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The storms of winter 2012 leave their mark on Great Pond



Photo taken Mar 2012. Cut through barrier beach with the large delta of sand extending into the Pond. The dredge appears as a small light speck at the far right edge of the delta.

Hurricane Sandy spared the Vineyard with relatively little rain; however, the Island received sustained winds of over 40 mph with gusts exceeding 60 mph for many hours. These winds, along with the storm surge, dramatically changed the shoreline of the Island. There were significant wash-overs all along the south shore, obliterating dunes and bluffs.

The Edgartown Great Pond was no exception. The dunes were compromised with wash-overs depositing large volumes of sand and seawater in the Pond. As a result, the Pond is higher than it has been in many years.

We had planned to begin dredging on November 1st in compliance with the Town's permits, but our activities were delayed. Overseeing the open-



Photo taken Feb. 2013 shows closed beach with delta now exposed. Vertical line indicates faint evidence of dredging through the delta.

ings is the Shellfish Constabe, Paul Bagnall. He opened the Cut on November 3rd, due to the extraordinary high Pond. Unfortunately, a Nor'easter hit, and the opening immediately closed.

The Nor'easter had winds that were higher than those of Hurricane Sandy. Furthermore, these winds were sustained for two days versus the one day of Sandy. The Steamship Authority and Cape Air cancelled virtually all trips for two days. As with Sandy, there were significant wash-overs that deposited sea water and sand into the Pond. The Pond remained very high, and any positive effect of the opening was erased.

[For more photos , please go to page 3.]

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Great Pond Foundation receives grants from two local foundations

In an effort to expand our base of support, the Great Pond Foundation has begun to seek out local sources of revenue. Freelance writer Jane Hawkes has embarked on a grant writing mission for the Foundation.

In October, the Foundation applied for and received \$5000 from the Permanent Endowment of MV. The funds will go to help support the summer intern program. [See related article on page 5.] In February, the Edey Foundation awarded the GPF a \$2000 grant so that a trailer may be purchased for a dredge work boat.

Our work to improve and maintain the water quality of the Pond impacts the entire Island. We are delighted to receive the local support and recognition for our activities and goals.

Foundation President Tom Wallace reaches out to broader base for support

As I report to you this mid-year, I ask that you join us once again in reaffirming our commitment to preserve the health of an extraordinary body of water – Edgartown Great Pond.

Heartened as we are by the progress that has been made, we have been forcefully reminded of the things beyond our control. While we are accustomed to contending with coastal New England weather, Mother Nature this winter this winter has delivered one body blow after another. The aptly named Hurricane Sandy and the series of nor'easters that followed deposited huge volumes of sand inside the barrier beach, substantially enlarging the delta and increasing the challenge of creating an opening to the sea. Nevertheless, Nessie was able to create a viable a channel through the delta leading up to the barrier beach. However, in spite, in spite of three valiant attempts in December, the Town was not able to create an opening before freezing conditions shut the Pond for the winter. Our plan to resume dredging in early March has been postponed yet again by two late winter storms. As soon as conditions permit, Nessie will be back in the Pond working hard to enable the impor-

tant spring opening.

On many other fronts, meanwhile, the Foundation has been busy throughout the winter preparing for another busy summer season. Interns are being recruited to support the oyster restoration project, equipment and procedures are being put in place for monitoring and testing water quality, and programs are being coordinated with the Town of Edgartown and other Island organizations that are working hard with us to preserve the health and beauty of Edgartown Great Pond.

The work of the Foundation would not be possible without the generosity of individuals such as you. My hat is off to our loyal donors; you should be encouraged by how far we have come and know how much we appreciate your continued support. If you are not yet a donor, I ask that you thoughtfully consider making a contribution at this time. The ability to maintain the health and beauty of our Pond will require broad support from all who appreciate and value this fragile estuary.

My thanks to you all. I look forward to seeing you in person as another summer season rolls around.

Tom Wallace, President

Treasurer/Secretary Dave Luening presents mid-year report with optimism

I am pleased to report that, having passed the mid-point of our fiscal year (July 1, 2012-June 30, 2013), the Great Pond Foundation is in good financial health.

The 2012-2013 Annual

Report published last summer outlines major programs, projects, and initiatives planned for the year. It also sets forth a budget totaling \$210,000 that includes projected operating expenses for this year as well as reserves to provide for future needs.

