the others, and all of them were unrelated to Sandwich Hatchery strain brook trout, this despite thousands of hatchery brook trout having been stocked into all of the study streams over many decades. Somehow, stream specific strains had survived intact; perhaps because they had evolved specific adaptations to the habitat generated requirements of their streams – hatchery trout, lacking these traits, did not survive long enough to pass on their genes.

Tracking the Unicorn Trout

Having resolved the issue of origin, or at least, the genetic separation of the wild trout swimming in still extent salter streams from hatchery strains, the next question that needed to be answered was –are the recovering wild brook trout exhibiting salter behavior?

Here again in 2007, Brendan Annett, now directing the Waquoit Bay Estuarine Reserve, devised a study to track the movements of brook trout to and from the tidal zone of the Quashnet River. With

funds from a grant, Brendan and, long time Quashnet restoration director, Francis Smith of Cape Cod TU, placed two Passive Integrated Transponder (PIT) antennas underneath Route 28, where the Quashnet flows under that road on its way to Waquoit Bay. Waquoit is the classic marine habitat of the salter brook trout, described by 19th Century naturalists and anglers as being one of the best places to catch salters in the spring months before the Bay's waters warmed and forced the trout up into the thermal refuges of their streams.

Annett chose to use Passive Integrated Transponders for tagging trout because of the small size of the tags and their reasonable price. PIT tags are the same devices used to record cars using the Speed Pass on a toll road. Each tag has a number that is recorded when the tag passes through a field created by the antennas. In the case of the Quashnet, having two antennas helped to determine the direction the fish were traveling. Trout passing through the upstream antenna and then the down stream antenna were moving toward tidewater. Trout moving through the down stream antenna first and then the up stream one were moving back to the fresh water habitat of the stream. Two deep cycle batteries power each antenna, and they need to be recharged periodically. This involves swapping the batteries out for new ones every two weeks.

Today, with funding from SRBTC, TU/NFWF, USGS Conte Anadromous Fish Research Center, and MassWildlife, the original PIT tag program that began in 2007 in the Quashnet, has expanded to include Red Brook and the Childs River. The Quashnet now has 3 PIT antennas, as does Red Brook. Meanwhile, PIT tags are being used in the Childs River to document the restoration of a salter brook trout population in this stream where native salters had been absent for over a decade.

Childs River

Brook trout had mysteriously disappeared from the Childs River despite the fact that the conditions needed to support brookies were still present in the stream. MDFW fisheries biologist, Steve Hurley, decided to move 19 tagged brook trout from the nearly adjacent Quashnet River over to the Childs to see if wild Quashnet fish might successfully spawn in the Childs. The introduced trout did spawn, and Hurley transplanted another 30 plus tagged trout from the Quashnet into the Childs. As a result Hurley is now tracking over 400 PIT tagged brook trout that were born in the Childs River. One trout has been recorded leaving the Childs and swimming up into the Quashnet, a journey that required crossing Waquoit Bay, only to turn around and return to the Childs.

PIT Findings and Limitations

While the original purpose of the PIT tag research was to track seaward movement of brook trout, other interesting aspects of brook trout behavior have been disclosed. Among the things learned is that brook trout prefer to move under cover of darkness. Dawn and dusk are periods of peak movement, but nighttime appears to be the time when brook trout do most of their traveling. In both the Quashnet and Red Brook, in stream movement peaks in the spring, slows in the summer and then increases almost exponentially in the fall, just prior to the November spawn. Shortly after the spawn, movement almost appears to cease. At this time, 2900 PIT tags have been deployed, with the majority of them going to trout in the Quashnet and Red Brook.

One of the shortcomings of PIT tags is that the receivers don't work well in saltwater, leaving researchers with little more than speculation as to where brook trout went once they entered tidewater. These limitations ultimately led to the development of an acoustic telemetry study of Red Brook's trout.

Acoustic Telemetry and Red Brook

Acoustic tagging began at Red Brook in 2010 under the auspices of a partnership of the United States Geological Service based at the Conte Anadromous Fisheries Research Center, the University of Massachusetts, Amherst, Department of Environmental Conservation, and MassWildlife. The initial tagging of ten trout took place in June of 2010, and 9 acoustic receivers were placed in Red Brook's estuary and throughout Buttermilk and Little Buttermilk Bays.

