

THE IPA NEWSLETTER

Mystic Lake, Middle Pond, and Hamblin Pond in Marstons Mills, MA

Summer 2010

A quarterly publication of the Indian Ponds Association, Inc.

Vol.10 No. 3



CYANOBACTERIA BLOOMS IN MYSTIC LAKE AND MIDDLE POND; HAMBLIN POND CLEAR

Abundant phosphorus in the water, coupled with hot summer weather, encouraged an early algal bloom in Mystic Lake, which worsened in July. Middle Pond remained clear and inviting through most of July, as the hot days continued. On July 20, dead mussels were reported in Mystic Lake, a smaller replay of last summer's catastrophic die-off. Hamblin Pond continued to remain clear and to be a favorite swimming site.

During the last week of July, the IPA received a report from consultant Dr. Ken Wagner that he had identified two species of algae in water samples from Mystic Lake, one of which was cyanobacteria. The IPA reported this information to the Town of Barnstable Health Division, which sent personnel out to take pictures. The photos were sent to the Massachusetts Division of Public Health (MA DPH), which declined to test the water at that time, but instructed that if the pond began to look like paint, they should be notified.

Cyanobacteria, or "blue-green algae", are single-celled algae that live in a great variety of habitats, including ponds. Under certain conditions, they secrete various kinds of toxin. It is thought that such toxins are probably responsible for the last year's mussel mortality in Mystic Lake and in Middle Pond this summer. These toxins can also be harmful to people and pets, which is the reason that it may not be safe to swim during an algal bloom.

In late July, Holly Hobart (IPA President) phoned Tim Simmons of MA Natural Heritage & Endangered Species Program (NHESP) and left a message that there was an algal bloom taking place in Mystic Lake and that mussels were dying. NHESP contacted MA DPH and asked them to test Mystic. On August 6, MA DPH reported back to the Town and Hobart that they had found cyanobacterial cell counts exceeding the state's threshold of 70,000 cells per milliliter and that residents should be notified that the pond was closed to swimming. The Town posted warning notices at the Race Lane and Sawmill Road ways to water. Hobart sent an e-mail on August 6 to all people living around Mystic Lake and Middle Pond for whom she had e-mail addresses, informing them of the closure.

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INVASIVE *HYDRILLA* FOUND IN MYSTIC LAKE

On August 16, IPA Vice President Bob Nichols was assisting consultant Ken Wagner with sediment sampling in Mystic Lake. Bob pointed out a bushy green weed under the water near the western shore that he had been concerned about. Suspicious, they took a sample for later identification. It turned out to be a plant that, if unchecked, would be a major problem. *Hydrilla verticillata* is an extremely fast-growing, invasive plant.



Hydrilla verticillata. Note that the leaves form whorls of 4-8 leaflets surrounding the stem.
Photo by Robert Nichols.

Hydrilla was brought to the United States as a decorative plant for aquariums, and somehow escaped into the wild, where it forms huge weedy masses in freshwater lakes and streams. It is spread by boats and outboard motors that are transported from infested ponds to clean ones, and also on the feet and in the droppings of birds. It spreads from plant fragments, buds, and also by means of tubers that can send runners as far as 25 feet from the parent plant. It infests ponds throughout the southern US and is making inroads in northern states. It is extremely difficult to eradicate.

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This newsletter, with a circulation of over 650, is a forum for the exchange of ideas on matters germane to the IPA mission and, as such, the views expressed by authors of articles do not necessarily represent official IPA policy.

IPA ANNUAL MEETING REPORT

The IPA held its annual meeting on July 11 at the lovely summer home of Jon and Debby Halpert and Janis and Michael Maloney, overlooking Mystic Lake and Middle Pond. An estimated 75 members and guests were in attendance. The weather cooperated again, giving us a beautiful afternoon for the 4:00 pm meeting under the trees, which was followed by a social gathering with wine and hors d'oeuvres.

Two new Directors, Bob Nichols and Emily Wheeler, were elected to 2-year terms, replacing outgoing Directors Nancy Wong and Jane Smith, who had both served the maximum three 2-year terms. Current Directors Jon Halpert, Holly Hobart, and Bob Kohl were re-elected to their third 2-year terms, and current Director Gay Rhue was re-elected to a second 2-year term. The Schwarm Scholarship award, a check for \$1,000, was presented to Nicholas Atcheson of Marstons Mills. The minutes and treasurer's report were accepted and approved. President Holly Hobart, in her report, summarized current developments with the forthcoming alum treatment, the ongoing gray willow eradication project, and organizational developments within the IPA to encourage participation on the Board of Directors. In that regard, she announced that Alex Frazee had recently agreed to serve as an Associate Director. At the end of the business meeting, a panel consisting of Holly Hobart, Emory Anderson, Carl Thut, Bob Nichols, and Rob Gatewood answered questions from the audience about the alum treatment of Mystic Lake, scheduled to take place this fall.