In spite of the extraordinary challenges presented by Mother Nature, progress is being made on all fronts and planned expenses are on track. As a rough gauge of this, we are now 72% of the way through the fiscal year and year-to-date expenditures total 53% of budget.

Donations for the year are also on track at 71% of the \$210,000 goal. To those of you who have already made your contribution to the Foundation this year, many of whom have been our most loyal supporters from the very beginning, we thank you and are most grateful for your contin-ued generosity.

To those on whom we are counting on for contin-ued support, if you have not already done so, we need and would greatly appreciate receiving this year's contribution as soon as possible to assure full funding of the critical dredging operations

A special appeal goes to those who appreciate and value the Great Pond but have not yet become supporters. The alarming condition of other ponds throughout Southeastern Massachusetts is a wake up call for us to continue every effort to preserve the health of our Pond before it is too late.

If you have questions or would like additional information about the finances of the Foundation, we will be pleased to respond. Just let us know. Thank you all for your support!

Finally, Edgartown Great Pond is opened but with delays in spring dredging activities



Wilson's Landing after Storm Sandy

The Fall/Winter season started with a bang on the Edgartown Great Pond. First we experienced the wrath of Hurricane Sandy in late October. This was followed by a much less publicized but equally potent Nor'easter one week later.



Nov 3, 2012 cut made after Hurricane Sandy

Both storms caused the ocean to wash over the barrier beach in several locations. The area of the Cut and Delta were expanded as sand and water were deposited into the Pond. The rain and wash over resulting from the storm surges also caused the Pond level to rise to the highest levels anyone has seen.



Closed beach February 2013

early December. All attempts failed as the beach and Delta had grown so significantly, and the wind and tides failed to cooperate.

We launched the dredge and began dredging in the second week of December. Fortunately, we experienced generally good weather and were able to make significant progress eating through the sand that had been deposited into the Delta with the two storms. We dredged for three weeks and were able to create a well defined channel approximately 20 feet wide and 6-10 feet deep.

On March 15th the Town successfully opened the Pond. The high Pond and significant volume of water resulted in

a very productive cut. As of this writing on March 19th the cut was approximately 100 feet wide and flowing well. The Pond height has reduced as well.

The high Pond and lack of a Fall opening required that the Town attempt to open the Pond as soon as the threat of ice and low Pond temperatures would not impact the shellfish population. This unfortunately coincided with our March dredging activities.

So, our dredging has been delayed and may not occur this Winter/Spring as the permit is only valid until April 1. If so, our next opportunity for dredging will be November 1.



Nov 9, 2012 channel closed after Nor'easter

Paul Bagnall, the Edgartown Shellfish constable who is responsible for opening the Pond, attempted to make the cut three times in mid-November and

Text and photos by John Coskie



Opening of barrier beach March 15, 2013

Local marine biologist explains the threat of Dermo disease on local oyster population

Dermo is the common name for a disease caused by the parasite Perkinsus marinus, that affects our Eastern oyster, Crassostrea virginica. There are many related parasites that cause perkinsosis in marine bivalves and have caused tremendous economic losses around the world. On Martha's Vinevard, we have seen the devastating effects of Dermo. We have seen the sickly-thin and watery animal on the half shell where creamy, ocean-meets-butter flesh should be. We have seen the empty shells on the sand, serving only as habitat for smaller animals and as collectors of mud. But if you look closer, you will now see oyster spat on that shell. Spat - newly set or juvenile ovsters - are the sign that the population is reproducing and the future of the pond may be blessed with oysters.

The story of Dermo began in 1946 in the Gulf of Mexico with widespread oyster mortality. Initially blamed on local oil extraction activity, the cause was eventually determined to be what we now call Dermo. Until the late 1980's dermo was a southern disease, occurring from Chesapeake Bay and south. Then, following a series of unusually warm winters, Dermo was detected from Delaware Bay to Damariscotta Maine within a few years. It is generally (yet not unanimously) thought that Dermo did previously exist at these northern locations at very low levels prior and the favorable conditions allowed it to reproduce and take hold within the oyster populations. It wasn't until 1994 that the first mild Dermo infection was detected on Martha's Vineyard.

