

# THE IPA NEWSLETTER

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

Fall 2011

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## HYDRILLA SPREADING WITHIN KNOWN AREAS IN MYSTIC LAKE

Another season has been spent battling *Hydrilla* in Mystic Lake with mixed results. No new areas with *Hydrilla* have been found beyond the four general areas where it was first identified in August 2010. However in all four areas *Hydrilla* was found to have spread to varying extents beyond the patches that were removed and covered by barriers in September 2010.

The area at the southern end of the lake had the least amount of new growth with only limited small growths outside the two barriers at that location. Very little growth occurred under these barriers.

The worst area was in the cove on the western shore where the largest patch (30ft by 40ft) was remediated and covered by barriers last year. Many new patches were found, scattered up to 400 hundred feet north and 200 ft south of the original patch. Also extensive regrowth occurred under some of the barriers and had spread outward significantly from beneath the barriers. The town funded hand pulling of *Hydrilla* in this area by two SCUBA divers for four days this August to get it back in control.

The other area on the western shore near the Sawmill Road beach had two new 5 ft. diameter *Hydrilla* patches sprout close to one of the three barriers at this location. One of these patches was hand pulled completely and the other hand pulled partially by the IPA. Also, one of the barriers in this location had been moved several feet away from its intended location, which allowed some sprouting of the *Hydrilla* before it was noticed and replaced. It is essential that these barriers not be disturbed. (Continued on page 3)

## EAGLES ON CAPE COD

At about this time of year there begins to be a number of sightings of Bald Eagles on Cape Cod. So far, there has been no evidence that they nest on the Cape, only that they are here on a regular basis.

When we say "nest" we mean that area where they breed, incubate and rear their young. For the most part, eagles breed out on the Quabbin Reservoir in the Belchertown, MA area. There also seems to be one pair breeding in the Lakeville area.

Historically they have flown down to the Cape to feed at the landfills that each town provided and you could always see them at the Yarmouth and Barnstable dumps. Although they are primarily fish-eaters, they will take advantage of carrion. They will also eat birds, reptiles and amphibians and will take their food live or as carrion. Basically, they will eat anything that they can get their talons into.



Now that the land-fills have been capped, they can be seen cruising the shores around our ponds or perched in trees along side the ponds watching for fish. (Continued on page 7)

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IPA, Inc., P.O. Box 383  
Marstons Mills, MA 02648

E-mail: [info@indianponds.org](mailto:info@indianponds.org)

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

## UPDATE ON BLT ACQUISITION OF MIDDLE POND LAND

Barnstable Land Trust (BLT) is making progress toward their goal to preserve the last undeveloped parcel along the fishway that leads herring to their spawning grounds in Middle Pond.

On Thursday, December 1, BLT hopes to get final approval from the Barnstable Town Council on a \$150,000 appropriation from the Community Preservation Act Fund to help purchase 1.17 strategic acres. Community Preservation Act Funds are raised through a 3% property tax surcharge approved by Barnstable voters in 2004. The funds can only be used for affordable housing, historic preservation, and land acquisition, including recreation lands. You can show your support by calling or writing to your Town Councilor or by attending the public hearing. The meeting begins at 7 p.m.

The 1.17 acre parcel is currently owned by heirs of Frances Pittendreigh, including Jane Smith, a former IPA Director. It is at the northern end of the Marstons Mills River where the herring run meets Middle Pond. The property is the last undeveloped lot along the herring run and links to a short trail on five acres owned by the Town so it will enhance the adjoining Town lands while preserving important wildlife habitat. The acquisition of this land will also protect freshwater wetlands and the quality of the public water supply.

BLT's goal is to conserve the land and provide permanent access to the herring run for maintenance by the Town. Total project costs are estimated at \$335,000. For its contribution, the Town would hold a conservation restriction and would be given a permanent access easement over the land to allow for maintenance of the head of the run.

