Issue 3, Spring 2018

Barnstable Clean Water Coalition

COALITION Quarterly

Hidden Threats to Our Salt Marshes

Diamondback Terrapins Head Back To Sandy Neck, see article on page 6.

BCleanWater.org

A Note from The Helm

This winter, the Cape was hit by a series of Nor'Easters that provided a good reminder of the importance of our iconic salt marshes for storm protection. In this issue, we examine the role of salt marshes in our environment, as well as the "hidden threats" of sea level rise and nutrient pollution and what these mean for our sensitive coastlines.

Sea level rise is now occurring at a rate just above that at which salt marshes naturally grow, meaning they're at risk of drowning. On another front, nitrogen overload is overwhelming native plants, while creating ripe habitat for invasive plant species like phragmites. This "double whammy" is especially concerning to Cape Codders as this critical ecosystem protects our coasts and nurtures our wildlife.

Salt marshes host an incredibly diverse community of plants and animals - from threatened diamondback terrapins to the common periwinkle. The species that travel through, and inhabit, salt marshes are as varied as the American eel, which spawns in the Sargasso Sea, to the river herring like alewives and bluebacks, which spawn in our local rivers, ponds and lakes. These fish, along with menhaden, form the basis of a food chain that feeds many commercially important species such as bluefish, striped bass and tuna. Not to mention all of us!

The salt marsh helps keep our estuaries healthy, as marsh plants, shellfish and finfish filter phytoplankton (algae). Phytoplankton has always been present in our waterways, but today's "algae blooms" are largely the result of increased nitrogen load from our septic systems.

Ribbed mussels live in the marsh, filter water and physically help hold the marsh together. Oysters can each filter up to 50 gallons of water per day and menhaden can filter thousands of gallons, as their large schools appear in our bays in spring and fall. We are working with scientists, farmers, fishermen and other stakeholders to both educate and promote the healthy propagation and stewardship of these and other species. We are also partnering with scientists to develop ways to "build up" our marshes and mitigate the detrimental impact of nutrient pollution. Please stop by the office in Osterville and see me to learn more about our work and how you can help to protect these critical ecosystems and restore clean water to Barnstable!!

Zenas "Zee" Crocker
Executive Director

Thin-layer deposition of dredged materials (shown left) can build up and help salt marshes withstand sea level rise and increased flooding.

2018 Marstons Mills River Herring Count

Barnstable Clean Water Coalition (BCWC) and the Town of Barnstable's Natural Resources Program are working together again in 2018 to coordinate the monitoring of herring at the Mill Pond and Middle Pond fish ladders along the Marstons Mills River.

Every spring, two species of herring – alewife (Alosa pseudoharengus) and blueback (Alosa aestivalis) – migrate from Nantucket Sound through the Three Bays estuary and up the Marstons Mills River to spawn in Middle Pond and Mystic Lake. River herring are anadromous fish, which means they spend most of their lives in the marine environment, but travel to fresh water to reproduce. After spawning, adults swim back downstream to the sea. Once hatched, young herring spend the summer feeding in ponds and lakes. Come fall, they will swim out to the ocean to mature.

River herring are important components of aquatic food webs. Alewives and bluebacks feed on phytoplankton (plants), zooplankton (animals), insects and fish larvae. The river herring are forage fish that are preyed upon by commercially important species like striped bass, bluefish, and tuna, in addition to marine mammals and birds.

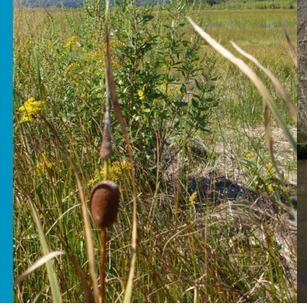
With the assistance of over 80 volunteers, BCWC has been providing the Massachusetts Division of Marine Fisheries (DMF) with valuable herring population data from the Mill Pond fish ladder since 2012. Volunteers are responsible for counting herring as they travel up the fish ladder into Mill Pond. The "run" usually starts in early April with the arrival of alewives once water temperatures reach 51˚F. When water temperatures rise to 57˚F, bluebacks will start running.

From the visual count data, scientists at DMF can calculate the estimated run size of river herring. Last year, BCWC volunteers counted approximately 5,251 herring. DMF estimated a run size of 36,148 herring for the Marstons Mills River in 2017. This figure was considerably higher than in 2016 with a visual count of 2,043 fish and a run size estimate of 13,954 herring.