During the discussion, questions were raised regarding the continued presence of the invasive purple loosestrife plant around Hamblin Pond and also the need for a derelict boat and debris cleanup on Hamblin Pond. Although no firm decisions were made, it was agreed that a new 3-year permit for the removal of purple loosestrife should be obtained from the Town Conservation Commission, and that plans should be prepared for organizing a derelict boat and debris cleanup on Hamblin Pond either this fall or next spring.

Following the business meeting, the Directors met briefly to elect officers for the following year. Elected were Holly Hobart, President; Bob Nichols, Vice President; Carl Thut, Treasurer; and Emily Wheeler, Clerk.

CYANOBACTERIA BLOOMS IN MYSTIC LAKE AND MIDDLE POND; HAMBLIN POND CLEAR *(Cont'd from page 1)*

Meanwhile, in Middle Pond, the algal bloom did not appear as severe as in Mystic, but mussels were dying in alarming numbers and the water became cloudy and offensive. The week after Mystic was closed to swimming, MA DPH tested Middle Pond at the request of the IPA and found cell counts slightly in excess of the state threshold. The Town promptly informed the IPA and posted notices at the public beach. On August 13, people living near Middle Pond received e-mails from Hobart that Middle Pond was closed to swimming.

The policy of MA DPH is not to reopen a beach until the water has tested below the threshold of 70,000 cells per milliliter (ml) for two successive weeks. During the height of the bloom, Mystic Lake's counts were as high as 200,000 cells/ml. Both ponds subsequently cleared up as air temperatures cooled. Mystic Lake was reopened to swimming on August 20. It is anticipated that Middle Pond will be reopened after testing during the week of August 22.

The alum treatment of Mystic Lake, which will begin September 20, is expected to create an immediate improvement

in that pond's water quality and a long-term improvement in the water of both Mystic and Middle (see article on page 4).

The waters of Hamblin Pond remained clear and untroubled by algae throughout July and August.

Holly Hobart

MA DPH publishes informational material for the public concerning the dangers of cyanobacteria. You can find these at:
<http://www.mass.gov/?pageID=eohhs2homepage&L=1&L0=Home&sid=Eeohhs2>.

To be included in e-mails from the IPA concerning the ponds, please send an e-mail to: info@indianponds.org.

INVASIVE *HYDRILLA* DISCOVERED IN MYSTIC LAKE (Cont'd from page 1)

Only two other ponds in Massachusetts have *Hydrilla*. One of those is Long Pond in Centerville, where it was first discovered in 2001. The Town of Barnstable has spent \$20,000 to \$25,000 per year over the past five years on professional eradication using pesticides, without actually getting rid of it. The Massachusetts Department of Conservation and Recreation has covered some of that cost through grants. The difficulty of the task is attested to by Rob Gatewood, Director, Barnstable Conservation Division, who said that tubers that have been in Long Pond's sediments for as long as nine years, after removal of the stems and leaves, are still sprouting.

This is yet one more problem for Mystic Lake, a pond that already has serious problems with excess phosphorus, algae blooms, and dead mussels. The IPA immediately filed a Request for Determination of Applicability (RDA) with the Conservation Commission to allow immediate manual removal of the plants by a team of volunteers.

The following day, Bob and Annette Nichols searched the shores of Mystic Lake and discovered several more patches of *Hydrilla*. Most of these are small, less than 10 feet across, but one patch covers an area of approximately 15 x 30 feet. They have also searched the entire shoreline of Middle Pond, but have found none there.

The IPA's manual removal plan involves a team of volunteers to be trained by Ken Wagner, a certified lake management professional with *Hydrilla* experience. The team will first surround a clump of weed with a specially-constructed

fine-mesh net. The net has floats on the top edge and sinkers on the bottom edge to completely enclose the clump and prevent any fragments from escaping. Using rakes, the team will then harvest the plants within the encircling net and place them into plastic bags, which will be hauled away for disposal. After an area is completely cleared, a benthic barrier of black, special-purpose cloth called Aquascreen will be placed over the area and held down by a weighted PVC frame. This barrier will remain on the bottom to prevent re-sprouting from tubers. Vigilant monitoring of the eradication sites will continue until no further signs of *Hydrilla* are observed, which can take years.