**Support from the community is critical to the success of this acquisition.** For more information you can call Jaci Barton at the BLT office, (508) 771-2585 or e-mail at [jaci@blt.org](mailto:jaci@blt.org).

--Jaci Barton

## CALLING ALL COLLEGE BOUND SENIORS!

The IPA is pleased to announce that it will offer two \$1000 scholarships this Spring to graduating seniors from Marstons Mills. The Schwarm Memorial Scholarship was established in 2005 in memory of Edward Schwarm, a former I.P.A. director and officer. It is in his memory and the goals of the IPA to select students who will balance their professional careers with a continuing effort to preserve our environment.

The scholarships are available to any graduating senior residing in Marstons Mills and attending public or private high school. Applications are available at the Barnstable High School Guidance Office or on the IPA website at [www.indianponds.org](http://www.indianponds.org). Deadline for submission is April 1<sup>st</sup>. We encourage seniors to apply early.

## HYDRILLA SPREADING WITHIN KNOWN AREAS IN MYSTIC LAKE

(Continued from page 1)



*Hydrilla tubers are small (1/4"-3/8") bulb like growths on the rhizomes buried in the sediment and will sprout new plants in a subsequent season.*

Next year the IPA plans to be more aggressive early in the season to pull *Hydrilla* before it has a chance to grow excessively. The IPA has purchased a 100 ft by 6 ft fine mesh seine net to sequester patches while raking them out to prevent *Hydrilla* fragments from escaping and establishing new growths. We also plan to remove one or more of the barriers that seem to have had the least regrowth this year and monitor the area closely for regrowth. Any regrowth would be hand pulled immediately. Also, it is hoped that the Town will have some funds available for professional assistance.

All these areas will have to be closely monitored for many years with any regrowth removed until it is clear that the tuber bank has been exhausted. Anyone willing to volunteer with the IPA to remove *Hydrilla* next summer can use the contact link on the IPA website at [www.indianponds.org](http://www.indianponds.org) or email to [info@indianponds.org](mailto:info@indianponds.org).

The fourth general area is located on the eastern shore where four barriers were installed last year. One new 5 ft. diameter patch developed in 5-7 ft. deep water outside one of these barriers. This patch was hand pulled by the Town funded SCUBA divers. Other more limited small growths were found outside the barriers and these were hand pulled.

At this latitude *Hydrilla* dies back at the end of the growing season after having produced tubers (tiny bulb-like entities) in the sediment that will sprout new plants in a new season and can remain viable for several years. We have found tubers on *Hydrilla* that we have hand pulled (see photo). *Hydrilla* is also known to produce turions (winter buds) at leaf axils, which spread the plant by dropping off at the end of the season and sprouting in a future season. We have not seen any turions on the *Hydrilla* in Mystic Lake.



*A benthic barrier of black screen and PVC pipe covering an area where *Hydrilla* was removed. Such barriers must not be disturbed.*

--Bob Nichols

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[WWW.INDIANPONDS.ORG](http://WWW.INDIANPONDS.ORG)



## MUSSEL SURVEYS AND STATUS— 2007 TO 2011

The following article attempts to summarize the mussel survey work done over the past few years in the Indian Ponds. It also presents a general overview of the 2011 survey results, which have just been received. To view both of the 2011 survey reports in their entirety, including all maps and tabulated results, please go to the IPA website, [www.indianponds.org](http://www.indianponds.org).

In spring, 2011, two professional surveys were performed to ascertain the status and condition of the freshwater mussel populations of Mystic Lake and Middle Pond. The "2011 Freshwater Mussel Survey in Mystic Lake" was underwritten by the Town of Barnstable as part of the post-alum treatment sampling and survey work mandated by Natural Heritage's order of conditions. The IPA commissioned the "Freshwater Mussel Survey in Middle Pond and Hamblin Pond" (2011) to get a benchmark after the mussel kills that happened in Middle Pond in the summers of 2009 and 2010. The IPA also requested that observations be made in Hamblin Pond to determine whether there were any mussels living there, and if not, whether there were any signs that mussels had inhabited the pond in the past, and if not, whether Hamblin Pond might be a suitable habitat for mussels in the future.