While recent herring run numbers are encouraging, river herring still face many challenges. River herring populations plummeted in the late 1900's due to overfishing, by-catch, habitat loss and degradation, and climate change. Alewives and bluebacks help clear lakes and ponds of excess nutrients and algae. The long-term effects of increased levels of nitrogen, phosphorous, and contaminants of emerging concern (CECs) on river herring are unknown. Tracking the herring each year allows us to better understand the conditions of the stream, fish population, and overall health of the local food chain. It is just another one of the ways that BCWC is working to monitor water conditions, engage with our volunteers, and educate our community about the complex interactions between the environment, wildlife, and people.

Above: BCWC volunteer John Walker counting herring at the Mill Pond fish ladder. Below: Making the leap into Mill Pond.

Salt Marshes: More than just a pretty Cape Cod View



Common reed (Phragmites australis) is an invasive wetland plant that takes over impaired salt marshes.

This female Mallard is pictured in a healthy salt marsh habitat in Barnstable.

This winter was certainly one for the books for Cape Cod. We experienced extreme temperatures, destructive wind storms, widespread power outages and far too many Nor'easters that resulted in super-tide storm surges along our coasts. Our shoreline environment took a beating, resulting in extensive damage and erosion.

The Role of Salt Marshes

This difficult winter shone a spotlight on one of our most important coastal environments on Cape Cod: salt marshes. Salt marshes are ecologically designed to buffer the sea from the land, and likewise protect the land from the sea. They serve as nature's sponges, absorbing wave action, storm surges and rising sea levels from washing over the land, while simultaneously filtering land-based pollutants from flowing directly into the fragile near-shore ocean environment. Barnstable has several major salt marshes throughout the town protecting our beaches and bays, including Great Marsh, Halls Creek, Centerville River/ Long Beach, and Dead Neck/Sampson's Island.

Nature's Nurseries

Healthy salt marshes are considered one of the most productive habitats in the world. These dynamic ecosystems serve as nursery grounds for many species of important recreational and commercial finfish and shellfish, including menhaden, black sea bass, summer flounder, blue crabs, soft-shelled clams, oysters and quahogs. The shallow, muddy, tidal-influenced marsh creeks provide protection from predators and provide rich food supplies to young fish. The variety of wildlife found in salt marshes includes birds (great blue herons, osprey, bitterns, egrets, red-winged blackbirds) and mammals (deer, muskrats).

Threats to Salt Marshes

Though salt marshes serve as naturally resilient systems, nurturing and protecting keystone species and young fish, they are under siege by overwhelming conditions coming at them from both land and sea. As this winter demonstrated, storm surges are increasing in severity, sea level is rising, and the vegetative foundation of the marshes – smooth cordgrass, salt hay grass and switchgrass – are in danger of drowning.

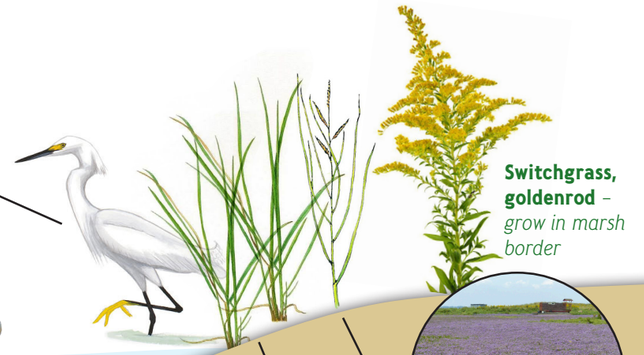
On the other end of the marsh, the fresh water that flows from rivers and streams through the marsh and into the ocean carries with it increasingly high levels of nitrogen, other nutrient and toxins, threatening the fragile ecosystem. Essentially, the overload of nitrogen means that marsh grass roots do not need to grow as deep to receive nutrients, resulting in much shallower root systems. Robust root systems are necessary to keep the marsh peat together, and without deep roots, the foundation of the marsh crumbles and erodes. Impacts from increased coastal development over the last century has also resulted in a severe loss of salt marshes along the New England coastline.

This "double whammy" of less stable marsh due to nutrient overload combined with greater stress from intensified storm surges and sea-level rise puts this critical habitat in danger of washing away.

So how can we protect them?

To best protect these critical ecosystems, it is important that we understand just how valuable they are, and how human activities are impacting their health. First and foremost, we must stop the onslaught of nutrients and toxins into these fragile environments. That requires cleaning up our watersheds and reducing nitrogen loading into the bays. Barnstable Clean Water Coalition is developing the Living Laboratory in the Three Bays watershed to test and demonstrate the impact of alternative technologies and strategies to mitigate nitrogen before it enters the marshes.

