Issue 2, Winter 2018

Barnstable Clean Water Coalition

COALITION Quarterly

Troubled Waters



Rescue Mission Underway in the Marstons Mills River, see article page 4.

Sea Lettuce Invades Otter Habitat

BCleanWater.org

A Note from The Helm



As we head into the first full calendar year as Barnstable Clean Water Coalition, I am excited to share with you the many plans we have lined up for 2018. This past year was one full of positive change and we are well-positioned to implement our plans to restore clean water in Barnstable.

If our paths have crossed in recent months, then you know just how passionate I am about this cause. It is imperative that we protect our waterways, not just so we can enjoy summer days on the water, but also to ensure quality of life for all the people and animals – present and future – who call Barnstable home. Our cover shows some of our neighbors here in town – river otters! They remind us that we are not the only ones dependent on clean water and a healthy environment.

The coming year will be full of action for Barnstable Clean Water Coalition. This issue introduces the Marstons Mills River Restoration Plan, a comprehensive strategy we are developing to tackle nitrogen pollution head on. We are working with the Town of Barnstable to identify areas to install or implement various alternative technologies to restore the watershed and mitigate nitrogen. We are focused on this one particular watershed as a "living laboratory," taking proven nitrogen mitigation technologies out of a lab environment to apply the science to the real world.

In order to provide evidence on the relative successes of the technologies we plan to implement, it is critical to have detailed and comprehensive baseline data. Moving into 2018, we hope to expand current testing to more locations in the watershed.

Representatives from local, state and federal agencies are interested in and eager to help us set this plan in motion. We recently had eight members of the U.S. Environmental Protection Agency visit and tour the watershed with us. They recognize that a successful strategy in this one watershed could be replicated throughout the state, and even around the country. It is very encouraging to have so much support from regulators and experts in the field.

In this edition of Coalition Quarterly, we've highlighted three of the biggest projects we plan to tackle as part of this overall strategy: wetlands restoration, Mill Pond, and aquaculture. Future newsletters will dive deeper into each of the proposed nitrogen mitigation strategies, detailing the technology, locations, and anticipated outcomes of implementation.

In addition to this watershed strategy, we're pursuing projects in other parts of town. We are exploring programs to develop benthic mapping in Barnstable Harbor, build floating wetlands in Lake Wequaquet, and raise water-filtering oysters in Hyannis. Our water systems are all integrated and we can't achieve clean water without a widespread approach to the full town.

We made a lot of progress in 2017 and look forward to staying connected with you throughout 2018! This is a real opportunity to take action on clean water in Barnstable and we are working hard toward this goal. Check out our upcoming events and I hope to meet you at one!

Zenas "Zee" Crocker
Executive Director

From the Cover:
Sea lettuce is a species of green algae (genus Ulva) found in waters compromised by high nutrient (including nitrogen) levels. BCWC is working to address the nutrient loading problems in our watersheds to help all of us, including otters and other wildlife that inhabit our local waterways.

Join BCWC and Cape Cod Beer in the Race for Clean Water in 2018

Grab your sneakers and run/walk for clean water at the 3rd Annual Cape Cod Beer *Race To The Pint* on Sunday, May 6th from 3pm-6pm.

BCWC is proud to be the beneficiary of funds raised at this year's *Race To The Pint*, a 5K/10K race organized by SEMC Sports, that starts and ends at Cape Cod Beer (1136 Phinney's Lane in Hyannis). Both the 5K and 10K course wind through scenic roads in Barnstable village. Cash prizes for top winners in all age groups (ages 7 and up). To register for the race, visit **https://www.runreg.com/cape-cod-beer-race-to-the-pint**. Race registration closes after 825 registrants or on April 20th, so register early to be included and to get the best rate!

The post-Race party at the brewery will feature food and live music. Admission to the party is free for all registered runners/walkers and includes one free drink ticket.

However, even if you aren't participating in the race, a $5.00 donation at the door to BCWC will get you in to this fun event (free for all children 12 and under).

We hope to see you at Cape Cod Beer on May 6th for an afternoon of fun and competition as we raise funds and awareness for clean water in Barnstable.

BCWC Needs You – Volunteer Your Time for Clean Water

Help us restore and preserve clean water in our town – join our growing team of BCWC volunteers.

Our volunteers come from all walks of life and have various skills and knowledge to offer. We have many different opportunities for volunteers to get involved and would love to add you to our team.

If you like working outside, you can help BCWC staff collect water samples and data, monitor for marine invasive species, or count herring. If you like interacting with the public, we always need assistance at community events, especially at our upcoming Race for the Pint with Cape Cod Beer. Across all our programs, we could use your help.