The Dermo parasite gains access to the oysters while it is filtering water in search of unicellular plants called phytoplankton. An adult oyster can filter up to 30 gallons of water a day and cannot avoid ingesting the parasite if it is present in the water column. Most parasites pass through the

To diagnose and measure Dermo infections, small pieces of tissue are stained with iodine solution. Under a compound light microscope, Dermo cells can be seen as black spheres. Above is a heavy infection.



digestive system of the oyster, while some – and it only takes an initial few – penetrate into nearby cells. Once inside its host, Dermo will multiply and infect additional tissue. As this happens fecundity may diminish, and mortality will typically occur in about 3 years.

In their initial investigations, scientists determined important characteristics of the disease including the effects of temperature and salinity. Temperature is crucial to the seasonal cycle of Dermo disease. The presence of the parasite is reduced in the cold winter months sometimes so low it cannot be detected. When water temperature warms to about 15C (or 59F) it begins to proliferate again within the oyster host, and will peak in infection intensity and prevalence within the population sometime in late summer to mid-autumn, depending on location. During my field research in 2008 and 2009 I tested oysters from Edgartown and Tisbury Great Ponds as well as Oyster Pond, monthly during the summer seasons. I saw infections increase rapidly between June and July, and peak in the second half of September. However, one of the most glaring things I learned during my research is that Dermo levels do not follow the same pattern two years in a row, and temperature does not run the show alone! Salinity is the other influencing factor.

Salinity, we know, changes suddenly in the Great Ponds as they are opened to the ocean, and can range from 12ppt (parts per thousand) or less in the summer to

about 28ppt when they are tidal (open ocean is 33-34ppt). Salinity probably drops down much lower in the winter and spring when openings are fewer and contributing streams are running strong. Typically, Dermo favors waters above 15ppt. That is not to say that it is not found in fresher water or that fresh conditions will protect oysters from the disease, but that oyster mortalities are less like to occur at low salinity.

It is probably the combination of warm water and evaporative conditions that increases salinity, and encourages parasite growth in the late summer. Studies have shown that very low salinity and temperature in combination are more effective at reducing infections than either factor on its own. Such combination may occur in the Great Ponds during a good cold winter when the ponds are rarely breached (except by a strong north eastern storm) fresh water from springs and creeks accumulates. Conversely, mild winters may allow the parasite to retain more of its presence, thus causing more or greater infecas the summer tions progresses.

Fortunately, the future is not bleak for our Great Pond oysters anymore. Fishermen and shellfish constables now report that many oysters are growing to market size and that mortality seems to be low. During my field work I observed mortality rates that were very low compared to those of Delaware Bay, for example, where many Dermo report continued

oyster beds still experience heavy Dermo infections. There are many reasons why mortality may be low. My research supports the hypothesis that there is an increase in resistance to Dermo disease. With time and continued exposure it seems that our oysters are developing resistance and that oysters in Edgartown Great Pond is leading in this trend by a small margin. This doesn't mean that Dermo will ever disappear or that mortality will never occur but it does mean that there is ample reason for hope.

I strongly believe that the immediate future of the oyster populations lies in the hands of the resource managers. Er intern constant. By deploying masses of shell into the ponds, the town constables provide substrate for spat to settle which is especially essential when the adult population is suboptimal. Recently increased efforts by the Martha's Vineyard Shellfish Group to produce millions of spat from hatchery reared larvae will – if hey have not already – produce considerable results and will surely help to ensure a healthy oyster population for the next generation.

Emma Green-Beach is a native of Martha's Vineyard and the grandchild of the late Warren and Terry Beach of Wintucket Cove on Edgartown Great Pond. Emma was a summer employee of the Martha's Vineyard Shellfish Group, Inc from 2006-2010 and Martha's Vineyard Vision Fellowship Alumnae. She received her Masters of Science degree from Rutgers University in 2011 from the department of Ecology and Evolution. Her thesis titled Dermo Disease on Martha's Vineyard: Infections of Perkinsus marinus and its influence on oyster host population structure focused on the oyster populations of Martha's Vineyard. She is currently employed by the Marine Biological Laboratory in Woods Hole as a Research Assistant in the Scientific Aquaculture program.

Summer intern reports on 2012 oyster restoration project

Last October (2011) Rick Karney brought over 1,000,000 baby oysters to be overwintered in the pond. We set them into the muddy bottom to protect the young oysters from ice on the surface of the pond. These oysters were brought up in April by Boo Bassett and were worked with throughout the 2012 summer season.