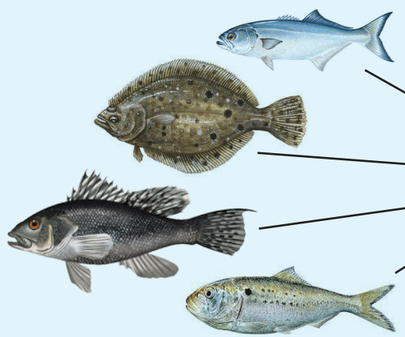
Second, there are more marsh-centric strategies to help build up the height, and therefore resiliency, of salt marshes. BCWC is working with the Town of Barnstable to explore approaches that would be a good fit for our marshes. Third, it is critical that the public appreciate what incredible ecosystems salt marshes are and the vast benefits and protections they provide our community. Next time you watch a beautiful sunset over Sandy Neck or relax with friends on Long Beach, take a minute to appreciate the salt marsh. Awareness, education and local advocacy play a huge role in how our community will address and manage extreme threats to the marshes in coming years. We may be out of the woods on this one particularly rough winter, but with rising seas and inevitably stronger storms in the future, we must take proactive steps to protect the marshes and ensure they stay healthy and productive into the future.



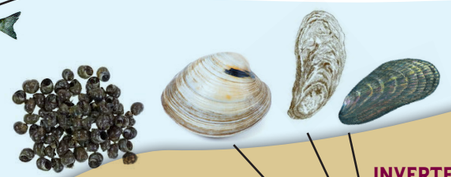
VERTEBRATES
- Diamondback terrapins
- Great blue heron
- Great and Snowy Egrets
- Least and common terns
- American Bitterns
- Northern Harriers
- Red-winged blackbirds

Switchgrass, goldenrod – *grow in marsh border*

SPEND ENTIRE LIFE CYCLE IN SALT MARSHES
- Mummichogs
- Sheepshead minnow
- Striped Killifish
- Atlantic Silversides



SPAWN/LAY EGGS IN OCEAN, LARVAL FISH HATCH AND SWIM TO SALT MARSH TO DEVELOP
- Bluefish
- Summer Flounder
- Black Sea Bass
- Menhaden
- Sea Trout



INVERTEBRATES
- Fiddler, green and blue crabs
- Ribbed mussels
- Oysters
- Quahogs
- Soft-shelled clams
- Grass shrimp
- Periwinkles

GRASSES

Smooth Cordgrass *(Spartina alterni-fora) – grows in low marsh*

Salt Hay grass *(Spartina patens), glasswort, Sea lavender – grows in high marsh*

Field Notes from Meg

Last fall, BCWC was offered the opportunity to participate in the Town of Barnstable Natural Resources' Diamondback Terrapin Headstart Program. This program was created to increase wild populations of the threatened terrapins, which are found in the Great Marsh, on the south side of Sandy Neck Beach Park. In the wild, only one out of every one hundred terrapin hatchlings survive their first year. The Headstart program goes a long way towards rebuilding this population.

Sandy environments found along the bay side of Cape Cod are the preferred nesting habitat for terrapins. Often, the females must cross developments and roads to reach the nesting site. Nests are also found along paths used by off-road vehicles. As a result, females and hatchlings crossing these paths may get hit by vehicles. In an effort to reduce hatchling loss, Natural Resource officers move these nests with eggs to safer dunes far from off-roading paths, eliminating the threat of vehicle fatalities. Near the end of August, the nests are relocated once more, this time to the Natural Resources building. Once the terrapins hatch and grow to about the size of a quarter, they are delivered to local schools and organizations, who are responsible for their care throughout the fall, winter and spring until their release.

Once the terrapins reach approximately four inches in length, they are ready to be released back into the wild at Sandy Neck, typically in late May or June. While the mortality rate for hatchlings does include vehicles and loss of habitat through development, natural causes like predation are also very common. First-year hatchlings are especially vulnerable to predation from gulls, crows, herons, crabs, raccoons, foxes, skunks, mink and rats. By caring for hatchlings over the winter, the terrapins reenter the wild roughly the size of an adult three-year-old terrapin, dramatically increasing the probability of their survival.

Diamondback terrapins play a pivotal role within the delicate salt marsh ecosystem. The marsh provides essential terrapin habitats of grasses and small pools of brackish water (a mixture of freshwater and seawater). Terrapins eat a variety of marsh organisms including snails, crabs, mussels, clams, shrimp and insects. Like all carnivores, a terrapin's consumption of smaller prey helps to regulate species throughout the marsh ecosystem. Without this population control, these animals would wreak havoc on the valuable sea grasses that keep the marsh intact. Terrapins are also bio-indicators of an estuarine environment. If the health of a salt marsh deteriorates, the health of a diamondback terrapin will decline. Understanding the importance of diamondback terrapins as an environmental indicator is imperative for continuing the efforts to improve water quality in estuaries and salt marshes in the town of Barnstable and throughout Cape Cod.

