



COALITION Quarterly

The Healing Process



BCleanWater.org



A Note from The Helm



Three and a half years into our revised mission to restore the Cape's waters and rescue our blue economy, we are ready to begin the healing process. Right now, that effort involves removing nutrients and contaminants from wastewater, which enters the groundwater predominantly through our septic systems.

The principal problem we are facing is nitrogen overload. This starts with all of us – every time we flush, our urine goes through a chemical process, changing from ammonia to nitrogen as it travels with our groundwater into our lakes, streams, and estuaries. This nitrogen, coming from every septic system, is just too much, causing an overload. And as we are sure you have heard before, nutrient overload is the enemy of all water, causing cyanobacteria to bloom and making the water dangerous for human (and animal) use.

The healing process will take time and things are likely to get worse before they get better. As part of our plans to address this excess nitrogen issue, we began two groundbreaking projects this summer that will remove nitrogen both at its source (septic systems) and in the surface water of a local cranberry bog. You can read more about these initiatives on pages 4 and 5. These are small but important steps on a long journey to preventing further contamination and to restoring the quality of our water.

Shubael Pond, the primary site for our work using alternative septic system technology, is already closed for swimming due to cyanobacteria. And once again, the Three Bays estuary is experiencing shockingly low levels

of dissolved oxygen, algal blooms, and sea sponge die-offs. As a reminder, the Marstons Mills River delivers nearly 9,000 kg of nitrogen annually, into the North, West and Cotuit bays – and that is just into those areas. Sadly, other bays, like neighboring Popponesset Bay that lies between Barnstable and Mashpee, are even worse off.

Embracing the new, more virtual world we now live in, we have started to build a video library to feature the positive steps we are taking to solve these problems with your support. Other topics feature BCWC's additional work in the cranberry bogs, along with our water sampling and education work throughout Barnstable.

There will be no vaccine to cure the water conditions on Cape Cod. Instead, we must continue to work together to take incremental steps toward a healthy aquatic ecosystem. I am pleased to be able to say that we are now taking our first steps to remove nitrogen from our waters!

How To Use A QR Code

In this newsletter, we have printed "QR" codes that will take you directly to short videos (averaging three minutes) on topics ranging from our work in the cranberry bogs, to how our current Title 5 septic systems work and what the new NitROE Waste Water Treatment System will do differently. Just scan the QR code with your smartphone camera and you will be able to watch the videos.



Summer Water Sampling

An important part of BCWC's water quality monitoring is the collection of water samples from our ponds, streams and estuary. This summer, we are lucky to have David Carter on board to conduct weekly water sampling at several sites, including four ponds, one river and cranberry bogs.

The water sampling at the ponds involves collecting two different samples at pre-determined depths (one shallow and one deep) using a sampling pole. These samples are then tested to determine the concentration of nitrogen and phosphorous at each depth. David samples at four key sites -- Long Pond, Bearse Pond, and Lake Wequaquet in Centerville, along with Shubael Pond in Marstons Mills. These ponds were chosen due to the annual recurrence of cyanobacteria blooms during the summer months. This sampling program began three years ago to record and follow the changes in the nutrient levels.

David also assists with streamflow monitoring and water sampling along the Marstons Mills River. Streamflow measurements and water samples are collected at ten different locations along the river. At each location, the depth, velocity, ion conductance, and temperature of the river are measured and recorded. In addition, water samples are collected at each location and analyzed for the total amounts of nitrate and organic nitrogen (TKN). This sampling is done weekly to monitor the flow of nitrogen down the river into the Three Bays estuary and to track seasonal changes with water flow.



David Carter, a marine science major at University of Maine, sampling in the Marstons Mills cranberry bogs.

Our newest water sampling program this summer is at the recently installed bioreactor in the Marstons Mills cranberry bog system. David is collecting weekly water samples at various points throughout the bioreactor. Sampling will continue over the next year to determine how the bioreactor works in varying seasonal conditions and whether levels of nitrogen are reduced in the water flowing through. Depending on the data, bioreactors can potentially be used in other ditches throughout this cranberry bog system and other bog locations on Cape Cod. See page 5 for more information about the bioreactor project.



*Cyanobacteria
on Cape Cod
video*



Progress with Alternative Septic Systems

Back in June, a new alternative septic system called the NitROE Waste Water Treatment System (NitROE WWTS) received a permit for “provisional approval” from the Massachusetts Department of Environmental Protection. This permit codifies a 40% improvement over all previously permitted Innovative/Alternative septic systems - and that is only the beginning! We believe this system will ultimately achieve a 90 to 95% reduction in nitrogen flowing into our groundwater, thus performing equally to or better than most municipal treatment systems.

The town of Barnstable, working with BCWC, The Nature Conservancy (TNC), the U.S. Environmental Protection Agency (EPA) and many others, has applied for a Municipal Vulnerability Preparedness grant from the state. If approved, the grant will provide funding for more detailed work and data analysis on this system

in the Shubael Pond neighborhood of Sand Shores. If you are interested in applying for a grant, please go to BCleanWater.org for our grant application or contact Jennifer Loughran at jloughran@bcleanwater.org for more information.