Extreme case of infestation of *Hydrilla* in a pond. Photo from www.mainevolunteerlakemonitors.org/mciap/herbarium/Hydrilla.php

To learn more about *Hydrilla*, see the following:

Massachusetts Department of Conservation and Recreation's (MA DCR) fact sheet, <http://www.mass.gov/dcr/waterSupply/lakepond/factsheet/Hydrilla.pdf>;
 MA DCR's "rapid reponse plan" for dealing with a *Hydrilla* infestation, <http://www.mass.gov/dcr/watersupply/lakepond/downloads/rrp/hydrilla.pdf>;
 more information and photos, <http://plants.ifas.ufl.edu/node/183>; and
 "The Perfect Aquatic Weed", a scientific article on *Hydrilla*; with many references, <http://plants.ifas.ufl.edu/node/184>.

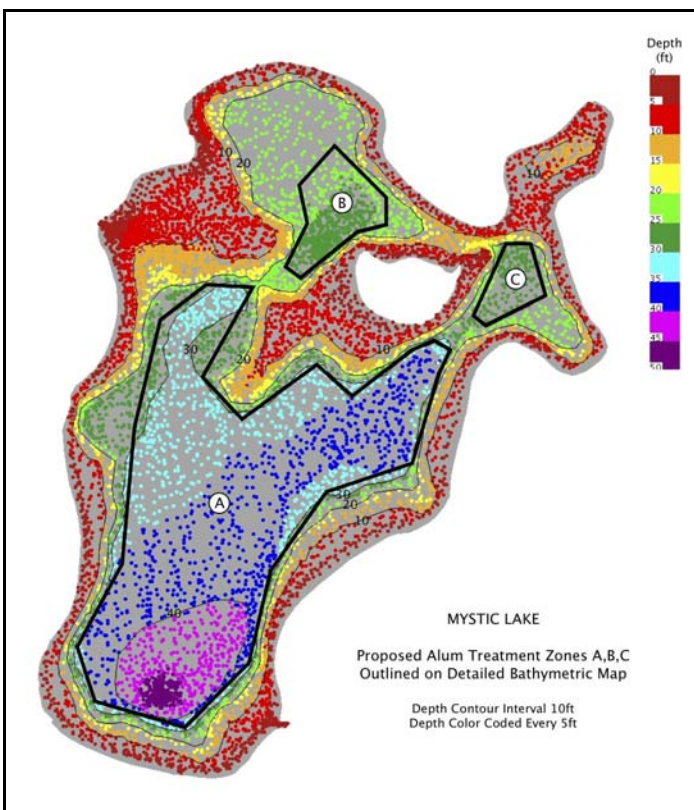
THE IPA NEEDS YOUR HELP IN FIGHTING HYDRILLA! PLEASE CONTRIBUTE TODAY!

Read the letter accompanying this newsletter and use the enclosed remittance envelope to send your tax-deductible donation. Write "Hydrilla" by "Other Donation" on the envelope.
 If you are not already an IPA member or have not renewed your membership, please do so today.

ALUM TREATMENT OF MYSTIC LAKE TO BEGIN SEPTEMBER 20

After six years of work and waiting, the alum treatment that is designed to cure the excess algae in Mystic Lake is actually going to happen. The Town has signed a contract with Aquatic Control Technology, Inc. (ACT), a company with considerable experience in the remediation of ponds. They will provide the equipment and will apply the alum (aluminum sulfate) and buffer (sodium aluminate) solutions, in carefully measured proportions, to the lake. Supervising the work will be Dr. Ken Wagner, an expert in lake management. The team of Wagner and ACT accomplished the successful alum treatment of Long Pond in Brewster/Harwich in 2007.

The initial phase of the alum treatment took place on August 17, when Dr. Wagner took water and sediment samples and observed the mussels in Mystic. The samples were sent to a laboratory for analysis. The concentrations of phosphorus found in sediment samples at each carefully charted location will be used to calculate the dosages of alum to be applied to those areas. Accompanying Wagner was IPA Vice President Bob Nichols, who supplied his boat, GPS, and his many years of experience on and around Mystic Lake.



Footprint for alum treatment of Mystic Lake showing the three deep basins (A, B, and C) to be treated. Dots represent the 11,000+ digitized depth soundings made by IPA Vice President Bob Nichols.