One of the headstart diamondback terrapins when it arrived at BCWC in September and the same terrapin in May. My how they have grown.

Smart, Natural Landscaping for Cleaner Water

This spring, as you're planning out your yard and gardens, we hope you will consider how your landscaping decisions impact Cape Cod and our local waters. Smart landscaping can reduce water use and actually help, not harm, the local environment and wildlife. Read below for easy tips on how you can make a difference today for Cape Cod's future.

- Reduce the use of fertilizers and pesticides or better yet, use none.
- If you must fertilize, use an organic or slow-release WIN (water insoluble nitrogen) fertilizer.
- Only fertilize lawns once a year in the fall.
- Pull weeds by hand, instead of using chemicals.
- Mow your lawn on the highest lawnmower setting, about 3".
- Recycle grass clippings by leaving them on the lawn to return nutrients to the grass.
- Use native grasses like perennial rye, and fine and tall fescues.
- Promote the concept of a natural-looking Cape Cod lawn, instead of a perfectly manicured green lawn.
- Water once a week, early in the morning to avoid water loss to evaporation. Healthy lawns only need about an inch of water a week to promote deep roots.
- Switch to drip irrigation. It's more efficient and less wasteful than conventional sprinkler systems.
- Mulch plants and garden beds to help retain moisture.
- Rethink your landscape – plant less turf/grass and plant more gardens using native, drought tolerant plants.
- Choose native plants that will attract pollinators (bees and butterflies), benefit wildlife and look more natural.
- Instead of paving, use plants or gardens on and along your walkways and driveways for a more natural look that reduces runoff and retains water.
- Clean walkways and driveways with a broom, instead of water.
- Plant more shrubs and trees to help control erosion, absorb rainwater and take up atmospheric nitrogen.

Here's a list of native Cape Cod plants that will not only make your property beautiful but are environment and wildlife friendly.

Wildflowers

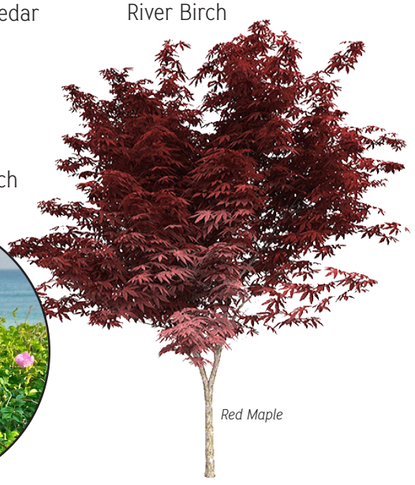
Swamp Milkweed
New York Aster
Mountain Mint
Butterfly Milkweed
Bird's Foot Violet
Royal Fern
Cardinal Flower
Jewelweed
Seaside Goldenrod
New England Aster
Boneset
Spotted Geranium
Teaberry
Cinnamon Fern
Mayflower

Shrubs

Winterberry
Virginia Rose
Steeplebush
Red Chokeberry
Gray Dogwood
Bearberry
Arrowwood
Highbush Blueberry
Sweet Pepperbush
Wild Raisin
Summersweet
Silky Dogwood
Northern Bayberry
Common Elderberry
Beach Plum
American Hazelnut
Swamp Azalea
Spicebush

Trees

Alternate-Leaf Dogwood
American Holly
Black Gum
Tupelo
Eastern Red Cedar
Ironwood
Red Maple
Black Oak
White Oak
White Pine
American Beech
Shadbush
Atlantic White Cedar
Black Cherry
River Birch



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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.

Upcoming Events! BCleanWater.org

Don't Miss the Boat This Summer! Join us at one of our events and support BCWC's work for clean water. Visit our website at BCleanWater.org for more details.

Friday, June 29th
Annual BCWC Open House
Wianno Club, Osterville

Wednesday, July 25th
Watery Wonders of Eagle Pond, Eagle Pond, Putnam Avenue, Cotuit
10am-12pm
A program in partnership with Barnstable Land Trust, visit blt.org to register and for more details.

Friday, August 24th
Clean Water Challenge Golf Tournament
Oyster Harbors Club, Osterville

Saturday, September 8th
9th Annual Cape Cod Wildlife Festival
Mass Audubon Long Pasture Wildlife Sanctuary, Cummaquid
10am-3pm

Saturday, September 15th
8th Annual Paddle for the Bays RACE Cape Cod and Beach Party
Oyster Harbors Club, Osterville
RACE: 7am-12pm
Beach Party: 12pm

Despite the dreary weather, over 600 racers joined in the fun at the Cape Cod Beer Race to the Pint to raise funds for BCWC and to raise awareness for clean water!

Photo Credit: 13 Snaps Photography