A concern from the beginning was that tagging such a small number of trout would fail to produce any data. The size of acoustic tags requires that the trout be fully mature, which means that the tagged trout are near the end of their life span. PIT tagging has verified that our coastal brook trout rarely live beyond 4 years. The other ongoing concern is the cost of acoustic tags. With a price tag of around \$400 apiece, acoustic tagging can be an expensive gamble. To increase the chances of collecting data about the movement of Red Brook's trout in saltwater, it was decided to implant another 20 tags in September 2010. SRBTC, TU and the research partners covered the cost of the additional tags in the hope that some information about the movements of brook trout in saltwater would result.



One of the principal questions that the acoustic tagging effort sought to answer was whether or not brook trout from a restored coastal stream that had undergone dam removals and habitat improvement would take advantage of the newly enhanced opportunity to expand their habitat into the marine environment. The other questions were about the timings of migration and the possible seasonally influenced determinants of those migrations. Ultimately, it is hoped that researchers, like geneticist Andrew Whitely (UMass), will be able to discover if there is a genetic difference between coastal brook trout that move out of their streams to the marine environment, and those trout from the same stream that spend their entire lives in the stream (partial migration).

Proof of Anadromy

Given the miniscule portion of Red Brook's trout population that has been acoustically tagged, the data collected from the tags has proven to be well worth the investment. As of this writing, (Jan.

2013) 70 acoustic tags have been implanted into Red Brook trout. We know that some of these tagged trout have moved out into the Buttermilk Bays, usually after the November spawn. Surprisingly, because of warm summer temperatures in the bays, one trout spent part of August and September near Little Buttermilk Bay. A significant number of the tagged trout spent time in Red Brook's tidal marsh. One trout exited Buttermilk Bay headed for the Cape Cod Canal and was never seen again. *This would seem to corroborate information from Henry Lyman (more than a decade ago) that salter brook trout had been caught near the Mass. Maritime Academy.* Recently, following the placement of an acoustic receiver near Red Brook's headwaters, researchers have discovered that several tagged trout have traversed the entire brook to arrive at the, soon to be restored, cranberry bogs below White Island Pond.

At this time, the research partners are hoping to be able to implant acoustic tags into another ten to twenty Red Brook trout in an effort to extend the collection of data on brook trout movements for another year or two. Likewise, PIT tagging will continue. Meanwhile, the importance of the connection between freshwater streams and the marine environment has been made abundantly clear by the evidence compiled through the PIT tagging and acoustic tagging of brook trout. Seeing the interchange of energy between rivers and the ocean - from a brook trout perspective - forces us to reconsider the interplay of streams, estuaries and bays as being the moving parts of a broad interdependent ecosystem. For this reason, the Sea-Run Brook Trout Coalition purchased \$7500 worth of tags last year alone, and plans to continue to invest in this research that is important, not just for the future of our coastal brook trout, but for the future of all of the wildlife that depends on the interchange of fresh and saltwater.



Above is a young Red Brook trout that has been feeding on juvenile herring. The tail of a herring can be seen protruding from the mouth of the brookie. Salters feed on other fish early and often.

For more information on salter research, you can read Brendan Annett's genetic study: *Conservation Genetics of Remnant Populations of Anadromous Brook Trout at the Southern Limit of Their Range.* Recently, this study was republished in the AFS Journal in a version coauthored with Andrew Whitely, PhD of UMass, Amherst.

A special thanks from SRBTC goes to the research team carrying out the salter study: Todd

Dubrieul, Ben Letcher and Joe Zydlewski from USGS; Andy Danylchuk and Andrew Whitely from UMass, Amherst; and Steve Hurley from MassWildlife and Erin Snook working as an intern under the auspices of UMass. Our thanks also go to funding partners Trout Unlimited and the National Fish and Wildlife Foundation, and the owners of the Lyman Reserve at Red Brook, The Trustees of Reservations. And - thanks to all of the people who have worked so hard for over 30 years to restore salter brook trout, salters are no longer thought of as mythological creatures.

