



Chasing Ancient Hurricanes in Oyster Pond and Beyond

Presented by
Dr. Jeffery Donnelly, Senior Scientist
Woods Hole Oceanographic Institution

at the

OPET Annual Meeting

**Thursday
July 27th, 7pm**

SEA Semester
171 Woods Hole Road, Falmouth
Light Refreshments



Come learn how the sediment layers in Oyster Pond are used to understand the impact a changing climate can have on the intensity and frequency of hurricanes.

Dr. Jeffery Donnelly, a coastal geologist at the Woods Hole Oceanographic Institution, is the featured speaker at the OPET Annual Meeting. He uses sediment cores from the bottom of Oyster Pond and elsewhere to study the long term record of hurricanes and other major coastal storms. Wind and waves from these storms carry sand into the ponds where it settles to the bottom. Over time, the sand is covered by black organic mud that accumulates during non-event years. These dark and light layers tell the hurricane history of a location. Radiocarbon dating can pinpoint the date the storms occurred. Dr. Donnelly uses this history to study how hurricane activity has varied over the last few thousand years and how the changing climate is having an impact. Looking into the environmental past provides a way to project what future changes might bring.

Doing all we can to Prevent another Algal Bloom



An aerial view of pea-green Oyster Pond on the right and blue Salt Pond on the left in mid August 2016. Martha's Vineyard is visible in the distance.

OPET spent this past year focused on protecting the water quality of Oyster Pond. We are continuing to do all we can to prevent a repeat of last summer's widespread algal bloom that turned the pond pea soup green. The bloom was made of freshwater algae species and that is why we are working to increase the amount of salt water entering the pond.

Our focus is on opening the connection between Oyster Pond and Vineyard Sound to increase the salinity levels and water flow to prevent another algal bloom.

Last summer's bloom was caused by a convergence of events. There was little to no rain due to the drought. Flow out of Trunk River was slow because phragmites plants had gradually grown into the river plus the Lagoon was full of dead eelgrass. As a result, the water in the pond became less salty and stagnant. Furthermore, the hot



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A Message from John E. Dowling — OPET President



Dear All,

This has been an exceptionally busy year for OPET, but I am pleased to report that excellent progress has been made on all fronts. The two major projects on which we have focused this year are management of the Headwaters Property which we purchased a year ago from the Woods Hole Oceanographic Institute (WHOI), and correction of the low salinity levels in the pond that are believed to have allowed the toxic algal bloom that occurred last summer.

The twenty-two acres of the Headwater land are now safely in conservation, and we are in the process of improving the land, making it accessible to the public, and are beginning to formulate a long-term management plan. A trail system has been designed and trails cut. The trailhead at the end of Fells Road has been cleared, cleaned, and three parking places installed. The trails need some

additional smoothing, trail markers and maps designed, and an informational kiosk built, all of which are underway. We are aiming to complete all of this by the middle of August.

The toxic algal bloom of last summer was deemed caused by blockage of the connection between the pond and Vineyard sound. Thus, salt levels in the pond dropped precipitously last year allowing for the algal bloom. Thanks to Chuck Martinson, Deputy Director of Falmouth's Marine and Environmental Services and the Town, two dredgings removed an enormous amount of blocking material from both the river and lagoon. Recent measurements show that the dredging is working. Salinity levels are close to desired levels, and the deep kettle hole in the southern end of the pond, which serves as salt water reservoir for the pond, has increased salinity from 1.2 parts per thousand (ppt) to 10.1 ppt. The oxygen levels in the pond are also excellent down to 8 feet, so the pond is very hospitable for our fish populations, especially herring and white perch.

Other projects are continuing, including ridding the shores of the pond of invasive species such as phragmites and purple loosestrife. Where the invasives have been removed, native species are reappearing which is exactly what we had hoped for.

Our annual OPET meeting is a bit earlier this year, Thursday July 27. We are very fortunate to have as our speaker Jeffrey Donnelly, a paleoclimatologist at WHOI. His research focuses on the environmental history of coastal ponds, including Oyster Pond. It promises to be fascinating, and I do urge you all to come. In addition to Jeff's talk, we will have a short business meeting and an update on pond conditions.

Finally, I would like to thank our Board of Directors who participate faithfully in our monthly meetings as well as serving on subcommittees and our organization in many, many ways, and also of course, our Executive Director, Wendi Buesseler who manages OPET so expertly and is involved with everything we do!

Join OPET Today!

Your Donations make it possible to continue our work to conserve and protect the natural environment and ecological systems of Oyster Pond.