The treatment “footprint” in Mystic Lake includes only water deeper than 25 feet to avoid mussel beds in shallower water. The alum solution will be injected about 10 feet below the surface, where it will form “floc”, a flurry of sticky particles that resemble snowflakes. Floc drifts to the bottom of the lake at a rate of about 6 feet per minute. When it reaches the bottom, the aluminum in the floc bonds chemically with phosphorus in

the sediments to form an insoluble compound much like sand. This compound is extremely stable and serves to “lock up” the phosphorus, preventing it from dissolving in the water and acting as a fertilizer for algal blooms. As it descends through the water column, the floc picks up particles of algae and bacteria suspended in the water and carries them to the bottom, thus producing an immediate improvement in the transparency of the water.

Mussels and other pond life will be monitored during the entire treatment process, which will be halted if mortality or stress is observed. Monitoring of pH and other chemical indicators will be done during and immediately after the treatment, and a professional mussel survey will take place one year later to assess long-term effects.

Equipment and materials will be launched from two locations on Mystic Lake, one at the southwest corner and the other at the Race Lane way to water. The principal piece of equipment is a barge like the one in the photograph below. The initial application will be limited to a 6-acre area, followed by three days of observation and monitoring of mussels and other



Motorized barge used for injecting alum solution into a lake.

animals for mortality or behavioral indications of stress. At the end of the three days, the remainder of the footprint area will be treated, one small square at a time. Different concentrations of alum will be applied to each square, depending on the concentration of phosphorus in the sediment of that area. The entire treatment is expected to be completed in about 10 days.

People should stay out of the water during the treatment period, and boats should avoid approaching the barge, which is unable to maneuver to avoid other craft. Swimmers can return to the water as soon as the treatment is finished. The treatment chemicals leave no residue in the water. The only difference you will see is a pleasing increase in transparency.

As groundwater flows through the Indian Ponds on its way to the sea, it flows first into Mystic Lake and then into Middle Pond. Thus, when Mystic is rid of its excess phosphorus, the water flowing into Middle will also be lower in phosphorus, and over time, the water quality in Middle Pond will gradually improve. If you have questions about the alum treatment, please send an e-mail to info@indianponds.org.

Holly Hobart

WATER FLOW THROUGH THE INDIAN PONDS

The Indian Ponds watershed is delineated in the 2006 pond study report (www.indianponds.org/pond_study_results.htm) prepared by the Cape Cod Commission. Groundwater flows through the ponds from northwest to southeast. It flows into Mystic Lake primarily along the underwater slope of its northern and western shores. Groundwater flows out through Mystic's eastern and southern shores into Middle Pond, through its entire northwestern shore. Groundwater then

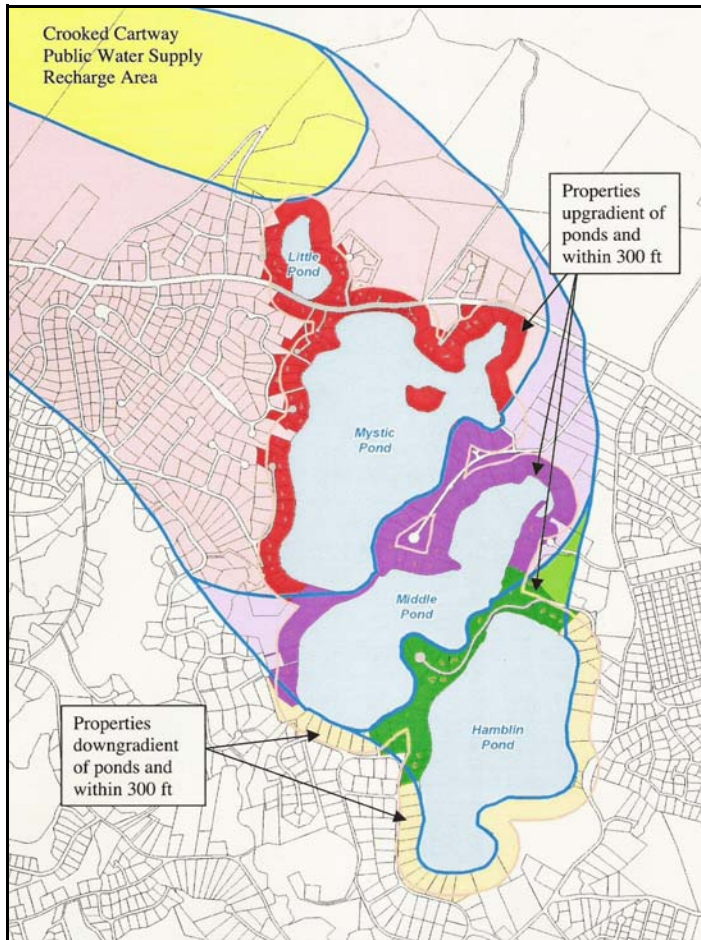
flows out the southeastern shore of Middle Pond into Hamblin Pond.