Fish Passage Modifications on Long Island

by Doug Swesty, SRBTC

On December 20, 2012 a group of stakeholders, including SRBTC Director Doug Swesty, USFWS Hydraulic Engineer Curt Orvis, NYS DEC Region 1 Freshwater Fisheries Manager Chart Guthrie, along with representatives from the NY Dept. of Transportation, Suffolk County Parks, and the Art Flick Chapter of Trout Unlimited, met at the Hard's Lake Dam fish ladder on Long Island's Carmans River. The purpose of this meeting was to assess the functionality of current configuration of the Alaska Steeppass fish ladder on the Hard's Lake Dam, which was originally installed in 2008. The Hard's Lake Dam, located only a hundred yards from the spot where Daniel Webster caught his famed 14 lb. Sea run brook trout in 1827, was impassable barrier until the fish ladder was installed in 2008.

The fact that the ladder was able to provide upstream passage for some fish had been established by the observation of spawning alewife upstream of the dam. However, a 2012 diadromous fish tagging study of Carmans River trout, alewife, and American eel, carried out cooperatively between Guthrie, Mike Frisk (Stony Brook University), and Matt Scalfani (Cornell University) has revealed that only a very small fraction of diadromous fish that reach the Hard's Lake Dam successfully ascend the ladder. For this reason, Curt Orvis, the senior fish passage expert for the USFWS's northeast region agreed to help assess the current configuration of the ladder and to suggest improvements. Orvis's investigation found that there is a design deficiency in the configuration of the ladder and suggested an easy modification to the ladder as a fix. Orvis also found, via hydraulic measurements, that the current ladder configuration does not have sufficient attraction flow at the lower end ladder. NYS DEC has agreed to undertake modifications to the ladder before the spring 2013 alewife run.



USFWS Hydraulic Engineer Curt Orvis measures flow depth at the base of the Hard's Lake Ladder.

The team spent the rest of the day looking at other fish passage issues on nearby brook trout streams. A brief survey of nearby Yaphank creek, a tributary of Long Island's Great South Bay, identified two

projects that would help to restore sea run brook trout. Yaphank creek lies entirely within Wertheim National Wildlife Refuge and contains a population of wild brook trout. Two culverts, one on a refuge road and the other beneath the Long Island Rail Road currently impede connectivity of the stream to the estuary. Orvis's assessment is that these could be remediated and SRBTC agreed to jointly pursue funding for these projects with USFWS and the NYS DEC.

The team also visited the site of the C-Dam on the Carmans River within Southaven County Park. While inspecting the C-dam Orvis identified a water velocity problem with the low-head dam, which was previously assumed to be passable. SRBTC Director D. Swesty suggested a experimental reconfiguration of the dam that could easily be achieved and which would lower the head on the dam and thereby reduce the flow velocity. The stakeholders have received permission from Suffolk County Parks in order to test this solution during the spring 2013 season.

Restoring Fresh Brook by Michael Hopper, SRBTC

Very few residents or visitors of Wellfleet, on Cape Cod, are aware that Fresh Brook (a.k.a. Trout Brook) in South Wellfleet once supported a wild and thriving population of sea-run eastern brook trout (*Salvelinus fontinalis*). Sadly, this population was extirpated prior to 1973 when a culvert was built with a flash board dam at the old railroad bridge, blocking the brook and causing a dead water to be formed above the new culvert.



Mass Division of Fish & Wildlife electroshocks Fresh Brook for wild brook trout.

Historically, anadromous brook trout, i.e. salters, were a common and valuable resource in the waters along New England's coast. These large

and abundant trout were prized for angling and eating. Overfishing and habitat loss has contributed to the decline of these native anadromous trout over the last 350 years to less than five percent of their original distribution in the Commonwealth of Massachusetts. Three streams on the outer cape once supported native populations of salters, these streams were: the Pamet River in Truro, and the Herring River and Fresh Brook in Wellfleet.

Today we have an interesting historical snapshot into what Fresh Brook was once like in 1893 as reflected with a passage from "The Sporting Art of Frank W. Benson" by Faith Andrews Bedford (pub. David R. Godine, Boston, 2000). Frank W. Benson (American Impressionist Artist 1862-1951) wrote in his Eastham, MA farmhouse log, on April 2 1893: "*All drove to Fresh Brook, South Wellfleet to try for Trout. Tied the Horse and fished down stream to the Railroad [bridge]. In the pool*

above the track F.W.B. [Frank W. Benson] caught a half pounder, then another half pounder then a one pounder. The others arrived and we caught from the pool 13 more fine Trout... The 15 fish weighed 17 pounds after they were brought home and washed”.

