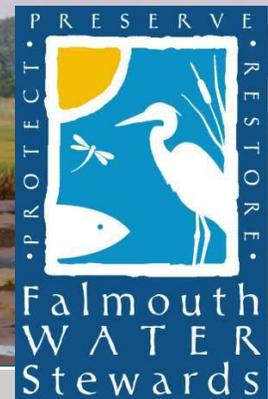




Photo: Pieter Beck



## MESSAGE FROM THE PRESIDENTS

By Deborah Siegal and Cheryl Holdren

Opening bills is never anyone's chore-of-choice, but once in a blue moon they contain a surprise, occasionally even a pleasant one. For over a year Falmouth Water Stewards has been working to bring the "Keep It Blue" brochure insert to your May water bill. We're grateful to both the Department of Public Works for choosing us as a worthy cause and the Town's Water Quality Management Committee for sponsoring this project. We'd also like to express our deep thanks to the **Falmouth Track Club** for their generous financial support toward the cost of printing the brochures. Jill Holdren, FWS Program Administrator, created the bro-

chure and shepherded the project to completion.

In late February, we organized a showing of author and film-maker Lynne Cherry's documentary series *Young Voices on Climate Change* for students at Lawrence Middle School. Lynne attended the all-day event and imparted her message of inspiration and hope to several hundred 7th and 8th graders. In addition, we co-sponsored with the Cape Cod Chapter of the Sierra Club a showing of the films and discussion with Lynne for the general public at the Woods Hole Research Center. Lynne's inspiring, short films feature children who have taken the initiative to do something significant to tackle climate change in their communities in order to ensure a healthy planet for generations to come. We hope the films have inspired some of our local youth to make a difference.

In May, we had our second annual herring walk and talk at the Coonamessett River Bogs. Fish biologists Joel Llopiz and Andy Jones (who is also an FWS board member) led an enthusiastic group on a hunt for migrating herring, while describing the life history of these fascinating, threatened local fish.

Our new stewardship program has recently been launched and you'll be receiving more information as it progresses and we work out the details.

Have you started stock-

*Cont. on p. 5*

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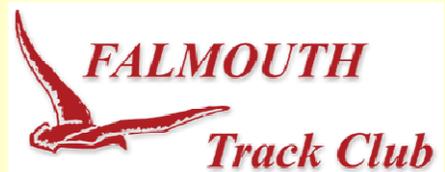
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Photo by Jill Holdren

Summer is almost here and the importance of clean, healthy waters comes to the fore once more.

A special thanks to the Falmouth Track Club (FTC)



for its generous support of the *Keep It Blue* water bill brochure effort.

For more information about the FTC and its programs and activities, visit:

[www.falmouthtrackclub.org](http://www.falmouthtrackclub.org)



PO BOX 156  
FALMOUTH, MA 02541

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Web: [www.falmouthwaters.org](http://www.falmouthwaters.org)

**Mission**

Falmouth Water Stewards' mission is to educate and inspire citizens to preserve, protect, and restore Falmouth's bays, salt ponds, estuaries, and fresh waters, and to advocate for healthy water bodies.

**Board of Directors**

- Cheryl Holdren Co-President
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Jill Holdren

*The FWS Newsletter is published twice a year and is available in PDF format on our website. Sign up for electronic delivery by writing to:*

[info@falmouthwaters.org](mailto:info@falmouthwaters.org)

**WHAT DO FLORIDA & CAPE COD HAVE IN COMMON? More Than You Might Think !**

*By Mary Hubbard*

As refugees from the winters of Cape Cod, we've learned that several water issues in Central Florida mirror those of the Cape. The fragile Indian River inland waterways, home of dolphin, manatee, horseshoe crab, wading birds, nesting bald eagles, bull sharks, osprey, and great blue herons, although cleaner than in the past, are still vulnerable to storm water runoff pollution, power boat gas leaks, and fertilizer loads during rainstorms from lawns, golf courses, and developments. Algae blooms plague those waterways as they do those on the



Viera Wetlands, Melbourne, Florida

Cape, smothering vital shellfish and eelgrass beds. Horseshoe crabs, present on earth since before the dinosaurs, have been in decline due to overfishing (for use in medicine for humans and bait for fishermen) and degradation and development of their breeding grounds. They are counted annually during their breeding period in March, and we contributed a count of twelve breeding pairs and about a dozen individuals during a half-hour period near dusk in the Keys.

