THE IPA NEWSLETTER

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

Spring 2013 **A quarterly publication of the Indian Ponds Association** **Vol. 13 No. 2**

INCREASED TOWN FUNDING FOR 2013 *HYDRILLA* CONTROL IN MYSTIC LAKE

The Town of Barnstable has entered into a contract with Aquatic Control Technology (ACT) for *Hydrilla* control this season in Mystic Lake and Long Pond (Centerville) for approximately $50,000. This represents a significant increase in the Town-funded effort this year for Mystic Lake. In 2012, the Town funded 9 days of diver-assisted suction harvesting (DASH) in Mystic Lake, and IPA volunteers did the remainder of the *Hydrilla* management.

ACT will perform a pre-management survey of Mystic Lake in early- to mid-June when the *Hydrilla* has typically sprouted. The survey will be performed by two snorkelers/divers and will map the distribution and density of the native plant species and the *Hydrilla*. Tuber sampling will also be performed to provide data on tuber density.

ACT has proposed to use either an increased DASH effort of 12-15 days, or the application of an herbicide, to control the *Hydrilla* in the cove where it originated (Area A shaded on the map). The *Hydrilla* has become widespread in this area and has reached the degree of infestation where herbicide is feasible and possibly more effective than DASH. The final decision whether to use DASH or herbicide will depend on the results of the June survey and any permitting obstacles to the use of herbicide.

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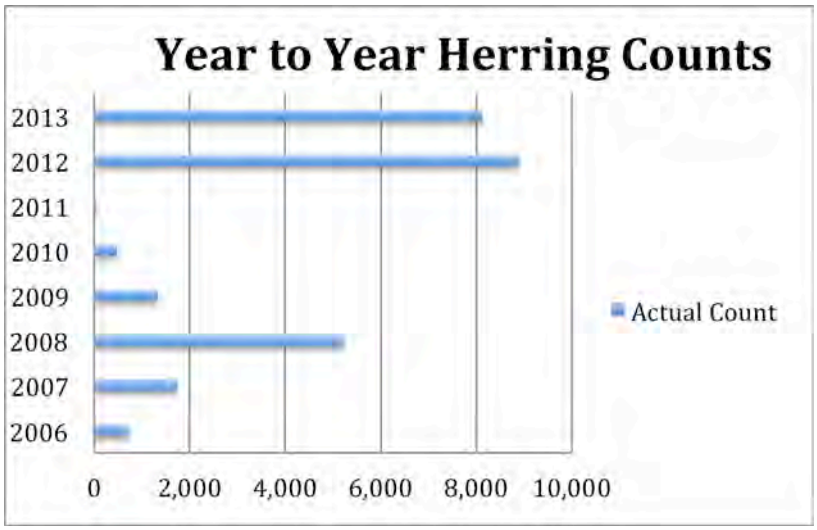
BANNER YEAR FOR 2013 RIVER HERRING COUNT



The year 2013 proved to be an excellent river herring run, with more than 8100 fish observed over 46 days of counting. While it did not surpass the 2012 total fish count of nearly 8900 fish, it did, in fact, prove to be a record year when the data our group of dedicated volunteers recorded is further analyzed.

The average length of the annual runs over the last eight years has been nominally 5 weeks. The year 2012 was an exceptionally long run at more than 8 weeks; however, that period includes a 10-day interval when counting was suspended with no fish observed. The herring then came in record numbers, with a single-day high of more than 1450 fish observed over 90 minutes. The peak 10-minute observation in 2013 was 178 fish.

The most interesting observation for 2013 was the sustained robust consistency of the observations. Triple-digit daily counts were reported for more than 50% of the run. This year had the highest average daily count for the eight years that we have been counting on the Marstons Mills River using standard methods.

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IPA OFFICERS AND DIRECTORS: 2012-2013

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The IPA is a 501(c)(3) organiza-Tion and a registered public charity. All dues and contributions are tax deductible.

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.

2013 SCHWARM SCHOLARSHIPS AWARDED TO GRADUATING SENIORS FROM MARSTONS MILLS

The IPA is pleased to announce that this year's recipients of the Edward Schwarm Scholarships are Jeffrey Clark and Sara Pipe-Mazo. Jeff and Sara were selected by the IPA Scholarship Committee based on their academic achievement, extracurricular activities, and their community service related to the mission of the IPA. They will each receive a $1000 dollar award at the annual meeting on July 14th.

Jeffrey Clark

The Schwarm Memorial Scholarship was established in 2005 in memory of Edward Schwarm, a former IPA Director and Officer who died in May of 2005. Due to the generosity of IPA members and the Schwarm family, two scholarships will be given this year.