The flow through the cut between Mystic Lake and Middle Pond is minimal compared to the groundwater flow between these two bodies. In fact, the flow through the cut is often controlled mainly by wind direction. However, it is likely that the small flow through the cut has spread at least some of Mystic's algae problem into Middle. It has been obvious at times this summer, as well as last summer, that the water in Middle close to the cut has been more clouded than the rest of the pond.

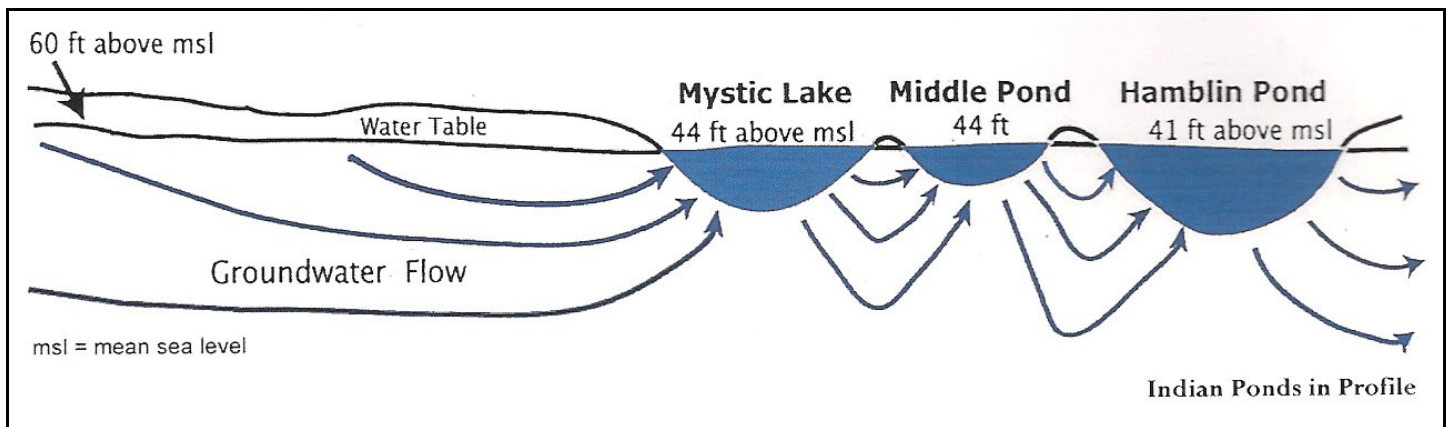
The pond study report estimated the withdrawal of water to flood the cranberry bogs to be no more than one million gallons each year. While a million gallons sounds like a lot, to put it in perspective, removing a million gallons from the 105-acre Middle Pond would result in only a 0.35-in drop in pond level. While water can flow unimpeded through the cut compared to the slower groundwater flow path, the groundwater flow area between Mystic and Middle is huge compared to the very small flow area of the cut. Water taking the groundwater route is filtered, whereas water flowing through the cut is not. The water level in the ponds is controlled by the groundwater level, and a short-term withdrawal of water from the Middle Pond outlet stream will be replaced by groundwater inflow and some flow through the cut.

The bottom line is that Mystic Lake acts as a filter for Middle Pond, which then acts as a filter for Hamblin Pond. Both this summer and last, Mystic was overwhelmed as a filter and apparently leaked some of its undesirable algal bloom into Middle Pond. Since the flow from Middle to Hamblin only occurs through the filtered groundwater route, Hamblin has been isolated from the problems affecting Mystic and Middle. **Fixing the phosphorous problem in Mystic with the alum treatment should prevent Mystic from adversely affecting Middle Pond in the future.**

Bob Nichols



Outline showing direction of groundwater flow from the northwest into the three Indian Ponds. From 2006 pond study report.



Cross-sectional view showing groundwater flow into and out of the three Indian Ponds. From 2006 pond study report.