All surveys mentioned in this article were performed by Biodrawversity LLC, of Amherst, MA. Ethan Nedeau, the owner and principal aquatic biologist of Biodrawversity, has a Master's degree in Entomology and Stream Ecology from Michigan State University and has conducted more than 200 projects, focusing primarily on freshwater mussels, since founding the company in 1998. He has published books on freshwater mussels of Maine, Connecticut, and western North America, including the outstanding book, *Freshwater Mussels and the Connecticut River Watershed*, published in 2008 by the Connecticut River Watershed Council. His publications, including survey reports, are always handsomely illustrated with his own photography and graphics.

The Middle Pond and Mystic Lake surveys of 2011 were follow-ups to prior surveys, also done by Biodrawversity, in 2007 and 2010. Both of the 2007 surveys were done for the Massachusetts Natural Heritage and Endangered Species Program (NHESP). They focused primarily on the three state-listed species, all of which occur in the Indian Ponds: tidewater mucket, eastern pondmussel, and triangle floater. At that time--only four years ago--Middle Pond's extraordinary populations of both rare and common mussels prompted Nedeau to declare it " ... the single best pond in Massachusetts and the entire Northern Atlantic Slope in terms of freshwater mussel diversity and abundance." Mystic Lake was deemed a close second. Since then, unfortunately, much has changed. The objective of this year's surveys was to find out how much, and to develop a scientific basis for possible restoration efforts.

The three species of state-listed mussels in Mystic Lake were also re-surveyed for Natural Heritage in summer, 2010, after the devastating mussel mortality of August, 2009, in order to establish a baseline prior to the alum treatment, which was done in September, 2010. Unfortunately, another mussel die-off happened between the survey and the alum treatment, so a proper baseline was not clearly established, although the survey did provide useful information on the extent of the devastation and relative numbers of the species that survived.

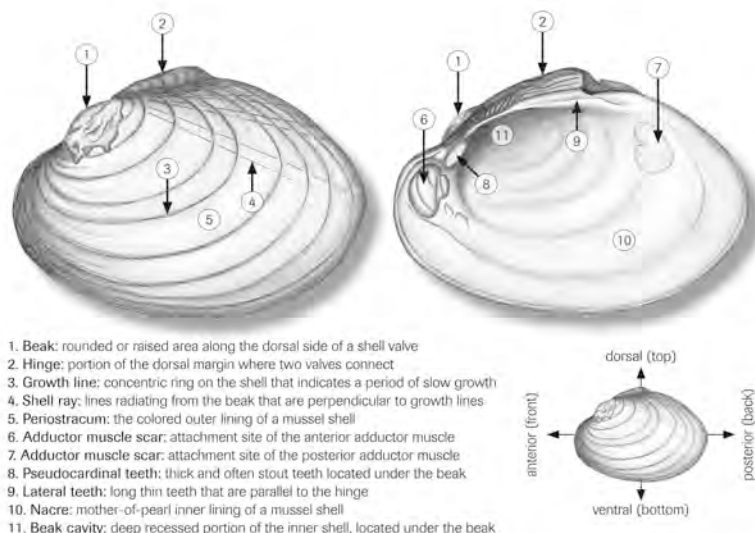


Figure 1. Typical shell morphology of a freshwater mussel. The species shown here is the yellow lampmussel.

Illustrations by Ethan Nedeau.

A standard technique is used for all of these mussel surveys. Some number of locations in the pond are mapped out ahead of time to include a range of substrates and habitats representative of the pond as a whole. At each of these locations, two 5m x 5m plots, "quadrats", are measured off and marked by weighted ropes, one in shallow (0.5-1.5m) and the other in deeper (2.5-5.5m) water. Each of them is then surveyed by a trained snorkeler or SCUBA diver for a period of 30 minutes, during which time each mussel within the quadrat is identified, examined for shell erosion, and counted, before being carefully replaced. GPS coordinates of the center of each plot are recorded, allowing follow-up surveys to be done at exactly the same places. Additionally, the diver also does video recording in deeper water at various places in the pond to identify mussel species living there and estimate their densities.