Contact us at info@bcleanwater.org or 508-420-0780 for more information and to learn about getting involved today.



(right) BCWC volunteer Chuck Gifford collects stream flow data in the Marstons Mills River.

Marstons Mills River Restoration Plan







THE CHALLENGE:
Nitrogen pollution threatens the waters of coastal communities throughout Massachusetts, and especially here on Cape Cod. Too much nitrogen in our estuaries leads to an overgrowth of algae, suffocating the native plants and animals in the water.

The Marstons Mills River serves as the backbone of the watershed that feeds into the Three Bays estuary, delivering all the nitrogen, other nutrients, and toxins it picks up along the way directly into the estuary. Researchers have determined that the maximum nitrogen load the Three Bays can sustainably handle is 25,600 kg/year. The most recent study performed in 2003 by the Massachusetts Estuaries Project found nearly 45,000 kg/year flowing through the river and into Three Bays. As this research is outdated by over a decade, it is possible there is an even higher concentration of nitrogen making its way into our estuary.

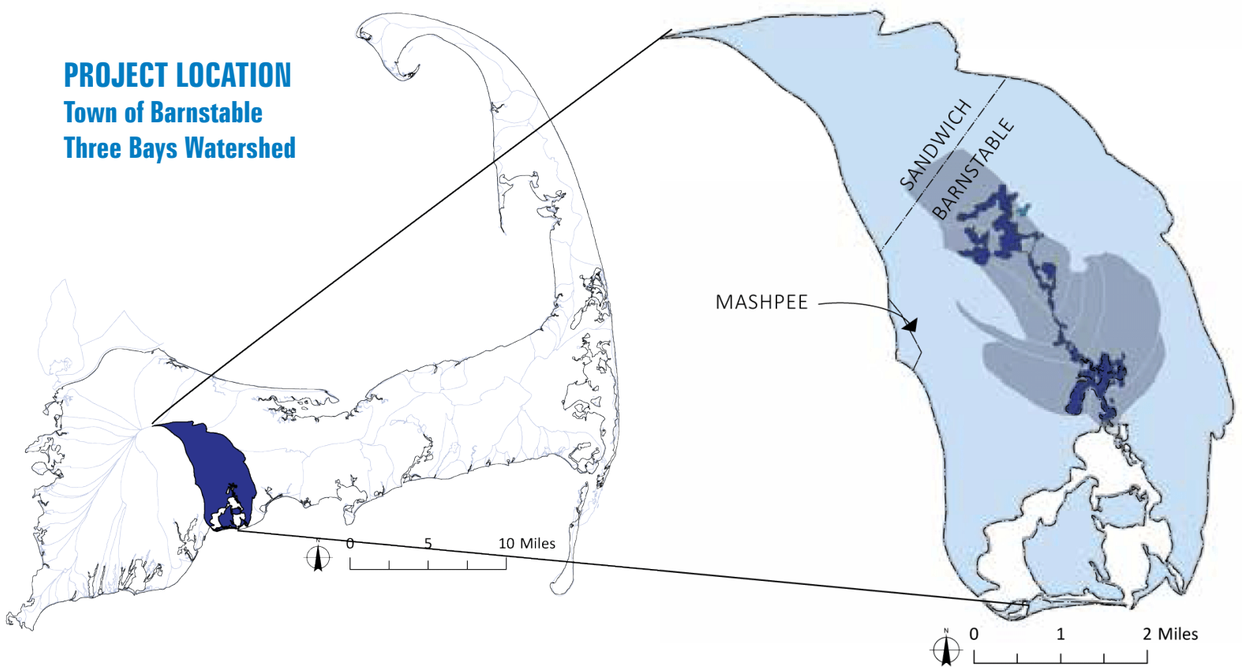
The Town of Barnstable recognizes the need for a solution to this water crisis. However, traditional municipal treatment (sewering) will not be available in the area for at least 20 to 30 years and at a very high cost. We must act sooner to mitigate nitrogen loading in order to protect this critical watershed.

THE PLAN:
Several alternative technologies and strategies are capable of mitigating nitrogen. By implementing several technologies in the same watershed, we aim to study the cumulative impacts of the overall strategy. This "living laboratory" will take science out of the lab and test it under real world conditions.

While we support and advocate for traditional municipal treatment in addition to this plan, we see a number of relatively low-cost alternatives as a way to begin mitigating nitrogen as soon as they're implemented, positively impacting the water within years, instead of decades.