Officers & Directors 2016–2017

President - John Dowling *Treasurer* - Keith Schwegel
Clerk - Eva Nilsen *Executive Director* - Wendi Buesseler

Directors:

David Bailey
Tom Davenport
Richard Hale
Melinda Hall
James Higgins

Meredith Golden
Steve Leighton
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Visit our web site at www.opet.org

Or send us an email at
info@opet.org

OPET Board meetings are open to all OPET members.

Meetings are held 4:30 pm on the second or third Sunday of the month at the Treetops Clubhouse.

We are a 501 c3 organization.
Contributions are tax deductible.
Tax Id number—04-3278142



Great Things are Happening on our Conservation Lands by Wendi Buesseler

Over the winter OPET made major improvements to our Headwaters and Zinn Park conservation lands. We now have new trails in the Headwaters land and a lovely parking area at the end of Fells Road!

Beautiful Trails

Together with the ½ mile of new trails linked with the existing pathways, the total trail network is now about a mile and a quarter long. The trails are designed to visit the highlights of the land and it is amazing how much diversity there is in these 30 acres. The trails seem much longer than they are as they travel up and down the changing topography. The paths overlook a vernal pool and wetlands, plunge down to the natural amphitheater, travel over a beech-tree ridge, move through a forest of white pines and stop at a large erratic stone surrounded by smaller rocks.



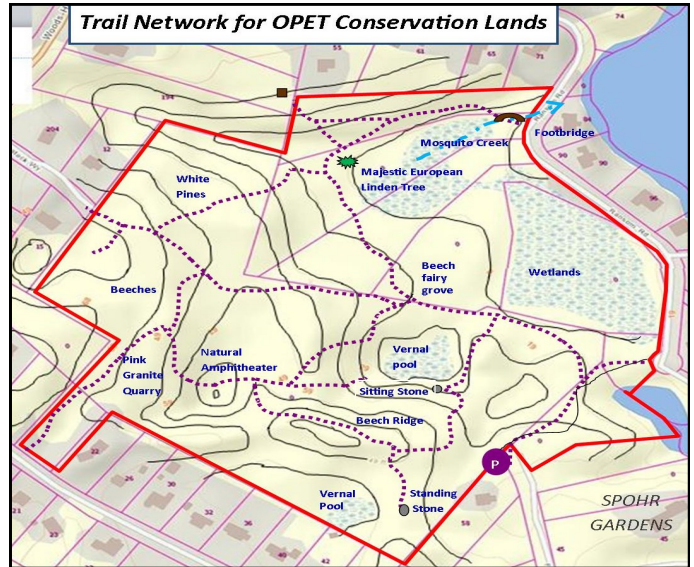
Hamilton cutting through the brush to create a trail.

OPET hired Hamilton Tree and Landscape to cut through the brush to create the new trails. Thank goodness we did! This was backbreaking work and penetrating the thick catbrier is nearly impossible with just hand tools. Hamilton had an awesome brush cutter that made short work of the thickest stand of catbrier. Because this machine was limited in where it could go, we had to slightly alter the layout of the trails. We also cleaned up and improved the existing trails.

You can now enjoy the features of this beautiful property, though some of the trails need more grooming. As some of the new trails cut through heavy brush, those plants are still trying to grow up in the middle of the pathways. Watch your email for volunteer days for more trail work! The best way to keep these trails open, however, is to use them!

New Parking!

The new parking at the end of Fells Road is finished. Creating this simple three-space parking area was more complicated than we anticipated. OPET had started negotiations with the Town to allow a parking area at the end of Fells Road. The



Town also offered paving the area which had degraded into a muddy, mucky mess. These plans came to halt when we were surprised to learn that the last 500 feet of Fells Road is privately owned. This meant we had to relocate all of the parking onto our property.



The infamous rock. Pieces of the massive boulder are in the foreground.

We hired Bill Armstrong to install the parking and generally clean up the area. (Our hope is cleaning up the area will discourage the occasional dumping that has occurred). All went well until he hit a rock that first appeared to be a small boulder... but turned out to be the size of a VW van! The rock was made of some material that would not easily break up. It took two and half days just to cut and chip away at the stone! Unfortunately these unanticipated complications increased the cost for OPET, but the parking area looks wonderful.

Items left on our to-do list are to construct a informational kiosk and color code and mark the trails. The Rotary Club of Falmouth has volunteered to build the kiosk in mid August. There is also a mess of invasive plants, including a stand of the dreaded Japanese knotweed, that need to be removed.