In **Mystic Lake**, in 2007, a total of 529 tidewater mucklets, 10 triangle floaters, and 9 eastern pondmussels were counted in 17 quadrats. Eastern elliptio and eastern lampmussels were the two most abundant species present. Total population densities were frequently estimated to be greater than 500 per quadrat, with the more common species being too numerous to count.

In 2010, only 31 live tidewater mucklets, 9 live triangle floaters, and no live eastern pondmussels were counted, although many were found dead. However, the eastern elliptio, the commonest of the non-listed species found in the pond, were still counted in large numbers, with counts greater than 100 in seven quadrats and greater than 500 in two quadrats. Unfortunately, densities had decreased sufficiently to make it feasible to count each individual mussel in a quadrat.

In 2011, counts were reported to be extremely low for all species. Only a single live tidewater mucklet was observed in 18 quadrats, and none at all of the other two listed species. Only 84 eastern elliptio were found in total and 12 alewife floater, the second most common species. The highest densities of mussels found were 7 in one quadrat and 17 in another. The reduction in tidewater mucklets from 2007 to 2011 was calculated to be 99.8%, with similar reductions estimated for other species. Eastern pondmussel and triangle floater populations, if any still exist, were too low to detect. Eastern floaters, alewife floaters, and eastern lampmussels were found, but in extremely low numbers. It appears that the eastern elliptio may be the sole species that still maintains a viable population in Mystic Lake, although it will take years to know for sure.

In 2007, **Middle Pond** was found to have not only the greatest diversity of species—seven--of any of the ponds studied including Mystic Lake, but also the greatest relative abundance of each. All except one of these species were counted in at least 80% of sites. 850 tidewater mucklets were counted in ten quadrats. From the abundance described, the bottom of the pond must have been thickly carpeted with mussels of many kinds. One interesting feature of the 2007 study is that it revealed that Middle Pond had the highest percentages of smaller, younger mussels, while Mystic Lake had the highest percentages of larger, older ones, of the nine ponds studied. The ten quadrats surveyed in 2007 were re-surveyed in 2011, plus five additional ones. In the 2011 survey, all species found alive were counted and shell condition was characterized by the degree of erosion, light, medium, or heavy. Only five species were found alive. In order of abundance, these were eastern elliptio, tidewater mucklet, eastern lampmussel, eastern floater, and triangle floater. No live eastern pondmussel or alewife floater were found. One of the 20 quadrats had no mussels in it at all. Densities of each species per quadrat ranged from zero to five. Only 135 tidewater mucklets were found in the re-surveyed quadrats. Calculations show an overall reduction in mussels of greater than 90 percent in four years.



*Tidewater mucklet from Middle Pond showing shell erosion.  
Photo by Ethan Nedea.*

**To the best of our knowledge, Hamblin Pond has never in living memory had mussels.** Biodiversity surveyed it by SCUBA and snorkel in two areas, looking for evidence of mussels. Area 1 ran 360m along the northern shore, and Area 2 extended for 250m on the southern shore. Two biologists surveyed each of the two areas for 1.5 hours at depths of up to eight meters. No mussels, alive or dead, were found. The substrate, a combination of sand and gravel similar to that found in the other two ponds, appeared to be entirely suitable for mussels. Given that Hamblin once had an outlet to the sea and is home to many types of fish, it is possible that the pond had mussels at some time in the past, but the eutrophication and algae blooms created by the duck farm killed them and, over the ensuing years, all traces of shells disappeared. The life of a mussel shell is thought to be approximately ten years; less in more acidic ponds, which Hamblin is not.