To some extent, Fresh Brook was preserved by private ownership of surrounding lands. In 1900 Richard Freeman purchased about 84 acres surrounding Fresh Brook in order to form a private fishing club on the brook. This club was active for about 25 years and the members were given life-time rights to fish the brook. These rights were extended to the male heirs of members during their lifetimes. During this period the brook was stocked with brook trout to supplement the existing wild population of salters.

At the present time, SRBTC in partnership with Trout Unlimited, Massachusetts Division of Fisheries and Wildlife, Massachusetts Division of Ecological Restoration, US Fish and Wildlife Service, and the Cape Cod National Seashore is working on a restoration plan for Fresh Brook in which has been identified as a candidate for restoration and reintroduction of native brook trout by Steve Hurley, Southeast District Fisheries Manager, Massachusetts Division of Fisheries and Wildlife.

SRBTC Receives Funding from EnTrust Foundation

by Geof Day, SRBTC

On an afternoon in October 2011, I was invited to attend the Century Bog Dedication Ceremony at the AD Makepeace cranberry barn. It was a gorgeous fall afternoon and I was thrilled that all sorts of state officials were meeting to celebrate the state’s recent acquisition of Century Bog, a cranberry bog formerly owned by AD Makepeace which forms the headwaters of Red Brook. Upon restoration by the state, Century Bog will return to being a white cedar swamp and will expand spawning habitat and greater thermal refuge for native sea run brook trout that are increasingly returning to Red Brook thanks to a decade of dam removal and restoration work.

It was an auspicious afternoon. Over coffee and cranberry-chocolate-chip cookies, I sat down and chatted with a woman whom I had been introduced to by Tim Purinton, Director of Mass Ecological Restoration. She told me how much she enjoyed learning that sea run brook trout were returning due to rehabilitation efforts. Later she bought one of the very first James Prosek Salter Brook Trout prints we sell as a way to raise money for SRBTC. In the envelope that contained her (generous) check was a simple application for a grant from EnTrust, a small family foundation. We quickly applied. In the spring of 2012 EnTrust awarded SRBTC the wonderful sum of \$10,000 which we were to use to send our board members to professional conferences, on PIT and sonic fish tagging, and on hiring a grant writer. This indeed was great news. While we’d all been working on sea run brook trout restoration for years, we’d very recently formed the Sea Run Brook Trout Coalition and had only just received our 501(c)(3) designation in July of 2011. Warren Winders and Mike Hopper, both founders of SRBTC were soon on their way to the Eastern Brook Trout Joint Venture (EBTJV) conference in Frostburg MD to give PowerPoint presentation about SRBTC's efforts.

As a direct result of attending EBTJV, SRBTC has joined the EBTJV and SRBTC President Michael Hopper now holds a seat on the EBTJV Steering Committee. Another result of the EnTrust funding is that SRBTC is now part of a NOAA award given to Trout Unlimited to support Maine’s Inland Fisheries and Wildlife and Acadia National Park for the removal of several culverts that would

help allow sea-run brook trout to return to Marshall Brook, Mount Desert Island, Maine. SRBTC also used EnTrust funds to purchase sonic tags which are presently tracking brook trout in Red Brook. Data collected is already providing additional evidence of anadromy, and tagging has also allowed Steve Hurley, of Mass Fish & Wildlife, and SRBTC partners to prove that sea-run brook trout can be successfully relocated and begin to reproduce in streams where once sea-run trout once occurred naturally. Additionally, as of the time of this writing, SRBTC has hired a grant writer and has written over half-a-dozen grant proposals. I personally wish to extend our sincerest thanks to the EnTrust Fund for helping to make our first year a great success.