In June 2012 we made chicken wire baskets filled with scallop shells for the remote set*. We proceeded to put four lines of these collectors** in Slough Cove and in Job's Neck Cove. One PVC square collector was placed outside the cove. This collector was used as a natural set later in the season .There were ten spawning cages inside and outside of Swan Neck. Each spawning cage was hung with collector bags. There were eight bags to each spawning cage, approximately 80 all together.

In the interim , Ava Petricone and I continued to make bags for the remote set (we needed 300.) Oysters kept the bags in the pond are free of algae overgrowth and predatory marine animals -such as green crabs and eels. We continually checked for signs of disease.

In July, Boo and I, set up the remote set on the property of a neighbor who allowed us to use her electricity to power the spawning tanks. In each of the tanks there were roughly 150 collector bags of oyster larvae brought from the Vineyard Haven Hatchery. They were fed algae daily. Every other day the tanks were emptied and refilled with fresh pond water. This process took ten days. We released the oysters, in the previously made 300 collector bags, on rafts all over the pond. We then took the remote set apart and returned the pieces to the Shellfish Department "Pit".

Rick Karney brought an additional shipment of larvae from the Lobster Hatchery in the beginning of August. We set up a natural set for these larvae on rafts.

Throughout the summer we continually culled the 1,000,000 oysters from the 2011 season, leaving the smaller oysters in the collectors so they could grow, releasing the larger more substantial/adult oysters throughout the pond. This entailed cleaning and algae removal, walking the pond perimeter in intervals to throw those that had been washed on shore back into the pond. The health and robustness from last summer's juveniles had a 90% success rate.

The oysters' natural spawning was not good this year . Several samples were sent to Woods Hole Oceanographic Institute for testing. We are unsure if the lack of spawning is due to climate , disease, or human factors. We hope to know soon.

At end of August we began preparing oyster bags/beds readying them to "over-winter" by moving the cages to protected coves and sinking them, marking these areas with buoys. We took up all the large collector cages that will not be in use and mushroom anchors that have held them in place. We then stored them off the pond at the "Pit".

*remote set - tanks made for holding, growing oyster larvae before releasing into pond system built on land with water filters and pumps

**collectors - There are several types made: some are made with chicken wire and scallop shells; others are made with plastic plates attached to buoys. There is also a square PVC floating collector.

Marco Petricone, Summer Intern Junior at Martha's Vineyard Regional High School

Understanding dredging: the politics, the science, the mechanics, the wisdom, the results

Editor's note:

Dredging for the Edgartown Great Pond ac-counts for almost half of the entire budget for the Great Pond Foundation. The operation oc-curs two to four times a year, depending on a number of variables. It is important that our friends and supporters understand the basics of our dredging operation. So, we are offering the following as a primer of sorts. We hope you find it informative!

Invasive Phragmites growing along the Pond edge.

The problem.

Run-off from local septic systems, and nutrient-rich contaminants like fertilizers as well as naturally occurring organic debris have leached into the Pond. As development and other human activity increase, this run-off has caused an overload of nitrogen, phosphorus, and organic matter which then stimulates a dense growth of phytoplankton (algae), re-ferred to as "algal blooms".

The algae concentrate on the surface of the water, turning it a murky green and impeding light to penetrate. Some of the algae are consumed by herbivores; most die and sink to the pond bottom. This debris along with the diminished light virtually smothers the oxygen producing organisms. The water becomes stagnant, unable to support aquatic plant and animal life. The Pond "dies' and eventually is filled in by noxious plants like *Phragmites*.

A heavy mat covers Pond surface during algal bloom

Mother Nature/ human clean-up efforts. The barrier beach is breached sporadically through natural weather and storm events.

The Pond water can then be flushed clean with sea water. Over the years, farmers and fishermen have also manually opened the pond to the ocean. For the past twenty years, efforts have been made to address the problem of excess nutrient loading in the Edgartown Great Pond. In the mid-1990's, in response to several studies on the Pond water quality, the town of Edgar-town upgraded its waste water treatment plant; however, nutrient-rich ground water from the old plant will continue to impact the Pond for some years to come.