THE FULLER FARM

Back in 1984, the Village of Marstons Mills was asked to identify critical vistas and important properties contributing to Village character for a very short priority list of possible future acquisitions by the Town. High on that list was “the Fuller farm”. On Route 149, the long stretch of open land, 19th century farmhouse, and especially the two large pieces of vintage farm equipment stored outdoors year-around, mark the property that has been owned by generations of the Fuller family.

Since the 1950s or so, the land has been mown for hay, providing wonderful habitat for birds, butterflies, and a wide variety of other wild creatures who thrive in open meadows. The property also includes shoreline on Middle Pond at “turtle cove”, where very steep banks prevent easy access, but the resident wildlife thrives.

It is very interesting researching a property like the Fuller farm because several neighbors and others interested in local history have shared the following stories about it.

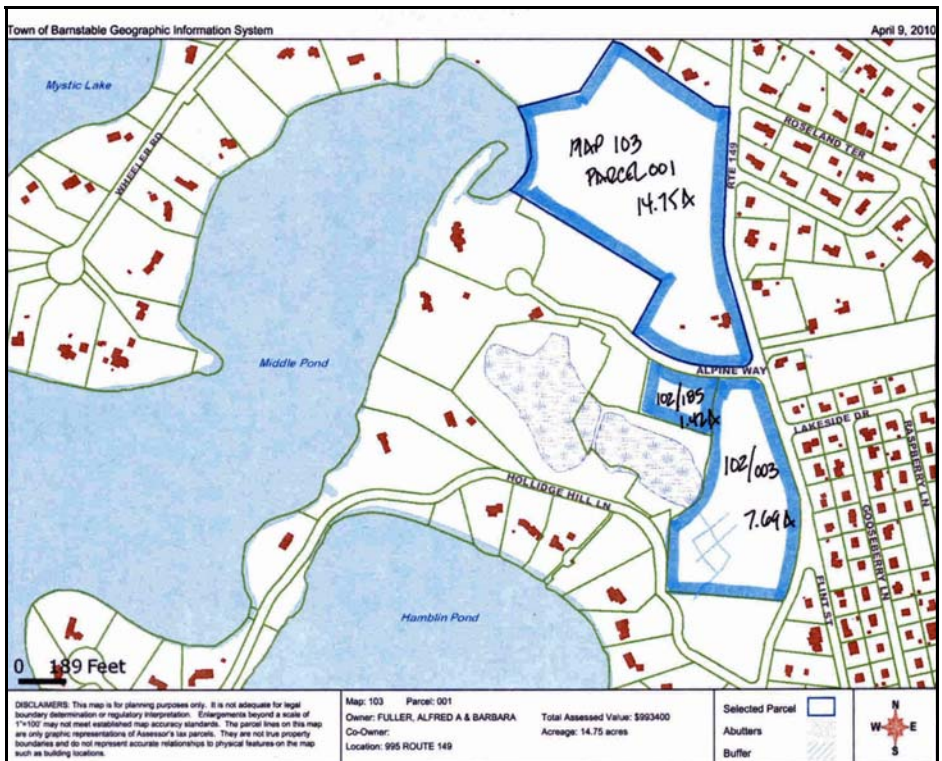
Apparently, the core of the house dates back to the late 1790s or 1800, but it burned down in 1868. “Ma” Olive B. (Hamblin) Fuller left some wet clothes on a rack next to the stove when she went down to check how the cranberrying was going in the bog south of the house. The clothes caught fire and almost completely burned the house down. It was rebuilt by Olive’s husband, Ansel E. Fuller (1843–1924), with the help of other local men. Some charring from the fire is said to be still visible in the pantry. At the time of the fire, there were some 50 bushels of potatoes in the cellar!

An original barn and silo on the property collapsed around 1980. Locals remember a small herd of perhaps 15 or 20 dairy cows on the farm, but think that it’s been at least 40 years since that sort of activity occurred on the property. Back then, the milk was likely sold for processing to and distribution by the Hord family’s “Mystic Lake Farms” on

Race Lane. At that time, crops like corn were also grown to feed the cows, and vegetables were grown for both family use and local sale. One individual remembers, with amusement, the pattern of local folks producing fresh foods for the summer residents of Wianno and Oyster Harbors, not unlike the farmers’ markets of today.

Because the farm falls within Barnstable’s Resource Protection Overlay District, and partially within the Groundwater Protection District, affecting all of the wells and streams down-gradient, including the waters of the Three Bays, its long-term protection is extremely important. No doubt, additional interesting facts will come to light, but, for now, we want you to be aware that the property might become available for sale as a “conservation area”, and that your support for this would be greatly appreciated.