SRBTC Joins Eastern Brook Trout Joint Venture

by Michael Hopper, SRBTC

The Eastern Brook Trout Joint Venture (EBTJV) is a unique partnership between state and federal agencies, regional and local governments, businesses, conservation organizations, academia, scientific societies, and private citizens working toward protecting, restoring and enhancing brook trout populations and their habitats across their native range. From 2006 through 2012, EBTJV has funded 67 projects in 14 states that have enhanced or restored 208 miles of stream habitat, 254 acres of riparian habitat and reconnected 278 miles of stream habitat by removing 67 fish passage barriers. Funding for these projects came from the U.S. Fish and Wildlife Service (\$2.5 million) and contributions from partners (\$13.6 million). In the Spring of 2012 the Sea Run Brook Trout Coalition (SRBTC) was invited to EBTJV annual conference in Frostburg, MD. With funding from a grant from EnTrust, both Warren Winders and Michael Hopper attended the conference. The EnTrust grant also funded the attendance of UMass Amherst graduate student Erin Snook, Erin has been working on a the acoustic tagging project on Red brook for the last two years. Erin was invited to give a presentation on her research to date, both to the fisheries management conference as well as the EBTJV annual meeting. On the last day of the EBTJV conference, SRBTC was invited to join EBTJV both as a partner and the Steering Committee. SRBTC signed off on the new EBTJV Memorandum of Understanding and joined both the joint venture and Steering Committee in December of 2012. Included below is the abstract for Erin's presentation outlining the collaboration supporting the project:

Erin L. Snook , School of Marine Science, University of Massachusetts Amherst, Amherst, MA

Andy J. Danylchuk , Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA

Benjamin Letcher , Conte Anadromous Fish Research Center, U.S. Geological Survey, Turners Falls, MA

Joseph Zydlewski , U.S. Geological Survey, Maine Cooperative Fish and Wildlife Research Unit, Orono, ME

Andrew Whiteley , Department of Environmental Conservation, University of Massachusetts Amherst, Amherst, MA

Todd Dubreuil , Silvio Conte Anadromous Fish Research Center, US Geological Survey, Turners Falls, MA

Steve Hurley , Massachusetts Division of Fisheries and Wildlife, Buzzards Bay, MA

We sought to describe movement patterns of brook trout in a small coastal system, Red Brook, following dam removal and stream restoration. Specifically, we wanted to identify patterns of movement between the stream, estuary, and bay. Between June 2010 and September 2011, we surgically implanted 70 brook trout (189-289 mm FL) with acoustic transmitters. To monitor movement, we deployed 15 stationary acoustic receivers; four in Red Brook, three in the estuary, and eight in the bay. Preliminary data reveal that four tagged fish have traveled into the estuary and bay. At least one individual was detected back in Red Brook after residing in the bay between November 2010 and January 2011. In June 2012 we will deploy 14 additional transmitters and conduct manual tracking in Red Brook to further understand in-stream movement. Using data from temperature and conductivity loggers deployed with the receivers, and comparing fish movements with tidal current data, we will present an analysis of factors that could be influencing the movement patterns of brook trout in the Red Brook system.

Ecological and Genetic Analysis of Salters in Stanley Brook, Acadia National Park, Maine

by Andrew R. Whitely, Assistant Prof., Dept. of Environmental Conservation,
University of Massachusetts Amherst

In coastal streams, brook trout exhibit different life history forms ranging from in-stream residents to individuals that migrate to the marine environment. Recent findings in Stanley Brook, Acadia National Park, Maine, suggest different life history forms also have different movement strategies that relate to different growth rates between resident and ocean-going individuals. How these movements relate to spawning opportunities and success, anthropogenic threats and disturbed habitats, harvesting, and other environmental conditions are unknown. Ben Letcher's research group at the USGS Conte Anadromous Fish Research Center in Turners Falls, MA initiated a collaborative research project in 2006 that was designed to understand the extent of brook trout movement strategies in Stanley Brook and the consequences of those movement strategies. This work is a collaboration between the Conte Lab, UMass Amherst, University of Maine, and the National Park Service.

At the UMass Amherst Conservation Genetics Lab, we are currently using genetic data to reconstruct pedigrees for all Stanley Brook brook trout collected within the 2 kilometer study reach. A



A beautiful brookie from Stanley Brook captured as a part of this study

pedigree describes all genetic relationships of the fish sampled (e.g. parent-offspring, full-sibling, half-sibling all the way through distant cousins, just as a human pedigree does). We will reconstruct pedigrees from genetic material already collected (through 2012). For the initial analysis we will examine fish collected between 2008 and 2012, which is approximately 5,000 fish. Efficient sampling is critical for pedigree reconstruction. Stanley Brook is a great place for this type of analysis – it is a small enough stream that we can sample most of the available spawners in a given year, then the following year we can catch most of their offspring. Once we reconstruct a pedigree, we will be able to examine what proportion of brook trout offspring are produced from parents exhibiting a sea run versus resident life history. We will then incorporate this information into a population projection model to improve understanding about restoration effects on Stanley Brook sea run brook trout

population persistence.