Town excavator digs a channel through the barrier beach

Since 1995, the town has been manually cutting a channel through the barrier beach to flush out the Pond and introduce clean sea water. These openings can close up in a relatively short amount of time, often before a good flushing has been achieved

In 2003 the town dredged the channel; however, financial constraints prevented the town from continuing the practice. In 2008 the Great Pond Foundation began its dredging program using a rented dredge. After a hugely successful fund raising campaign, the Foundation was able to purchase its own dredge "Nessie" and has maintained a dredging schedule every year since.

Background.

The Massachusetts Department of Environmental Protection defines a great pond as any pond or lake that contained more than 10 acres in its natural state. Ponds that once measured 10 or more acres in their natural state, but which are now smaller, are still considered great ponds. According to its website <u>http://www.mass.gov/dep/ water/resources/grtpond.htm</u>, there are sixteen great ponds on Martha's Vineyard, Edgartown Great Pond being the largest at 890 acres.

The Pond is a spring-fed barrier beach pond, owned by the Commonwealth of Massachusetts and managed by the town of Edgartown. Open to the public, the Pond is enjoyed by shoreline (riparian) property owners, island residents and visitors who swim, sail, fish, bird watch, kayak, etc. Just as importantly, the Pond is home to a large commercial shellfish population and other marine flora and fauna.

The Players and the rules.

The town of Edgartown is authorized by the Commonwealth of Mass to manage the Pond. A number of entities are involved in the opening/dredging process: the Pond Advisory Committee, which serves as a consortium of town departments and private citizens with common interests in the Pond; the Dredge Committee, which manages the town dredge used in Edgartown Harbor (not the Pond); and the Shellfish Committee, which is responsible for managing shellfish resources and the opening of EGP to protect the fishery. Shellfish Constable Paul Bagnall, of the Shellfish Committee, has responsibility for the actual openings.

Cutting of the barrier beach and dredging in the Pond are permitted only under strict regulations. Dredging may be done only during the months between October and March and may not be done in concurrence with the opening of the beach. As a rule the barrier beach is opened three to four times a year, usually in April, August and the fall. The summer opening is the most important for the Pond as it occurs when the water is warmest and most susceptible to algal blooms.



An aerial view of the channel cut through the barrier beach

The Dredging process.

When the barrier beach is opened (either by storm or human effort), sand is introduced from the ocean side to the Pond, and a delta is formed at the mouth of the channel. The dredge is used to move material (sand, silt, organic matter) from behind the barrier beach at the delta. Traditionally a cutter head acting much like a



Roto-Rooter digs and suspends material that is then sucked up into a pipe and deposited on the barrier beach as "beach nourishment".

This method works best on hard compacted material; however, we found that using the Fan Nozzle works better than the cutter head for the lighter less compact material of the delta. There are also no moving parts and thus, fewer chances of equipment failures or breakdowns with this method.



Dredge is launched into Pond from trailer

While most dredges require cranes to get them into the water, our dredge (fondly named "Nessie") is launched much like a boat off a trailer. Such portability allows us to launch from virtually any site.

The dredge is powered by a 280 horse-power turbo-charged diesel engine and has several pumps. A large pump move s mate-rial with the smaller ones operating the dredge hydraulics. Unlike most dredges that have their power plant expose on the platform deck, Nessie's power plant sits within the hull where most leaks can be contained. It also organic vegetable oil in its A great aerial shot of the dredge's progress through the uses



"Spuds' anchor the dredge as fan nozzle sucks up sand

Once launched, the dredge moves via two outboard motors at the rear corners. To secure its position at the dredge site, four "spuds" are lowered from each corner of



Seen from above, dredge cuts through delta. Notice, at upper right, the length of pipe extends back to the beach.

the dredge to the Pond bottom. The fan nozzle then sweeps back about twenty feet and forward about 10 feet sucking up sand and digging to the desired depth of six to eight feet. A 1200 foot length of pipe moves the sand to the beach.

Depending on how heavy the material is, the dredge can move the sand 3,000 feet with a productivity of 200-300 cubic yards per hour. Once a section is done, the spuds are raised, the dredge moves forward to the next section.



delta.

The timing of beach openings depends on variables such as weather, tides, availability of excavator, height of Pond water, etc. Given the sometimes unpredictability of New England weather, plans for the cuts can change at a moment's notice. The Foundation coordinates its dredging efforts around these openings to dredge as much as possible within the time allowed.