Unlike on Cape Cod, the water table in most of Florida is just below the surface, so that digging a hole produces a pond. Sand and soil are piled up to form house lots less prone to flooding. Groundwater stores are overdrawn, leading to sinkholes where the water is not replenished. Grey water is stored in lakes and ponds, then used for

irrigating, while also being reabsorbed by the soil and filtering into the aquifers, a strategy we may want to investigate in Cape Cod. Invasive plants like Brazilian pepper and Australian pine are hydrophilic, crowding out native plants, which don't deplete the groundwater. Like our own invasive Autumn Olive, Brazilian Peppers are loved and spread by birds, taking over local roadsides and infiltrating fields once filled with native sawgrass, palmettos, and scrub pines.

Waste treatment in Central Florida has an advantage over water treatment

in the Cape. Because of year-round relative warmth, plants can and do play an important role in the treatment process.

North of Melbourne, in Viera, two square miles of wetlands were created to assist with sewage treatment. The wetlands consist of a large and deep (20 feet at center) lake, surrounded by acres of swampy marshland in a series of man-made cells of varying depth, where the final clean up is done by a variety of water plants. The area draws tourists and birds from around the world, with trails that can be driven, walked or biked, and provides a home to alligators, turtles, and myriad bird species, including the endangered caracara eagle

Like in most of the Cape, most households in Florida use septic systems, which fail to remove destructive nitro-

*Cont. on p. 4*

Join FWS Today!

Falmouth Water Stewards, formerly FACES, is a 501c3 non-profit organization that is mainly supported by member dues and donations from neighborhood associations, community organizations, local businesses, and concerned citizens.

Please renew your membership or join FWS today so we can continue to work to protect, preserve, and restore our fresh and coastal waters. Or, donate in any amount to help us fulfill our mission.

**MEMBERSHIP DUES**

Student	\$5
Individual	\$20
Family	\$25
Organization	\$40
Supporting	\$50
Benefactor	\$100

Dues or donations in any amount may be sent to:

**Falmouth Water Stewards  
PO BOX 156  
Falmouth, MA 02541**

Or pay or donate online:  
[www.falmouthwaters.org](http://www.falmouthwaters.org)

**Thank you for your generous support!**

*Donations and dues to FWS are always tax-deductible.*

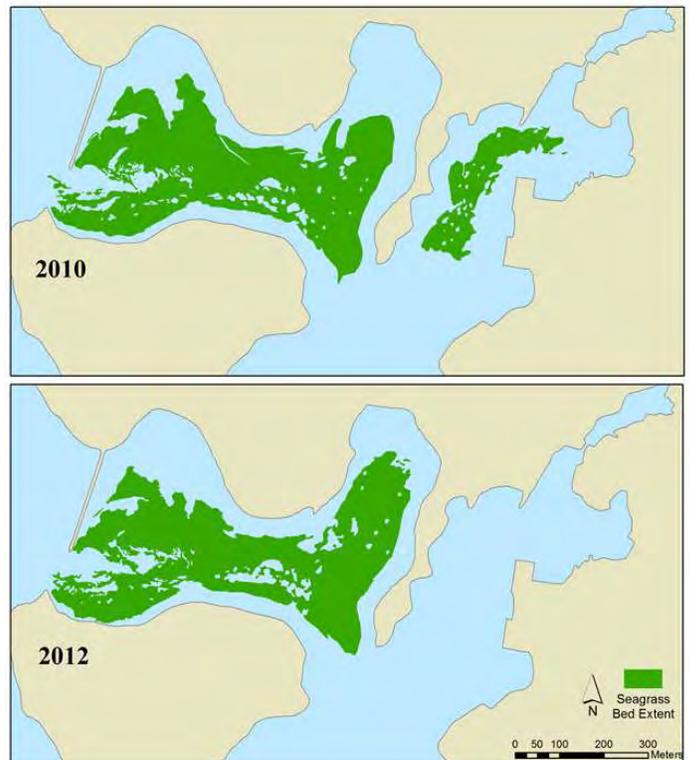
**N POLLUTION IN WEST FALMOUTH HARBOR:  
Lessons Learned & Future Outlook** *By Bob Howarth*