**Where are we now?** The devastating loss of mussel populations in Mystic and Middle Ponds is bad news for water quality. Mussels are extremely effective natural filters--a single mussel can filter several gallons of water a day. Their presence in large numbers helps to keep water clear and algae under control. (Continued on page 6)

## MUSSEL SURVEYS AND STATUS 2007-2011 (Continued from page 5)

It is not yet known how successful the alum treatment will be in eliminating neurotoxic cyanobacterial blooms, which are the suspected, though not yet proven, culprit in mussel mortality. In summer 2011, although both Mystic Lake and Middle Pond experienced cyanobacterial blooms, they were less severe than those seen in 2010, when similar blooms closed both ponds to swimming. It will take a few more summers before we know to what extent the alum has succeeded in controlling or eliminating these devastating blooms. Cyanobacteria are tiny chemical factories that produce different kinds of toxins under different environmental conditions. It is not well understood what specific situations induce them to produce the neurotoxins that appear to be so lethal to mussels. We don't even know what particular conditions cause cyanobacterial blooms to appear, although high levels of available nutrients are certainly contributory. **Preventing and eliminating such blooms by keeping nutrients and other pollutants out of pond water is the single most important thing we can all do to protect our ponds.**

**Where do we go from here?** Two possible courses of action are being discussed. One is to augment the depleted populations of mussels in Mystic and Middle by transplanting mussels from other ponds where they are more numerous. This course of action poses many questions: whether and where local mussels, which would be genetically better adapted to their new home, could be obtained; what life-stage (gravid females, juveniles, infected host fish) would translocate best; the possibility of spreading diseases, parasites, or invasive species; the cost. Even if all these considerations could be addressed satisfactorily, we could not contemplate moving any mussels into a potentially lethal situation. We must make the ponds healthy and safe enough to support their own mussels before we can attempt to augment the populations.

The other possibility is to move some mussels from Mystic and Middle into Hamblin Pond. There are certainly questions here as well: are the mussels healthy enough to be moved; would we be introducing anything into Hamblin that shouldn't be there; what time of year would be best? However, this course of action appears to have more advantages and fewer potential drawbacks than adding mussels to Mystic and Middle. Hamblin is in the same watershed and has a similar substrate to its two neighboring ponds. It does not experience cyanobacterial blooms. Transportation would be a relatively simple matter. The translocated mussels could be monitored and surveyed easily, even by trained volunteers. A staged, multi-year implementation, starting small and increasing, is quite feasible. Hamblin looks like a ready-at-hand refuge where mussels could be sheltered for eventual return to their home ponds, or to grow a new population for Hamblin Pond that will help it remain healthy into the future. The IPA will be looking closely at the possibility of such a program in the coming year.

--Holly Hobart

RELATIVE ABUNDANCE OF MUSSEL SPECIES IN MYSTIC LAKE AND MIDDLE POND 2007 AND 2011					
1 = MOST ABUNDANT; 7 = LEAST ABUNDANT					
SPECIES	MA LISTED?	MIDDLE 2007	POND 2011	MYSTIC 2007	LAKE 2011
Eastern elliptio <i>Elliptio complanata</i>	No	1	1	1	1
Eastern floater <i>Pyganodon cataracta</i>	No	5	4	2	0
Eastern lampmussel <i>Lampsilis radiata</i>	No	2	3	3	3
Alewife floater <i>Anadonta implicata</i>	No	4	None Found	None Found	2
Tidewater mucket <i>Leptodea ochracea</i>	Spec Concern	3	2	4	4
Eastern pondmussel <i>Ligumia nasuta</i>	Spec Concern	6	None Found	5	None Found
Triangle floater <i>Alasmidonta undulata</i>	Spec Concern	7	4	6	None Found

**EAGLES ON CAPE COD** *(Continued from page 1)*

Both male and female eagles have the distinctive "bald" head, neck and tail and both have a dark brown back and breast. They have a wingspan between 72 and 90 inches. Juvenile eagles are a mixture of brown and white and reach maturity, with the white head and tail, in four to five years. The female is slightly larger of the two and they do pair for life. They will take a new mate shortly after the death of their previous mate.