In coming publications of Coalition Quarterly, we will further explain the details of how each of these systems work and our implementation plans for the proposed technologies. We are pursuing partnerships and permits with various agencies and organizations, including the U.S. EPA, the Massachusetts Department of Environmental Protection, and the Town of Barnstable.

The map below shows the Marstons Mills River watershed and highlights where we are proposing three projects that can have the greatest impact on nitrogen reduction: aquaculture, Mill Pond dredging, and wetland restoration.



AQUACULTURE:
In its former incarnation as Three Bays Preservation, BCWC successfully implemented projects that seeded oysters in North Bay and West Bay as a means of removing nitrogen. In recent years, oyster farms in the bays have grown and harvested tens of millions of oysters. Shellfish are incredible organisms and each one grown and then harvested from the estuary removes nitrogen.

While aquaculture is incredibly productive in the bays – economically, environmentally, and socially – there is still much untapped potential. BCWC is working with the town to identify areas where we can grow even more shellfish. And although oysters are impressive filter-feeders (each filtering up to 50 gallons of water every day), we believe that a polyculture of shellfish in the bays will help restore a healthy benthic habitat, cleanse the water, and remove nitrogen. Along with oysters, we are interested in promoting the propagation of quahogs, ribbed mussels, and other native species.

MILL POND DREDGING:
Located directly in the middle of the Marstons Mills River watershed sits Mill Pond, a six-acre pond created over three centuries ago for a grist mill operation. Now, water north of the pond flows directly into, then out of the shallow pond, carrying all the nitrogen it has acquired upstream with it.

One way to remove nitrogen from water is to allow it to gasify by remaining still in a body of water, essentially evaporating into an inert gas already abundant in our atmosphere. However, due to centuries of sediment buildup, Mill Pond has become so shallow that water does not sit in there for long. It continues to flow without an opportunity to gasify.

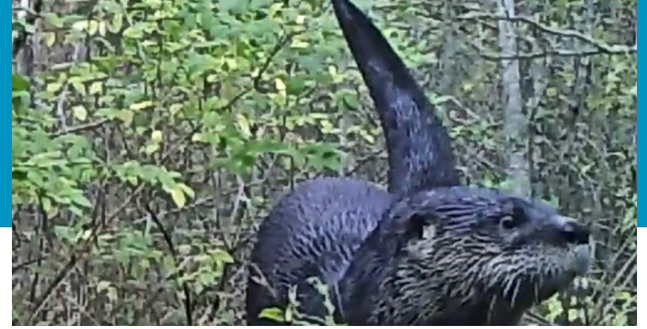
Our proposal to dredge and restore Mill Pond to its original average depth of eight feet will allow the water to rest in the pond, removing vast amounts of nitrogen through the passive and natural process of gasification.

WETLAND RESTORATION:
In the northern regions of the watershed, several cranberry bogs serve as the headwaters for the Marstons Mills River. While it's not apparent that the bogs themselves contribute significantly to the nitrogen-loading in the system, they are located in a heavily populated area of Marstons Mills and may capture much of the septic system and fertilizer runoff from these homes.

These bogs could offer a prime opportunity for the restoration of acres of land to more natural freshwater wetland systems. Wetlands are an excellent nitrogen attenuator, as plant life helps to absorb it and – as with ponds – the slower moving water allows the nitrogen to gasify.

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Field Notes from Meg



Otters in Barnstable? Who knew! While collecting water samples and streamflow data along the Marstons Mills River, we noticed signs of animal activity and unusual tracks on the bank. Curious, we decided to install a motion sensor camera nearby to find out what was happening in the area. Imagine our surprise when we discovered not one, but two river otters and several other animals that call this place home!

North American River Otters (Lontra canadensis) are found throughout the U.S. and Canada. Although closely related to weasels, otters are comfortable both on land and in water. They are near-sighted, but can see underwater in part due to a nictitating membrane, or third eyelid, that covers and protects the eye while submerged in water.

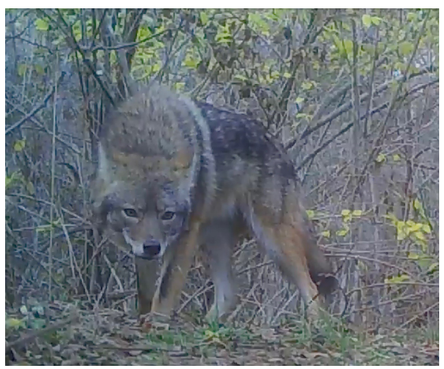
Otters use their long, sensitive whiskers to locate and hunt prey, including fish found in both fresh and estuarine environments, crustaceans, mollusks, amphibians, reptiles, and even small mammals or birds. In multiple videos, the otters are seen rolling around on the grass and marking their territory. These elusive creatures were historically hunted for their thick fur pelts, but now the main threats to their survival are habitat degradation and environmental pollution.