Since 2005, a team of researchers from Cornell University and the Ecosystems Center of the Marine Biological Lab (MBL) have been studying the response of West Falmouth Harbor to nitrogen pollution. Woods Hole Sea Grant has supported the group's work for the past several years. The harbor has received high inputs of nitrogen from groundwater contaminated by the Falmouth wastewater treatment facility for many years. Although the facility has greatly reduced the amount of nitrogen released into groundwater since late 2005, the amount of nitrogen entering the harbor has remained high due to the approximately 10 year travel time of groundwater from the facility to the harbor. As a sensitive measure of the nitrogen input, we measure the nitrate levels in the groundwater entering the harbor every winter when biological activity (and therefore nitrogen processing) is low. Nitrate concentrations remained high as of March 2015, but we expect concentrations to decrease 2 - to 3-fold by early to mid 2016.

One striking feature of our research is the large change in dissolved oxygen levels over the course of a day. Dissolved oxygen levels are often quite low first thing in the morning, sometimes low enough to adversely affect animal life, but rise steadily during the day as photosynthesis by algae and seagrasses proceeds. By sunset, oxygen concentrations are frequently 50% to 100% higher than would be expected just from equilibration with the atmosphere. To understand the consequences of dissolved

oxygen in the West Falmouth Harbor ecosystem requires continuous monitoring over at least a 24 hour period. Spot sampling during any single time of day — a common monitoring approach for estuaries — can be very misleading.

One of the surprises from our study is that feedbacks within the harbor made the nitrogen pollution worse. As water quality in the most nutrient-enriched (i.e., nitrogen polluted) area (Snug Harbor) deteriorated, the small snails and other animals that normally graze on the algae and bacteria on seagrasses became less abundant, and the growth of these algae and bacteria exploded, creating a thick sheath around each grass blade. Some of these bacteria carry out a process called nitrogen fixation, in



The distribution of seagrasses in the outer harbor (left) and Snug Harbor (right) before the die-off in 2010 and in 2012 based on surveys with side-scanning sonar. Plot from 2010 is reprinted from Howarth et al., 2014, Biogeochemistry 118: 1-20. Plot from 2012 is courtesy of Melanie Hayn.

*Cont. on p. 6*

## THE 208 PLAN FOR CAPE COD *By Doug Brown*

In September of 2011, the Conservation Law Foundation and Buzzards Bay Coalition filed a lawsuit against the EPA, asserting that it had not fulfilled its obligation to implement Section 208 of the Clean Water Act in Cape Cod, which “is intended to identify the water quality management problems of a region and to develop cost-effective and environmentally sound approaches to deal with those problems.” (clf.org). The parties in the lawsuit went into mediation but without success.

In January of 2013, the Massachusetts Department of Environmental Protection (Mass DEP) directed the Cape Cod Commission (CCC) to develop an update to the 1978 208 Plan for Cape Cod to address Cape Cod’s increasingly polluted water bodies, mainly due to nitrogen from wastewater and provided \$3.35 million to do so. The 208 Plan for Cape Cod gets its name from Section 208 of the Clean Water Act of 1978. The CCC submitted a final draft of the 208 Area Wide Water Quality Management Plan to Mass DEP on March 16. The draft plan is available on the CCC’s home page or at <http://cape20.org>

Mass DEP is reviewing the plan and will work with the CCC to revise it as needed between now and June 15, 2015, the deadline for submission of the final plan to the US Environmental Protection Agency (EPA).

Plan recommendations (excerpted from p. 1 of the CCC April 7, 2015 Newsletter), include:

- “shifting permitting from a town to watershed basis;
- Provisions for use and development of non-traditional technologies to lower cost and speed results;
- Regional-scale water quality monitoring and data storage; and
- Continued development of the financial models and decision-support tools built through the plan.”