Jeffrey is the son of Jeffrey O. Clark and Sandra Leo-Clark of 253 Whistleberry Drive, Marstons Mills. Jeff is an Eagle Scout and has received the Eagle Bronze Palms, Eagle Gold Palms and World Conservation award. He received his World Conservation Award from the Boy Scouts for his merit badge work in Environmental Science, Soil and Water Conservation, and Citizenship in the World. Jeff has led his scout troop on project Coast Sweep in cleaning the Race Lane Beach on Mystic Lake as well as Sandy Neck Beach preparation and clean-up efforts every year. Jeff is a senior at Barnstable High School and a member of the National Honor Society. He plans to attend Syracuse University this fall majoring in electrical, mechanical or robotic engineering.

Sara Pipe-Mazo

Sara Pipe-Mazo is the daughter of Gary Mazo of 150 Flint Street, Marstons Mills and Deborah Mangan of 28 Sturgis Lane, Barnstable. She will be graduating from BHS where she has been a member of the National Honor Society, Spanish Honor Society and Math Team. Sara spent her first semester junior year living and studying in Israel where she worked on several community environmental projects. As part of her senior year Advanced Placement Environmental Science class, she participated in water quality studies of the Marstons Mills River watershed. Sara plans to attend Brandeis University this fall majoring in studies leading towards a Master's degree in Actuarial Science or Forensic Accounting. We wish both Jeff and Sara great success in college and in their career pursuits.

---Gay Rhue

IPA ANNUAL MEETING
JULY 14, 2013, 4:00-6:00 P.M.
470 TURTLEBACK ROAD, MARSTONS MILLS

All IPA members are welcome to attend and vote on a new Board of Directors. Wine and hors d'oeuvres follow the business meeting and guest speaker. Enjoy a sociable gathering with your neighbors at a wonderful estate on the shores of Mystic Lake and Middle Pond. In case of rain, signs will direct you to an alternate location.

Pond Cleanup Day, originally scheduled for June 7, has been cancelled.

STILL SOME ISSUES WITH PHOSPHORUS IN MYSTIC LAKE AND MIDDLE POND

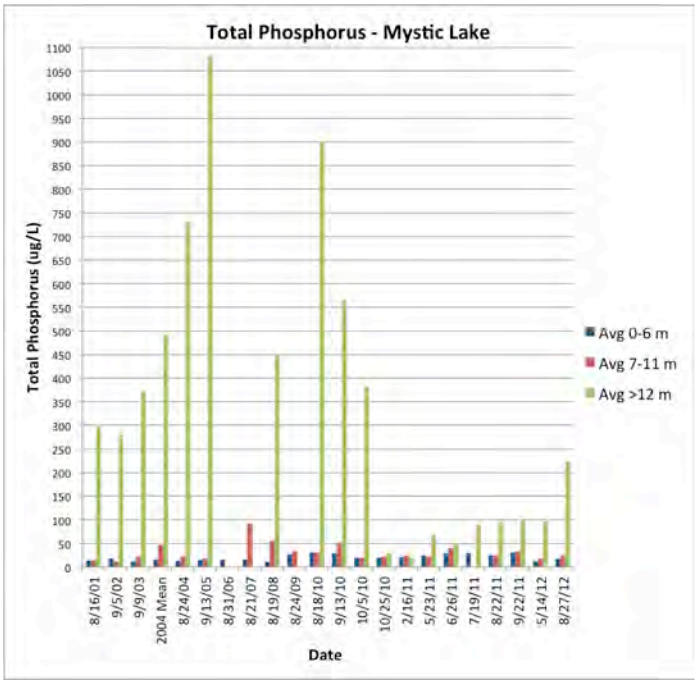
In 2012, the IPA contracted with Water Resource Services, (WRS) Inc (Ken Wagner) to perform water quality testing and sediment phosphorus sampling in both Mystic Lake and Middle Pond. This 2012 sampling in May was intended to supplement the PALS (Pond and Lake Stewardship) water sampling performed every year in August. This data would help quantify the success of the Fall 2010 alum treatment of Mystic Lake and provide additional insight on the increased phosphorus levels noted in Middle Pond in recent summers. The results of this sampling indicate that some areas of Mystic Lake may have been underdosed by the alum treatment and that Middle Pond does not appear to have significant sediment phosphorus.

Water Phosphorus Levels

Phosphorus is the water quality parameter that most influences algae blooms since it is the limiting nutrient for algae in freshwater systems. The purpose of the Mystic Lake alum treatment was to permanently bind available phosphorus in the sediment, thereby preventing its release during summer stratification.