The genetic work for this project will take place in the UMass Amherst Conservation Genetics Lab, run by Andrew Whiteley. A masters student, Morgan Lindemayer, will take the lead on the genetic analysis. Morgan is supported by the UMass Intercampus Marine Science Graduate Program. UMass Amherst undergraduates will also help out with the work. The SRBTC has generously contributed funding for some of the costs of the genetic work. We look forward to keeping you posted on our progress for this exciting project.

A Day on the Carmans River by Doug Swesty, SRBTC

Education and outreach is one of the basic missions of SRBTC. To further this effort SRBTC participated in the planning and execution of the first annual “Day on The Carmans River” sponsored by the Central Pine Barrens Commission (PBC). The PBC is a NY State Agency charged with the stewardship of much of Long Island's ecologically unique pine barrens region. This year PBC began a new initiative to educate area school students about the ecologically unique Carmans River ecosystem.

The Carmans River is a 12 mile long, groundwater fed, low gradient, coldwater stream. It also happens to hold a sizeable wild brook trout population. Formed by glaciation, the Carmans River is the finest example of a coastal plain stream in New York and perhaps the entire east coast. In order to promote ecological stewardship of the river the “A Day on the Carmans River” initiative was organized to get local schools to bring their students out to the river to learn by active involvement. In this initial year four school districts were involved and approximately 300 students participated in the field. The students got to learn about the ecosystem, sample the river for fish and aquatic invertebrates, and to take water quality samples. The students also were able to learn about fish passage issues and anadromous fish research projects that are currently taking place on the river. SRBTC Director Doug Swesty participated as an instructor and spent time teaching the students about the aquatic life in the river including insect life and salter brook trout, the geologic history of the river, and current ecological threats to the river. Participating students and teachers were incredibly enthusiastic and considered the day a great educational success. Planning is currently underway for an expanded version of this program for next year and SRBTC will again be there helping to educate our young people about coastal stream issues.



Long Island Watershed Director Doug Swesty points out a brown drake mayfly on the Carmans during a planning session

Brook Trout on Martha's Vineyard!

by Prudy Burt, SRBTC

The terminal moraine on the north shore of Martha's Vineyard is where a half dozen coldwater streams originate and start their journeys down to Vineyard Sound, or to flow into one of the Great Ponds on the south shore of the island. Starting up on North Road in the town of Chilmark, Mill Brook is one of those streams, winding its way through the woods along North Road and State Road, through seven man made impoundments, before flowing into Town Cove of Tisbury Great Pond. Mill Pond, the last of the seven impoundments, has been the subject of debate during the last three years. The pond and the dam that impounds it are both owned by the town of West Tisbury, which means that the town is liable for any costs of maintenance and management, for both the pond and the dam. Minor increases in bur reed growth during 2005 prompted the town's conservation commission to get a baseline assessment of Mill Pond, including a bathymetric survey, and water quality testing for excess nutrients. Results of this study showed that while the pond is shallow in places, water quality is very good.

The debate currently taking place in West Tisbury is whether the pond needs to be dredged in order to be maintained, or if the dam could be removed, allowing the historic flow of the Mill Brook to be restored, benefitting water quality, and native fish populations such as brook trout, river herring, brook lamprey and American eel. In January of 2012, SRBTC president Michael Hopper went to the Vineyard and presented information to a large and receptive crowd in the West Tisbury library on lessons learned in the restoration of two coastal streams in Massachusetts, Red Brook and the Quashnet River. Both streams have experienced dramatic increases in their populations of wild brook trout since restoration and barrier removal was completed.

Board member Prudy Burt, a lifelong resident of West Tisbury, has been advocating for dam removal. In addition to removing the recurring financial costs associated with maintenance of the dam and impoundment permanently, it would eliminate the physical barrier of Mill Pond dam to fish passage. Even more importantly, it would remove the



A brookie turned up during a survey on Mill Brook on Martha's Vineyard

insurmountable thermal barrier that Mill Pond creates. Preliminary water temperature monitoring in 2012 shows that Mill Pond routinely experiences temperatures above 80 degrees Fahrenheit, twenty degrees higher than those found at the headwaters, and untenable for native species. These high water temperatures persist all the way down to Town Cove, in spite of a well vegetated and shaded riparian buffer zone.