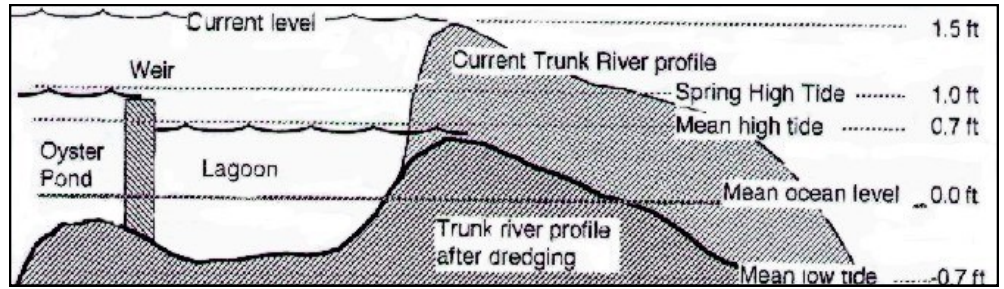
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sun evaporated the pond water and concentrated the nutrients in the pond. Our goal is to increase the salinity to 2 parts per thousand (ppt). During the bloom the salinity had dropped to 0.9 ppt. (In contrast, Vineyard Sound's salinity is 32 ppt).

There is only one way to increase the pond's salinity and that is by opening up the passage-way from Oyster Pond through the Lagoon to Trunk River and into Vineyard Sound. Any blockage in this complex chain prevents the salt water from flowing in and stagnant pond water from flowing out.

Our on-going efforts to raise the salinity started last May by mobilizing AmeriCorps to help remove phragmites blocking Trunk River. Once the bloom appeared in late August, we quickly mobilized to increase the inflow and outflow to the river. Discussions with Dr. Brian Howes, author of the Oyster Pond Massachusetts Estuaries report, and Chuck Martinsen, Deputy Director of the Town of Falmouth Marine and Environmental Services, led to the DPW dredging 20 tons of sandy debris from Trunk River. Even then, the salinity only nudged up to 1.1 ppt.

Over the winter our focus shifted to removing the blockage from the Lagoon. During autumn storms, eelgrass clumps can be carried up and dumped into the Lagoon without any corresponding outflow to push them back out. In the first week of February, a crane and a 1,000 foot dragline dredged 750 cubic yards of smelly muck from the Lagoon. The consistency was like chocolate pudding, but much smellier! OPET again owes many thanks



A profile of Trunk River, the Lagoon, weir and Oyster Pond from the mid 1990s showing how debris in the Lagoon can block the water exchange between Oyster Pond and Vineyard Sound. This also shows how this is not a new problem maintenance dredging will needed to keep this area open.

to Chuck Martinsen, who coordinated this huge effort. Chuck is also Falmouth's Herring Warden and OPET works closely with him to protect the pond's water quality and maintain free passage for the pond's herring population.



The muck being removed from the Lagoon this past February.

The blockage in the Lagoon had not only stopped the flushing of the pond, but also constricted the passage of herring and other migrating fish. Periodic maintenance dredging of the Lagoon will need to be included as part of any water quality plan for Oyster Pond.

The pond is now at 1.5 ppt and it continues to creep upwards. Salinity at the bottom of the

deepest kettle-hole in the lower part of the pond is at 10.1 so salt water is making it into the pond! Progress!



Now is the time to see Oyster Pond's Herring Fry

On many afternoons, from June until late fall, herring fry congregate at the weir. The weir is located just north of the culvert that connects Oyster Pond to the Lagoon. The herring pause here waiting for the cover of darkness to head to the open ocean. Water flow will trigger the herring to start exiting the pond and rain will bring hundreds to the weir. On June 20th, after a very heavy rain, Lou Turner saw somewhere between 10,000 and 20,000 herring swirling around the weir, there was such a mass it was hard to count! What a sight to see!

Was Last Summer's Algal Bloom Toxic?



Oyster Pond in mid-September 2016

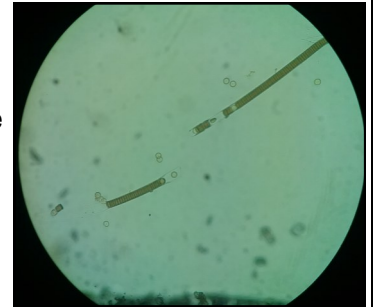
OPET's worries about the health risks of last summer's algal bloom were confirmed by a student's research project. Kristy Sullivan, a Wheaton College undergraduate, studied the algal bloom for her project in the Semester in Environmental Science program at the Marine Biological Laboratory.