In addition to the work being done at Shubael Pond, BCWC has announced its own grant program to fund up to \$10,000 of the costs for these same systems to be installed elsewhere in the town and throughout the Cape. As we go to press, we have over 30 grant applications from interested homeowners and a commitment from an additional 10 individuals willing to fund the installation of these systems on their own.

The following two videos explain what an existing Title 5 septic system is and what the new NitROE WWTS can do.



Before and after photos of a NitROE WWTS installation.



*Current Septic
Systems of Cape
Cod video*



*Future KleanTu
NitROE Waste Water
Treatment System video*

Marstons Mills Cranberry Bog Restoration

In December 2019, BCWC, the EPA and TNC co-hosted the Marstons Mills Cranberry Bog Restoration Workshop. This workshop, attended by 47 scientists and regulators from the local, state, and national level, focused on identifying nature-based strategies to reduce the amount of nitrogen travelling through the cranberry bogs at the headwaters of the Marstons Mills River.

These cranberry bogs act as a collection system for water flowing from the thousands of residential septic systems surrounding the upper reaches of the Three Bays watershed. The bogs, the Marstons Mills River system and Mill Pond all offer a unique opportunity for the creation of a “natural treatment system”, which incorporates many of the same components that are found in our own municipal wastewater treatment system.

We are beginning to install nature-based strategies, known as bioreactors, in the bogs that will hopefully become part of a comprehensive ecosystem restoration plan. Each of these bioreactors is designed to remove nitrogen from the surface waters using wood chips, along with additives including biochar (charcoal used as a soil amendment for both carbon sequestration and soil health benefits) and alum (a chemical compound).

An impressive team of scientists is working on three separate bioreactor projects sited near each other in the bogs. One team is led by researchers from the University of Massachusetts Dartmouth School for Marine Science and Technology (SMAST) and another is led by researchers from Mount Holyoke College. The third group, led by our own BCWC team with assistance from the EPA and TNC, installed the first, woodchips-only bioreactor at the end of July.



Bioreactor installation team composed of BCWC, EPA and TNC staff.



The team hard at work.



*Cranberry Bog
Bioreactor Nitrogen
Reduction Project
video*



Summer Staff on the Move

For three summers now, BCWC has grown oysters in an upweller demonstration project on Hyannis Harbor in partnership with the Massachusetts Oyster Project and the town of Barnstable. The tiny oyster spat are only 1-2mm (the size of a grain of sand) when first placed in buckets in the upweller. They filter phytoplankton (algae), nutrients and sediment from water pumped into the tank from the harbor – growing bigger and cleaning the water at the same time. Once the oysters reach 25mm (the size of a quarter), they are put in protective mesh bags and relocated to a suitable growing habitat in the Three Bays estuary. Here, the oysters will continue maturing and improving water quality in our local waters. Once they are big enough, approximately 3 inches, the oysters can be harvested by local recreational shellfishers. This year we are set to raise 120,000 oysters, which is the same as last year. In three years, we have grown almost 300,000 oysters!

This summer, we were lucky to have three amazing aquaculture interns caring for the oysters – Caroline Davock (a biology major at Smith College), Drew Kelly (an environmental science major at Lafayette College) and Jack McCann (a wildlife ecology major at University of Maine). BCWC would especially like to thank the

Barnstable Association for Recreational Shellfishing (BARS) for their generous donation to help fund the operation of the upweller this year.

Our 2020 water stewards, Hannah Crawford (BS in zoology from Miami University of Ohio), Julia Fone (an economics/environmental studies major at Wesleyan University) and Emma Taccardi (PhD in marine biology from University of Maine), have spent their summer out on Dead Neck Sampson's Island. On the island, the water stewards have been educating visitors and boaters about the barrier island's ecology and wildlife. In addition, they have been busy monitoring six locations in Barnstable for invasive marine species and collecting water samples and associated water quality data throughout the Three Bays estuary.

Read more about BCWC's 2020 aquaculture interns and water stewards on our website at BCleanWater.org.



Aquaculture interns Caroline Davock, Jack McCann and Drew Kelly at the upweller on Hyannis Harbor.



Water Steward Emma Taccardi monitoring the bays.



Water Stewards Julia Fone and Hannah Crawford educating visitors out on the island.

Community Advocates

Why We Support BCWC:

David Abelman & Marilyn Weil-Abelman

After spending many years visting the ponds on Cape Cod with their then young children, David Abelman and his wife Marilyn decided to make Long Pond in Marstons Mills their Cape escape. "Here on Long Pond, you would never know you were in the hustle and bustle of other parts of Cape Cod" notes David. Though they both love the ocean, the calmness of the pond allows David to enjoy his favorite activities like kayaking, swimming, and riding on his pedal board, while Marilyn loves the sheer beauty of the pond and its surroundings.