A fish survey of Mill Brook in September, 2012, by Steve Hurley, Southeast District Fisheries Manager for the Massachusetts Division of Fisheries and Wildlife and SRBTC scientific advisory board member, reinforced the effect that Mill Pond has on the fisheries habitat of the lower Mill Brook. While isolated wild breeding populations of native brook trout were found in the upper reaches of the brook, not a single brook trout was found below the Mill Pond dam, while American eel and warm water species such as golden shiner, brown bullhead and tessellated darter predominated.

Historically, Mill Brook has supported a healthy population of sea run brook trout, river herring and smelt. Nelson Bryant, writer of the “Outdoors” column at the New York Times for over thirty years, grew up a stone’s throw away from Mill Brook. Several of his essays refer to the times spent fishing for sea-run brook trout with his friend, Beanie Alley. Additionally, in Jerome Smith’s book “Natural History of the Fishes of Massachusetts”, published in 1833, Smith writes about sea run brook trout: *“...In no place, however, do we remember to have seen them in such abundance as in Duke’s County, upon Martha’s Vineyard... while returning home from a ramble among the heaths and hills of Chilmark and Tisbury, that crossing the principal brook of the island, our attention was attracted towards the agitated state of the waters, and never do we recollect so fully to have realized the expression of its being 'alive with fish', as on this occasion.”*

SRBTC is excited to participate in the debate about Mill Pond and Mill Brook, and about the possibility for stream and habitat restoration. To date, SRBTC has been able to gather several important pieces of data to help inform this conversation for the town of West Tisbury. These include: a site reconnaissance and cost estimate of dam removal for Mill Pond, through the Massachusetts Division of Ecological Restoration; a connectivity report assessing culverts and stream/road crossings on Mill Brook and how these might be improved for fish/wildlife passage; preliminary water temperature data through the donation of two Hobo water temperature loggers from Michael Chelminski, civil engineer at Stantec Consulting in Topsham, Maine, and SRBTC member; and lastly, an assessment of fish passage issues on Mill Brook by state diadromous fisheries biologist, Brad Chase. This is an important ongoing discussion for the town of West Tisbury, and SRBTC is committed to facts and science-based data being at the heart of it. Stay tuned for further developments.

SRBTC Weighs In on Keeping Hurricane Sandy Breach Open

by Doug Swesty, SRBTC

What do barrier islands and Hurricane Sandy have to do with salter brook trout? Quite a lot if you look at the whole life history of an anadromous brook trout. The latest research by researchers at the UMass and the USGS Conte Anadromous Fish Laboratory (see previous article by Warren Winders) indicates that anadromous brook trout make use of coastal bays during the winter months. On Long Island (NY) several of the coastal streams that hold wild brook trout populations (Beaverdam Creek, Yaphank Creek, and the Carmans River) empty into Bellport Bay on the south shore on Long Island. And how could this possibly involve Hurricane Sandy? Continue on Dear Reader!

Sadly, Bellport Bay, which is a portion of the larger Great South Bay which extends along much of Long Island's south shore, is currently listed on the US Environmental Protection Agency's Impaired Waters list, in part due to excess nutrient pollution. However, the recent advent of Hurricane Sandy, which devastated much of LI's south shore, brought a ray of hope for the ecological health of Bellport Bay. The Hurricane opened an inlet in Fire Island, the barrier island which bounds Bellport Bay on the south side. The breach in the barrier island allows an exchange of sea water between the open ocean and Bellport Bay, allowing for an improvement in water quality because of the “flush” of fresh seawater. The site of the breach, which is located within the Fire Island National Seashore's (FINS) Otis Pike Wilderness, is directly across Bellport Bay from Yaphank and Beaverdam Creeks and the Carmans River. (see inset photo). Any anadromous brook trout making use of Bellport Bay directly benefit from improvements in water quality enabled by the barrier island breach.

Unfortunately, a lack of scientific understanding by a few political leaders, who feared that this breach could lead to additional flooding of homes along the south shore of LI, led to a demand that the National Park Service, which oversees FINS, immediately close this breach. In response, SRBTC joined with other environmental and civic organizations to oppose such a closure by sending a joint letter to the



A USGS aerial photo showing the breach in Fire Island and Bellport Bay. The mouths of Beaverdam Creek, Yaphank Creek, and the Carmans River are located along the northern shoreline of Bellport Bay at the top of the photo. The Atlantic ocean is at the bottom of the photo.