Alex Frazee



The Fuller farm on Route 149 in Marstons Mills consisting of three separate parcels of land (outlined in bold borders) totaling 23.86 acres.

GOOD NEWS FOR MARSTONS MILLS HERRING RUN

The IPA has been informed by Precinct 11 Town Councilor Hank Farnham that, due to the extraordinary efforts of Town staff, the Town will, subject to Council approval, be receiving a series of grants totaling nearly \$1 million for four different restoration/remediation projects that have been in the Town’s Capital Plan, but were not funded earlier due to funding limitations. One of these projects is rebuilding the 1000-ft sluiceway of the Marstons Mills Middle Pond herring run, which will receive \$192,100. Further information on this project will be provided in a subsequent issue of this newsletter.

RESULTS OF JUNE 2010 MUSSEL SURVEY IN MYSTIC LAKE

In early June, Biodiversity, an ecological consulting and communications company based in Amherst, MA, conducted a 3-day mussel survey in Mystic Lake under contract from the Mass. Natural Heritage & Endangered Species Program (NHESP) to assess the population following last summer's major kill. As a result, they concluded that about 80% of the mussel population had perished. They also confirmed, as we already knew, that mussels died at all depths. This means that the anoxic conditions, which had risen to a depth of only 5 m (16 ft) last August, could not have been the sole cause of death.

This same contractor had performed a lake-wide survey of Mystic Lake in 2007 and, in 2008, had surveyed two plots associated with a private dock project. These prior surveys provided a good baseline to assess the impact of the mussel kill. The 2010 survey revisited 14 of the 17 plots surveyed in 2007 and the two plots for the dock project surveyed in 2008, plus three new plots. In addition, two plots in Middle Pond were surveyed to gauge the level of mortality in Middle Pond, which was found to have been minimal.

Three of the seven species of mussels found in Mystic Lake in 2007 are listed by the NHESP as being of special concern. The most populous of these three in 2007 was the tidewater mucket. The 2010 survey determined that almost 95% of that

species had perished in 2009. The other two listed species are the triangle floater and the eastern pond mussel, both of which were found in very low numbers (~10 of each) in 2007. In the 2010 survey a similar very low number of live triangle floaters were found, and no live eastern pond mussels were found.

Detailed counts of all mussels found in the two 10 m x 24 m plots surveyed for the dock project in 2008 and again in 2010 showed almost an 80% reduction in total mussels of all species. The survey report extrapolated the change in population observed within these plots to reflect the entire lake area considered to be mussel habitat (out to a depth of 20 ft). As a result, **the survey concluded that possibly as many as 24 million mussels died in the 2009 event.**

This extrapolation would mean that the original mussel population was about 30 million, which would have been an average of 10 mussels per square foot of area down to 20 ft in depth in the whole lake. This is likely a significant over-estimate of the population by extrapolating from an area of particularly higher mussel density than is typical in the whole lake. However, **it now appears safe to conclude that millions of mussels died in Mystic Lake in the summer of 2009.**

Bob Nichols

IPA FUNDS STUDY OF 2010 MUSSEL KILL IN MIDDLE POND AND MYSTIC LAKE

This summer, on July 20, floating dead mussels were first reported in Mystic Lake as a blue-green algal bloom was building. Ten days later, many more dead mussels appeared throughout Middle Pond. Last summer, Mystic Lake suffered a severe mussel kill in mid-August coincident with a major blue-green algal bloom, followed by a much lesser mussel kill and a lesser bloom in Middle Pond.

Another severe blue-green algal bloom occurred in Mystic Lake this July and early August, but fewer dead mussels appeared since 80–90% of the population had perished in 2009, and those that survived may have been the more resistant ones. However, a significant mussel kill occurred this summer in Middle Pond. Early this summer, Middle Pond was observed to have an abundant and apparently healthy mussel population, but now it is very difficult to find live mussels in Middle Pond, as was the case with Mystic Lake last September.

This spring, it was possible to find at least some live mussels in most areas of Mystic Lake that previously had abundant mussels. These survivors were not apparent last September and may have buried themselves deeper in the bottom sediment. Currently, there may be similar surviving mussels buried in Middle Pond sediment.