The eagle became our national symbol in 1782 but was not protected and hunting reduced their numbers. By the time hunting of eagles and DDT were outlawed, their numbers had fallen to less than 500 pairs. Today, with conservation efforts, that number has risen above 9,800 pairs.

Eagles are strong flyers and can be seen soaring over Cape Cod, particularly at the annual Truro Hawk-Watch. They frequently harass other birds, such as Ospreys, to steal their catches, sometimes grabbing a fish right out of the Osprey's talons. They are strong swimmers and are capable of floating and occasionally use their wings as paddles to move along where they cannot wade. They are often harassed themselves by other raptors and small birds such as crows, blackbirds, and flycatchers.

**BALD EAGLE FACTS**

- REMOVED FROM ENDANGERED SPECIES LIST IN 2007
- FLY TO AN ALTITUDE OF 10,000 FEET, AT SPEEDS OF 30-35 MPH
- WEIGH FROM 10-14 LB.
- MAY LIVE AS LONG AS 50 YEARS IN WILD
- ARE STRONG SWIMMERS, BUT MAY BECOME HYPOTHERMIC IN COLD WATER
- MATE FOR LIFE, OR UNTIL ONE DIES
- BUILD NESTS IN TALL TREES NEAR RIVERS OR COASTS
- NEED FROM 1,700 TO 10,000 ACRES TO HUNT IN
- WEIGH FROM 10-14 LB; WITH WINGSPAN OF 72 TO 90 INCHES

Follow this link to see a video of two eagles on Mashpee Pond:

<http://www.youtube.com/watch?v=Qo5M1YIFWJ8>

**PHOSPHATES – CONSERVING A LIMITED RESOURCE**

Not only is phosphate a key macronutrient necessary for plant growth, it is an essential component of all living cells. Microbes, plants, and animals, including humans, cannot exist without it. It is found in our DNA as well as in many other biologically active compounds within plant and animal cells.

Recently, however, phosphate pollution has become an increasing concern and application of phosphate-containing fertilizers is now being regulated by many state and local authorities. Phosphate that is misapplied to lawns, landscape plantings, or in agriculture can run off into streams and other water sources where it can lead to algae blooms. Certain algae produce toxic compounds that impair the quality of drinking water. Algal blooms can also deplete oxygen concentrations in lakes and streams leading to fish deaths and decline of other aquatic organisms.

Another reason to regulate phosphate is the fact that there is a limited supply of this nutrient. All phosphorus used in agriculture is mined as phosphate rock, that is, the remains of ancient marine deposits. Significant phosphate deposits are found in just four countries in the world: the United States, China, Morocco, and South Africa. The United States already uses more phosphorus than is produced from domestic mines. At current rates of use, U.S. reserves will be depleted in approximately 40 years and world reserves in less than 100 years. Unlike oil, there are currently no alternative sources of phosphate for fertilizers. Depletion of this resource will have a major impact on food production and population growth.

Although phosphate fertilization is essential for peak agricultural production, we have found that most landscape soils throughout our operating regions have adequate levels of this nutrient. We collated the results of nearly 100,000 soil analyses from client properties that were processed through the Bartlett Tree Research Laboratories. In the past seven years, we found that only 10% of the results showed a phosphate deficiency.