Secretary of the Interior Kenneth Salazar. The letter called for the NPS to allow the breach to

remain open and for further scientific study of the effects of the breach on Bellport Bay. At the present time (March of 2013) the breach remains open and seems to be stable (in fact the site of this breach is known as Old Inlet which was a navigable inlet into Bellport Bay until it was closed by a series of storms in the first half of the 17th century). At recent meeting of the LI Diadromous Fisheries Working Group, an informal consortium of government and non-profit agencies (including SRBTC) it was reported that seals are currently using the inlet as a hunting ground for fish. At the present time a study by Cornell and Stony Brook University researchers is focused on anadromous fish (including brook trout) behavior on Bellport Bay and we may soon have our first indications of how the formation of this inlet may influence salter brook trout use of the bay.

Sea Run Brook Trout Coalition Contact Info

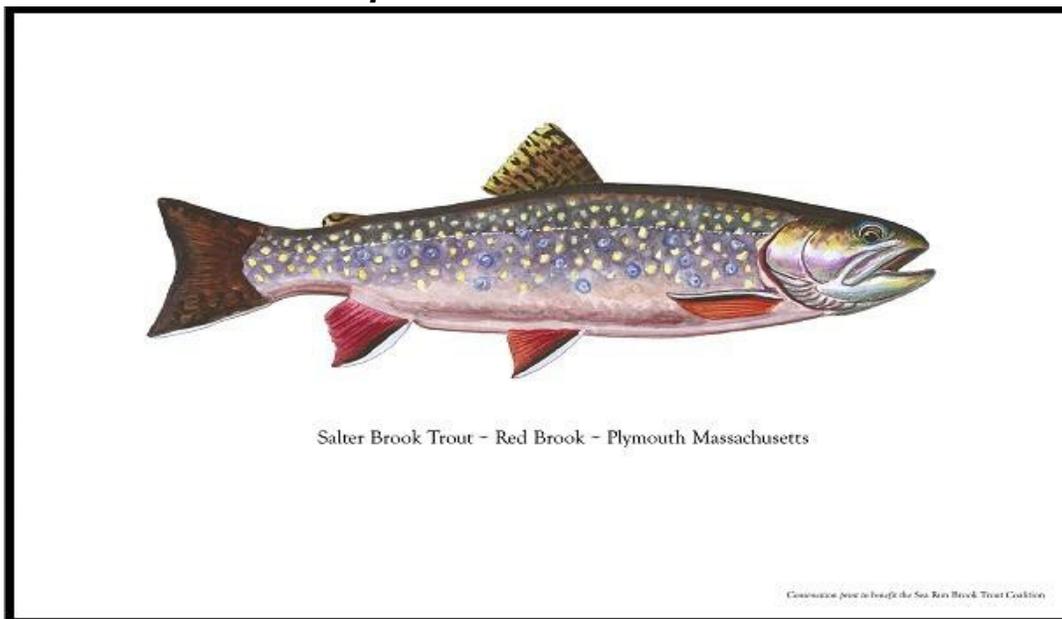
Want to find out more about SRBTC? Please feel free to contact President Michael Hopper at (860)-596-4055 (Home number)

Also check us out on Facebook at

<https://www.facebook.com/srbtc.org> or visit our website at

<http://www.searunbrookie.org>

Order a signed, limited edition (only 100!) James Prosek print of a salter brook trout. All proceeds benefit the SRBTC! Available,



framed or unframed through the SRBTC website at
<http://www.searunbrookie.org/james-prosek-print>

Join the Sea Run Brook Trout Coalition!

Please join us in our effort to protect and restore sea run brook trout! We are a federally recognized 501(c)(3) charitable organization and your contributions are tax deductible to the maximum extent allowed by law. Your membership fee of \$35/year helps us to continue to carry out restoration projects, advocacy, public education and outreach, and scientific research on sea run brook trout throughout the NE United States. You can join online through our web site at <http://www.searunbrookie.org> or, if you prefer, you may simply send us a check, made out to **Sea Run Brook Trout Coalition Corp.**, to our postal address:

**Sea Run Brook Trout Corp.
P.O. Box 1024
Newburyport MA 01950**

All of our members receive our free quarterly newsletter, *The Salter*, which will keep you abreast of our doings and other matters relevant to sea run brook trout.