Snorkeling in Middle Pond in early August revealed many obviously dead mussels with shells open and bodies coming out. However, there were many more embedded mussels

with apertures open, as would be expected of live filtering mussels. However, these were completely unresponsive when touched. When picked out of the substrate, the foot would remain extended and the apertures would remain open as though the animal were paralyzed or had died in that position. The photo below shows one such mussel in this condition. This mussel was replanted where it could easily be found again. Six days later, the same mussel was observed to be decaying, so it was either dead when photographed in the paralyzed condition or died soon after.



Mussel collected from Middle Pond in a paralyzed condition.

With the assistance of Jim Hurley of Mass Wildlife, the IPA collected a representative sample of several species of dead mussels from both ponds, froze them, and shipped them, along with pond water samples, to experts at the University of New Hampshire (UNH) for **toxicological testing funded by the IPA.** The UNH experts will only be testing for one of several possible toxins that blue-green algae can produce, so a negative test will still not rule out algal toxins as the cause of death.

Bob Nichols

CAPE COD'S GULLS

In spite of my constant efforts to try to excite one or two of you enough to turn you into birders, I'm afraid I'm going to have to burst a bubble. They are not seagulls. They are not sea birds, they do not live on the sea or mate on the sea. In fact, they are not even found very far out to sea. As you sail out of Boston Harbor on your way to Bermuda, it is not very long before you don't see any more gulls. They are found farther inland than out to sea. They are a land bird with a preference for seafood, or anything they can dig out of the dump.

Because of it's unique geographical position, Cape Cod, at one time or another, is home to at least half of the gull species that come into the United States. Some of them may be here in the winter, others in the summer, and some come here to mate whenever their mating season is, usually the spring.



Herring gull

We do have two species that are resident here year-round and those are the two we are most familiar with. The pretty, light-gray gull with the black tail feathers is the **herring gull**. Those really aren't his tail feathers, but rather the ends of his wings, called the primar-

ies. If you look closely, you'll see that they have a little red spot on their bill. That spot is called a gonyx and is present on a lot of birds, but is most noticeable on gulls.



Greater black-backed gull

The other species that we are graced with is the **greater black-backed gull**, which is the largest of the gull species. The fact that we have them here makes us the envy of birders everywhere away from the East coast. They can all talk about their own species of gulls, but when we casually mention that

we have a gull with a 65-in wing span, they all go running for their books.



Little gull

We have four species that show up here that are fairly easy to confuse when they are all in adult plumage. The little gull, laughing gull, Bonaparte's gull, and black-headed gull all have black heads and can be difficult to

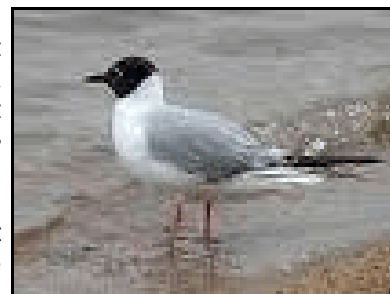


Laughing gull

identify without study. This is especially true because all four of them could be here at the same time, which is late winter and early spring.

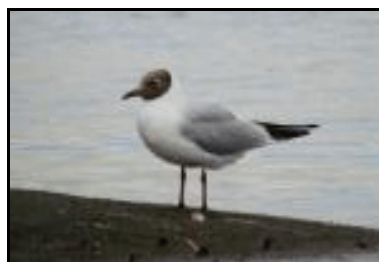
The **little gull** has a black hood, as opposed to a mask, a black bill, red legs,

and is on-Cape primarily in the winter when he won't have the black hood, but a dusky cap with a black spot behind his eye. The **laughing gull** is on-Cape during his breeding season when he wears a black hood that barely comes down the back of his head. He has a red bill and black legs. The



Bonaparte's gull

Bonaparte's gull is a winter visitor, so you may not see his black mask, but, if he is in breeding plumage, he can be identified by his black bill and red-orange legs. The **black-headed gull** is also here in the winter and can be distinguished from the Bonaparte's by his maroon-red bill and legs. In breeding plumage, he also wears a black mask.



Black-headed gull

The final gull that must be mentioned is the **ring-billed gull**, also a winter visitor. This gull looks remarkably like a herring gull except that when you study his beak, you will see that instead of a bright red spot, he has a black ring around the end of his beak.



Ring-billed gull

There you have a brief run-down on most of the gulls that you are likely to see around Cape Cod. You might see any of them on your ponds, particularly during winter. Before a storm, you can see great numbers of them in big parking lots such as at K-Mart. You will need your bird book and binoculars to properly identify them, but if it's spring and they are in full breeding plumage, they are probably either herring gulls or greater black-backs.