Currently, the CCC is working with towns to identify and designate Waste Management Treatment Agencies (WMAs) by the June 15th plan submission deadline. WMAs could be the 15 Cape towns or a collaboration of towns with shared watersheds. Their role will be to implement the activities of the Section 208 Plan, including managing waste treatment facilities and designing and constructing new works. The designation of WMAs is one of the conditions of the settlement of the CLF vs. EPA lawsuit.



*Photo by Jill Holdren*

The latest developments in structuring of WMAs indicate that Falmouth will likely partner with Bourne, Sandwich, and Mashpee to create an Upper Cape Waste Management Authority.

If the conditions of the settlement agreement are not met, the case will return to court. The Conservation Law Foundation has stated that their next step will be to pursue the State Revolving Fund, which will put great pressure on state government to act quickly to invest in restoring Cape Cod’s waters to good health.

## AMAZON SMILE

Some of you may know that Amazon has a program called Amazon Smile in which you can support your favorite charity simply by purchasing your amazon goods through the portal [smile.amazon.com](http://smile.amazon.com).

The goods are the same and the prices are the same, but if you start your shopping trip using that link and choose a charity, Amazon will donate 0.5% of the cost of your eligible purchases to your chosen organization.

The next time you shop at Amazon please consider shopping through the Amazon Smile Program and choosing Falmouth Water Stewards. Thanks for your support!

## FLORIDA *(Cont. from p. 2)*

gen, phosphorus, chemicals, and pharmaceuticals from wastewater. Unlike in the Cape, there is little if any discussion about how to remedy the situation.

It is clear that the issues facing coastal towns nation-(and world-) wide, including Florida and Massachusetts, are similar: waste treatment and nutrient removal; protecting coastal water bodies from wastewater and stormwater runoff; pro-

tecting and replenishing drinking water reserves; and coping with sea level rise and climate change. In many ways, Falmouth is ahead of other towns as we now have a plan to address some of our pressing water quality issues and we are beginning to implement it. Falmouth Water Stewards will continue to work for progress on all fronts in the campaign to protect and restore healthy waters.

WATERSHED CONFERENCE

By Wendi Buesseler



Photo by Jill Holdren

The Drinking Water Session focused on water conservation as a tool for minimizing environmental impacts. Some of the watersheds in Southeastern Massachusetts have seen low water levels in rivers and wetlands due to high pumping rates from nearby public wells during droughts.

Three of our board members attended “The Future of Water in Southeastern Massachusetts”, a conference presented by the Watershed Action Alliance of Southeastern Massachusetts (WAA) in April.

The day-long schedule covered all aspects of water issues from science and data collection to outreach to stormwater to recreational waters. The morning sessions focused on topics related to managing non-profits. The Fundraising for Water session was particularly useful with ideas on ways local nonprofits can raise money to support water-related projects. The Science and Data Collection session emphasized that citizen science works best when volunteers realize they are involved with something important, the results are shared with them, and they know their work is part of a bigger effort. The Outreach session provided examples of how watershed education and awareness efforts can be leveraged for greater impact.

The afternoon sessions were focused on broader topics – Stormwater, Drinking Water, Wastewater, and Recreational Waters. The Stormwater Session discussed the need for public education programs to make every property owner aware of the steps they can take to reduce stormwater pollution. FWS’ “Keep It Blue” Initiative is an effort designed to do just this.

The session on wastewater focused on permitting of treatments plants in the Taunton River watershed and the 208 Plan for Cape Cod. (see p. 4 for an overview of the this plan).

The Recreational Waters session focused on the importance of healthy water bodies for the pursuit of recreational activities such as swimming, fishing and shellfish collecting .

FWS Board members left the conference with good ideas for future activities as well as a clear understanding that the water issues we struggle with here in Falmouth are not unique to Cape Cod, but as discussed in our article on P. 2 , are shared by communities across the state, and indeed, well beyond.

PRESIDENTS’ MSG.