She introduced nutrients into water and sediment samples from Oyster Pond to try and replicate the bloom. She found five types of freshwater algae growing in the samples including the cyanobacteria *Microcystis* and *Aphanocapsa*. Both of these can produce microcystin, a toxin that can cause nausea, vomiting, paralysis and acute liver failure in large doses or with long term exposure. We don't know if the bloom ever reached toxic levels, but we are glad we took the precaution of warning the public to avoid contact with the water last September.

A finding of particular concern is that it appears *Microcystis* is overwintering in the sediment. If we have the same conditions as last summer, we might experience another bloom. This is why OPET is continuing to work with the Town to increase the inflow of saline water from Vineyard Sound. Increasing the salinity will dampen the growth of the freshwater algae.

What is Happening in the Lagoon?

In mid-May a carpet of algae began spreading over the Lagoon. Oh no, we thought, not again! This has happened here before, but usually at the end of a hot August. Typically, it is the usual suspects that cause such growth – a hot, dry summer, little exchange between the ocean and the pond, plus too many nutrients. But the flow is strong out of the pond and salinity high in the Lagoon. And there has been plenty of rain!



Lyngbya filaments from the Lagoon breaking open. Photo - Kristy Sullivan

An email group of OPET members and scientists Kristin Gribble and Ken Foreman of the Marine Biological Laboratory have been discussing the bloom - what it is and the cause. All agree that is likely a macroalgae. Kristy Sullivan, the SES student mentioned in the previous article, also pitched in to identify the species. She saw several types of algae with *Tabellaria* being the most abundant. She also saw some *Synedra* within the free-floating pennate diatoms. A few colonies of *Microcystis* were identified and possibly *Lyngbya*, a salt water cyanobacteria. Fortunately, neither is at concentrations for concern.

What the bloom is composed of is the easy part, trying to figure out what is causing it is the difficulty. Two possibilities – the February dredging of the Lagoon released nutrients from the sediments into the water column. Another is all the rain and road run-off. It is likely a combination of the two. For now, the bloom has faded somewhat during a break in the rain. Let's hope it continues.

Gifts to OPET in memory of:

- ♥ **Barbara M. Peri** from Christopher & Pamela Pazoles, John & Carol Helbling, Kathleen Taylor, William & Mary Jane Smith, Charles & Judy Shepard, Ladies 18 Hole Golf League, William Pazoles, George & Barbara Gulgas
- ♥ **Barbara A. Lankow** from Richard Lankow
- ♥ **Chip Morse** from Olivann & John Hobbie
- ♥ **Dr. Artemas J. Stewart** from Jean H. Stewart
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- ♥ **Dick Backus** from Denise Backus
- ♥ **Jayne A. Starosta** from Norman Starosta, Peter & Cynthia Starosta
- ♥ **Harriet Needham** from Mary Lou Welch, Meredith Golden & Bob Chen
- ♥ **Erza Laderman** from Aimlee Laderman
- ♥ **Mario DeGregorio** from Pam & Chris Polloni
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- ♥ **Robert King** from Meredith Golden & Bob Chen, Jerry & Kathie Dufromont
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- ♥ **Wes Gregory** from Sue Gregory
- ♥ **Dick Edwards** from Anne Edwards
- ♥ **Aya Spektor** from Elena Gorlovsky
- ♥ **Julie Nelson** from William Fleming
- ♥ **David Sykes** from Meredith Golden & Bob Chen

Gifts to OPET in honor of:

- ♥ **John and Judy Dowling** from George W. Logan
- ♥ **Jonathan Smith** from Linda Sattel & Michael Fanger
- ♥ **Lou and Lee Turner** from Alec & Judy Ziss
- ♥ **Mindy Hall** from Susanne G. Hallstein, Leslie Hall
- ♥ **Linda and Ben Butcher** from Hilary Simonds



Help Save Oyster Pond! Use the FREE Household Hazardous Waste (HHW) Collections

August 19 - 9am – 1pm @ Mashpee High School Oct 21 - 9am – 1 pm @ Bourne Landfill.

Remember -never dump chemicals in the ground, ditch or storm drain. They can flow directly into the pond. Do not dump chemicals down your drain as they can damage your septic system and migrate to Oyster Pond. If you live in a flood zone keep all chemicals in secure cabinets above potential flood waters to prevent them washing into the pond during storms.

Come learn what role Oyster Pond plays in understanding how a changing climate can impact the intensity and frequency of hurricanes.

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SEA Association

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Light Refreshments



Waves from the 1938 hurricane crashing into Woods Hole.
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OPET Annual Meeting—Thursday, July 27th at 7pm



**The Oyster Pond
Environmental
Trust**

**P.O. Box 496
Woods Hole, MA 02543**

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