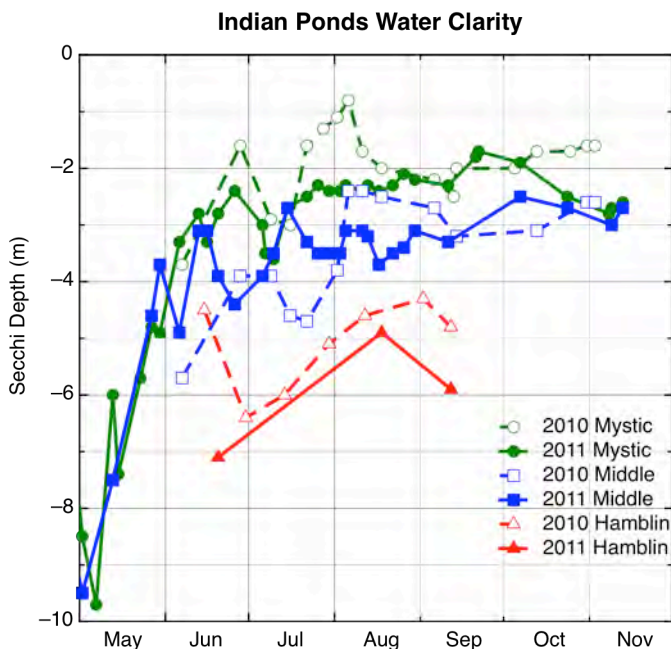
--Reproduced by permission of Bartlett Tree Experts from "Tree Tips", Spring, 2011



## WATER CLARITY A MIXED BAG IN 2011

Both Mystic Lake and Middle Pond started early May with exceptional water clarity of well over 9m (30 ft). Hamblin Pond, while not measured at that time, was likely as good or better. The clarity was dramatically reduced by the end of the month as a result of the mid-month turnover of the ponds mixing more nutrients into the water column, the warming of the water, and increased sunlight all contributing to increased algal growth.

The plot shows the Secchi depth data for all three ponds as measured in the May to November time frame for both 2010 and 2011. The solid lines and filled markers are the 2011 data and the dashed lines and hollow markers represent the 2010 data. The Secchi depth is the maximum depth at which a standard black and white Secchi disk is visible from above the water surface.



Only three measurements were made in Hamblin Pond in 2011, which in all cases showed better water clarity than was measured in 2010. Overall Hamblin Pond had much better water clarity this year than the other two Indian Ponds.

After the alum treatment last fall it was expected that Mystic Lake would show a big improvement in water clarity. Overall the clarity in Mystic was better this year than in 2010, except for a short period in early June and again in late September when it was slightly worse. After the fall turnover, Mystic ended the season with a Secchi depth of 2.6m, about 1m better than last year. The lowest clarity measured in Mystic was 1.7m on September 22, which is over two times better than the lows of 0.7m in 2009 and 0.8m in 2010. Also, Mystic gained 1-1.5m of oxygenated depth as compared to last year. While Mystic has not yet met expectations from the alum treatment, it has improved and hopes are that even greater improvement will be achieved next year, since it may take more than one season to reach a new equilibrium.

Compared to last year, Middle Pond water clarity varied, oscillating a meter or two better and worse over the course of the season. Overall it could be characterized as worse than 2010, except it was better all this August by as much as 1.2m. Even so, Middle Pond experienced two separate mussel die-offs this August, one at the beginning of the month, followed by a second lesser die-off three weeks later. Middle Pond ended the season after the fall turnover with a Secchi depth of 2.7m, about the same level of clarity as the end of last season.

The IPA contracted with Ken Wagner to sample Middle Pond water chemistry and plankton in June and September this year to compliment the annual August PALS (Ponds and Lakes Stewardship) sampling. This will provide a seasonal set of data to allow an overall determination of the current condition of Middle Pond and indicate what, if any, remediation measures should be considered.

Ken Wagner has also performed periodic sampling of Mystic Lake over the year following the alum treatment, as part of the treatment contract with the Town. He will soon be issuing a report of all the findings and this will be summarized in the IPA winter newsletter along with the results of the Middle Pond sampling.

An Excel spreadsheet with all IPA pond sampling data for 2011 is available on the IPA website at [www.indianponds.org](http://www.indianponds.org). This contains all the temperature and dissolved oxygen profiles with depth as well as Secchi depth and pH measurements.

--Bob Nichols