(Cont. from p. 1)

ing up on cloth grocery bags to replace the single-use plastic bags that are so detrimental to the environment and will be banned in Falmouth in 2016? Thanks to a generous member of the Board, FWS is delighted to be able to offer an organic cotton bag emblazoned with our beautiful new logo. For a picture of the bag and more details, please go to p. 7.

This summer look for us at the Falmouth Farmer’s Market, Arts Alive Festival (June 20 & 21) and at other fairs, where we hope to have a table with some of our displays, publications, and organic cotton bags.

An important date to put on your summer calendars is **Thursday, July 23<sup>rd</sup>** — the date of our, and your, Annual Meeting. If you’re interested in any aspect of oysters — cultivating them, harvesting them, the role they play in cleaning up dirty waters, or the “yum yum” part, — join us to hear our guest speaker, Scott Lindell, Director of Marine Aquaculture at the Marine Biological Laboratory, talk about this local mollusk. You can find more information about the meeting and the speaker on the back page of this newsletter.

Thanks for your support!

GET CONNECTED

We’d like to make FWS membership more inclusive and let you know when things of interest are happening. Send us your email (we never share member contact information) and from time to time we’ll let you know about events and news.



Have you checked our website lately? We’re in the process of transitioning to a new website so look out for changes soon. And follow us on Facebook and Twitter to stay on top of FWS and other water-related news.

## 2015 FWS SCIENCE FAIR WINNERS

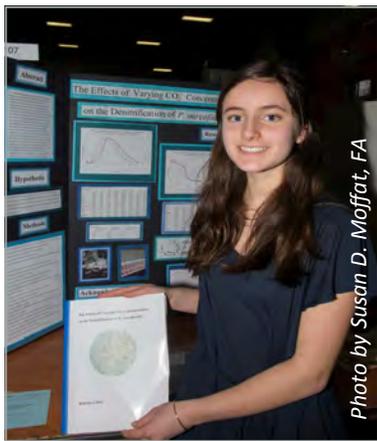
Each year, Falmouth Water Stewards gives awards to outstanding science fair projects in the area of water quality at both Falmouth High School and Falmouth Academy. This year, Falmouth Academy's Martha Clark won one of the FWS Awards with her project, 'The Effects of Varying CO<sub>2</sub> Concentrations on the Denitrification of *Pseudomonas aureofaciens*'. The results of Clark's project indicate that rising CO<sub>2</sub> levels are likely to adversely impact at least some bacteria's



Falmouth High School students, Lily Pariseault and Marcus Dalpe with their winning project.

ability to remove nitrogen, which, in turn, may impact water quality.

Falmouth High School students Lily Pariseault and Marcus Dalpe won an FWS Award for their project on the effects of ocean acidification on mollusk shells. They looked at the effect of waters of three different pHs — current ocean water, more basic water and a salt water solution titrated to be more acidic than current ocean water — on mollusk shells over time. The results: ocean acidification is bad news for mollusks.



FA's Martha Clark with her project.

## WEST FALMOUTH HARBOR (Cont. from p 3)

which the N<sub>2</sub> gas dissolved in seawater is made into biologically available forms. An increase in this process added to the total nitrogen inputs in Snug Harbor, and likely contributed to a large die-off in seagrasses there in the summer of 2010. The seagrasses have yet to recover.

With the seagrasses gone, less of the groundwater nitrogen pollution has been retained within Snug Harbor, and more has moved to the outer harbor. Increasingly since 2010, water quality there has worsened, and we are now starting to see the aggravating feedback of the nitrogen

fixation we first observed in Snug Harbor in the outer harbor as well. This could lead to seagrass losses in the outer harbor over the next few years, and so the expected large decrease in nitrogen pollution within the coming 1 to 2 years cannot begin too soon.

Once the nitrogen inputs to West Falmouth Harbor decrease, we expect a fairly rapid recovery in water quality. Re-establishment of seagrasses is often a slow process, though, and it may be some time before they again become a feature of Snug Harbor.

## SHARE YOUR THOUGHTS

Tell us about your connection to your favorite bay, pond, salt-marsh or stream.