Clean water is an important issue not only for people, but for the many species of wildlife that share our local habitats. Viewing the otters, coyotes, cottontail rabbits and other animals we've seen has served as a reminder of the importance of restoring and preserving our watersheds throughout Cape Cod. As we continue water testing in the Marstons Mills River watershed, we will also monitor wildlife in the area to ensure our efforts enhance their habitats in addition to mitigating nitrogen pollution. Stay tuned on the otters' activities by following along on our Facebook page!

Besides the playful otters, many other animals have also been caught on the motion sensor camera. Three robust raccoons regularly make an appearance at night moseying through the woods looking for food. Cottontail rabbits occasionally hop through, grazing on grass. Two common Cape Cod predators have also been caught on camera: the red fox and coyote. We have only fleetingly caught a glimpse of the more elusive red fox. The coyotes, on the other hand, have been seen much more frequently, especially at night, as they traverse the path near the camera. Some of these animals appear to be quite curious, as they closely approach and sniff the camera.









News from E.M.M.A.: Spotlight on Education

Education
Monitoring
Mitigation
Advocacy

BCWC has been busy working with students in the Town of Barnstable this winter.

In December, BCWC visited Hyannis West Elementary School to present to 80 second graders about clean water. These engaging students were learning about water in a school unit. They eagerly listened to BCWC staff explain how water on Cape Cod comes from our sole source aquifer, the importance of protecting and preserving clean water, and ways they can help save water on their own at home. The presentation was followed by a fun, interactive game of Water Jeopardy, where the students showcased what they had learned.



BHS Environmental Club members collect water depth and turbidity data (left), macroinvertebrate samples (below), and temperature and dissolved oxygen levels (below right) at monitoring stations in Lake Wequaquet and Long Pond.



This winter, BCWC started a Winter Pond Monitoring program with members of the Barnstable High School (BHS) Environmental Club. Once a week, BCWC staff and the high school students travel to three different ponds in the town of Barnstable (Lake Wequaquet, Bearse Pond and Long Pond in Centerville). Students record visual observations at each sampling site, including weather conditions, wave intensity, turbidity, water color, plant life and waterfowl. Dissolved oxygen, depth and temperature are measured using various instruments. The presence of cyanobacteria, often called blue-green algae and sometimes known for producing a toxin, is assessed using the "jar test" method. The students also test the pond water for nitrates and phosphorous using Hach kits.

For most of these students, this is their first time using water sampling equipment, like dissolved oxygen meters and Secchi discs, and performing data collection in the field. They all enjoy getting wet and dirty collecting benthic macro-invertebrates along the water's edge in the decaying leaf litter. These underwater organisms can be seen with the naked eye and are sensitive to changes in water quality. Wearing waders and using nets and shovels to scoop up samples, the students sift through mud and leaves in search of these small animals. To date, they have found crayfish, caddisfly and alderfly larvae, damselfly nymphs, leeches, snails and freshwater clams, all of which are returned to the water.



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Mission Statement

Barnstable Clean Water Coalition works to restore and preserve clean water in Barnstable. BCWC utilizes science as its foundation to educate, monitor, mitigate and advocate for clean water.

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THE U.S. ENVIRONMENTAL PROTECTION AGENCY VISITS BCWC

Restoring and preserving the health of a large, densely populated watershed is no small feat and we need strong allies and partners to achieve this ambitious goal. In addition to collaborating with local and state agencies and organizations, we are thrilled to be working closely with the U.S. Environmental Protection Agency (EPA). The EPA is currently conducting two distinct studies within the Three Bays watershed, demonstrating their level of interest in and commitment to the importance of clean water in our community. In December 2017, eight representatives from the EPA visited BCWC and took a tour of the Marstons Mills River watershed with Zee Crocker. The EPA has begun conducting isotope-level testing at several of our data collection sites, which will help us further pinpoint the exact sources of nitrogen pollution. The more we can understand about the sources of nitrogen, the better we can tailor our strategy to target them properly.



BCWC's Zee Crocker is joined by Bruce Rodan, Associate Director for Science for the U.S. EPA Office of Research and Development (ORD) in Washington, D.C., as well as senior executives from the U.S. EPA Region 1 in Boston and the Atlantic Ecology Division of ORD in Narragansett, Rhode Island.