Since moving here, the Abelmans have seen changes to the pond, which is now closed due to toxic cyanobacteria blooms. Wanting to learn more, David resorted to searching the internet, speaking to experts, and working with the Friends of Long Pond Marstons Mills to improve the pond's water quality. Research led him to Barnstable Clean Water Coalition, where he discovered a shared goal



in finding solutions to the poor water quality issues right in his backyard.

Thank you to the Abelmans for their support - we look forward to working with them to make Long Pond one of the cleanest ponds in Barnstable.

Support BCWC by visiting BCleanWater.org.

Volunteer Spotlight: Chuck Gifford

What is left to do when you already spend your time fishing, cycling, hiking, acting, traveling, sailing, and volunteering for the Rotary Club? For Chuck Gifford, the answer was volunteering with BCWC - and we are the luckier for it. One day, Chuck saw our posters advertising for herring count volunteers and decided to give it a try. After that, he asked, "What's next?" Moving onto estuary water sampling and then streamflow monitoring, Chuck hasn't looked back.

Like so many who call Cape Cod home, Chuck grew up visiting Nantucket with his family every year. After moving around the country, Chuck settled in Cotuit with his wife Julie and their three sons Connor, Cameron, and Hunter. "I love to be a part of an organization that is trying to change things and wants to make a difference," Chuck says.

Having lived around water his entire life, he loves everything about it, and hates to see what is happening to our waterways on the Cape. From the excess nutrients causing cyanobacteria blooms and plastics polluting the water, to the changes in eelgrass beds and bay scallop populations over time, Chuck understands what is happening and wants to do his part to make a positive change.

For information on volunteering with BCWC, contact Heather at hrockwell@bcleanwater.org.





P.O. Box 215
Osterville, MA 02655
508-420-0780
BCleanWater.org

Non-Profit Org.
U.S. Postage
PAID
Permit No. 58
Hyannis, MA

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.

Board of Directors

Michael Egan, *President*
John G. Kassakian, *Vice President*
Laureen Pfizenmaier, *Treasurer*
Mark C. Curley, *Clerk*

Jack Ahern
Bridget Burger
Edward M. Crosby, Jr.
Travis Cundiff
John T. Fallon, Jr.
N. David Samra
Dan Schwinn

Staff

Zenas Crocker
Executive Director

Heather Rockwell
Director of Operations

Meg Materne
Science Associate

Casey Dannhauser
Special Projects Manager

Christy Laidlaw
Development Consultant

Jennifer Loughran
Community Outreach Consultant

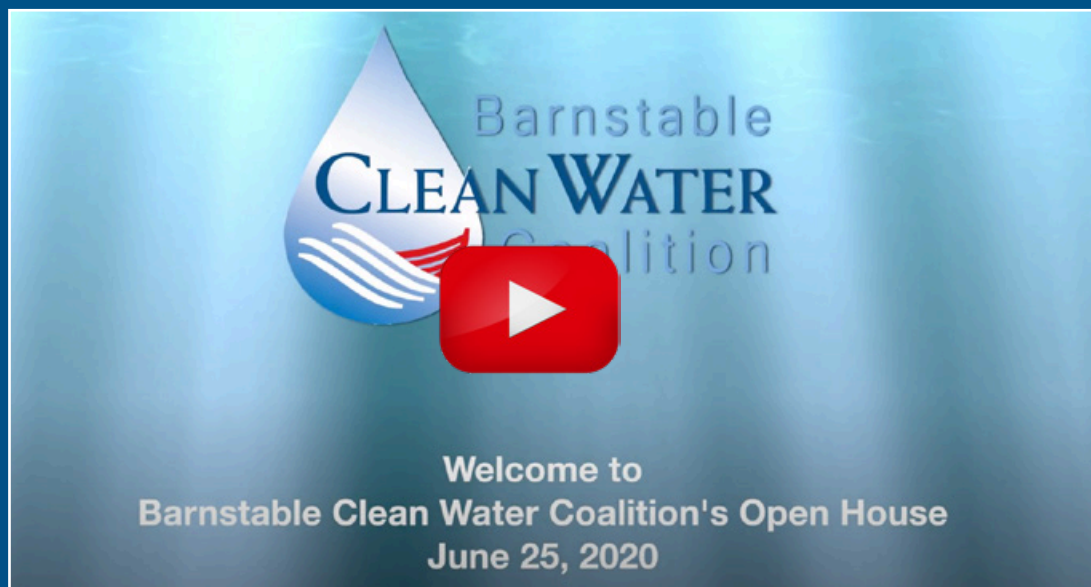
Susie Perry, *Graphic Designer*

Photo Credits: BCWC Staff, David Abelman, Leigh Dannhauser, Heather Fone, Bruce Gordon and Lillie Peterson. Videos Produced by Thomas Milkey, Grand Cove Productions



Printed on 30% recycled paper.

If you missed BCWC's Annual Open House, please scan the QR code to the right to view the video.



Help BCWC continue its work for clean water by donating today.



**Donate online at:
BCleanWater.org**



**Donate by mail:
BCWC
P.O. Box 215
Osterville, MA 02655**