We all enjoy and benefit from Falmouth waters in different ways. Whether it's a vernal pool that appears in your neighborhood every spring, a special kayaking spot, a really good fishing hole, a favorite cove you sail to, or your dog's preferred swimming pool, tell us about it!



Also, if you have questions about our waters, water quality, local ecosystems, pollution and/or related topics, write to us and we'll try to answer you.

You can share your thoughts, experiences, photos and questions by email:

info@falmouthwaters.org or snail mail: PO Box 156, Falmouth, MA 02541.

If you like, we'll include them in a future newsletter. Your questions (anonymized) may even be the topic of a future newspaper column!

FWS ORGANIC COTTON GROCERY BAGS *By Brenda Olson*

Falmouth Water Stewards' beautiful new shopping bags have something for everyone. They are a lovely, reusable bag option just as plastic bags are being phased out in Falmouth. They also help spread the word about Falmouth Water Stewards and the need to protect our local waters. Finally, each bag sold raises some much needed funds to allow us to continue to work to protect and restore Falmouth's fresh and salt waters. And, printed locally by Howlingbird Studio, which contributed to the cost of bags, they support our community in other ways.

We are asking local businesses to give us a nook to display bags for sale. So far we have space in **For Birds Only** and **Coffee Obsession** in both Woods Hole and Falmouth. We'll also be at the Arts Alive festival in Falmouth June 20 and 21. And bags will be available at the Falmouth Farmers' Market and other local businesses soon. If you know of a business or other venue that might be willing to sell our bags, please contact us! And please show your



*Photo by Jill Holdren*

support of the businesses who support us and healthy waters.

Our bags are made of certified organic cotton, are washable, and will last for years. Roomy and strong enough to hold groceries, their long handles make them easy to carry. Imprinted with our striking logo designed by artist Tamara Hartson Eder, they are fashionable enough to use anywhere.

**Each bag purchase includes a free one-year membership for new members.** New member buyers should send us an email or send in the form inside the bag.

FWS uses funds to create informative publications and PSAs and to support other education and advocacy activities aimed at increasing knowledge about the state of our local water resources and how we can best care for them.

Be sure to include a FWS bag in your collection!

MENTORING STUDENTS *By Patty White*

Falmouth Water Stewards continues to explore ways to work with Falmouth students on water issues. Three Falmouth High School students were mentored by Falmouth Water Stewards board member Patty White on a water quality-related project for the 2015 Science Fair. Fiona Hopewell, Emily Freedman, and Rachel Gilbert ex-



FHS Students with their Pondwatch Data Project.

*Photo by Patty White*

present the data to make it more interesting and relevant to the public, particularly students. They also suggested other ways of communicating the results of the Pond Watch monitoring program to students, including Twitter and entertaining morning announcements in the schools. Fiona, Emily and Rachel were awarded a third prize for their project. If you have ideas on how FWS can interface with local schools, let us know!

FWS PSA ON YOUTUBE!

The Oral History Project Team of FWS has created a two minute PSA. Check it out on our website, see it on FCTV, or watch it on Youtube:

<https://youtu.be/7AHzpMwbQHM>



And for those of you wondering, we continue to work on our oral history project and will be posting some choice vignettes very soon. Stay tuned!

FWS ANNUAL MEETING JULY 23<sup>RD</sup>

OYSTERS: OUR BRINY BIOENGINEERS



Thurs., July 23, 7:30-9:30 pm

Falmouth Public Library  
Hermann Room

with guest speaker **Scott Lindell**  
MBL Aquaculture Expert

*Light Refreshments*



**SCOTT LINDELL** is a fisheries and marine biologist by training and, since 2004, the Director of the Scientific Aquaculture Program at the Marine Biological Lab. In addition, he has 15 years of commercial fish farming experience.

*We look forward to seeing you there!*

JOIN FALMOUTH WATER STEWARDS OR  
RENEW YOUR MEMBERSHIP TODAY



Protecting, preserving, and restoring Falmouth's waters depends on all of us.  
Do your part by supporting FWS today.

[www.falmouthwaters.org](http://www.falmouthwaters.org)

Waquoit Bay. Photo by Jill Holdren