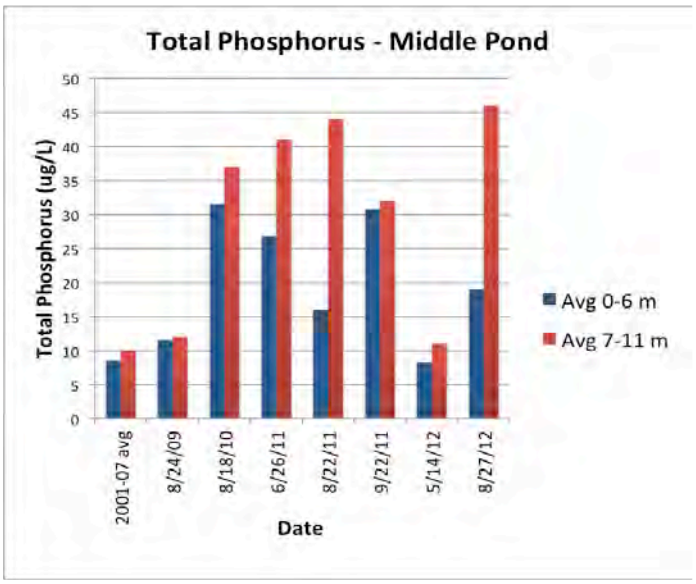
To facilitate data analysis and comparison to past results, the phosphorus levels measured are averaged over three depth ranges:

- Upper 6m (20 ft) - representing the surface waters where algae blooms are noticeable when they occur.
- Below 6m to 11m (36 ft) – the mid depth where blooms can form which may or may not move upwards.
- Below 11m (36 ft)– this is below the thermocline during the summer stratification and becomes devoid of oxygen thereby releasing available phosphorus from the sediment. (The Middle Pond data does not include this depth range since Middle Pond maximum depth is less than 11m.)



The results of the two 2012 samplings in Mystic Lake are shown in the figure along with all the phosphorus data since 2001. The May 2012 phosphorus levels were among the lowest recorded for the surface at 12 ug/L and mid-depth at 18 ug/L. The phosphorus level of 97 ug/L in the deepest water was similar to that in the second half of 2011, and very much lower than the pretreatment levels (before mid Oct 2010).

Compared to the May values, the phosphorus in the August 2012 PALS samples from Mystic Lake was up slightly at 17 ug/L in the surface water and 25 ug/L at mid depth, but more than doubled to 223 ug/L in the deepest water. This indicates that an appreciable release of phosphorus did occur from the sediment during the summer stratification. This does suggest that the alum dosage in this deepest area of the lake may have been insufficient. However the deep-water phosphorus was still much lower than that measured during the pretreatment years (up to 1083 ug/L). Since the higher phosphorus levels did not mix up into the upper water, we had excellent late summer water clarity in 2012 with a Secchi depth of 5.2m (17ft) on September 2.



The results of the two 2012 samplings from Middle Pond are shown in the figure along with results since 2001. The May 2012 phosphorus levels were quite low at 8-11 ug/L and comparable to the levels from 2009 and earlier. The August 2012 phosphorus level of 46 ug/L in the deepest water was the highest in the 12-year period, but the 19 ug/L value in the surface water was lower than three of the four samples from 2010-11. As a result Middle Pond experienced an excellent late summer Secchi depth of 6.6m (21ft) on September 2.

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THE INTERESTING LIFE OF THE RIVER HERRING

This year again, we have witnessed another good run of river herring (alewives) (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) into Mill Pond, the Marstons Mills River, and from there into Middle Pond and Mystic Lake. With the water in both Middle Pond and Mystic Lake very clear this year at the time of the herring run, thanks to the 2010 alum treatment to Mystic Lake, many people have reported seeing small schools of herring swarming near their docks or along the shore. What they witnessed may have been part of the herring spawning ritual. Our curiosity about these unique fish is once again aroused as we wonder when and why they leave the sea to run up freshwater streams to spawn, how and where in the ponds spawning takes place, how long it takes for the eggs to hatch, what do the young fish eat, who eats the young fish, and when do they return to the sea, to mention just some of the questions likely posed.

River herring, like salmon, are anadromous species. This "label" is because they spend their adult lives in the sea (saltwater), but return to freshwater for spawning and early development. Also like salmon, river herring have a homing instinct and usually return to the same

Alewife

water where they were born. Olfaction (sense of smell) appears to be the major sensory mechanism used by alewives and blueback herring to find and migrate to their watersheds of birth.

Blueback herring are found from Cape Breton, Nova Scotia to the St. John's River in Florida, while alewives have a more northerly range extending from Labrador and Newfoundland south to South Carolina. River herring can attain a maximum length and age of about 15 inches and 11 years, respectively. The two species closely resemble each other and are difficult to distinguish. Trained taxonomists can separate them based on difference in eye diameter, body depth, and peritoneum (lining of the abdominal cavity) color. The blueback herring is thinner and has a distinctive blue–black back, while the alewife is thicker and more greenish black. This distinction is most apparent in freshly caught fish.

Of the two species, alewives are the first to return to freshwater each year on the Cape to spawn; they begin to appear at the Mill Pond ladder in Marstons Mills when the nearshore water temperature reaches about 51°F, which happened this year on April 1, compared to March 21 last year. Blueback herring begin to arrive a few weeks later when the water is warmer. Males generally begin arriving before females. Spawning males are typically about 3–4 years old, while females are 4–5 years old.

Published estimates of the number of eggs produced by a river herring female range from 60,000 to 467,000 for alewives and 30,000 to 400,000 for blueback herring. Numbers will depend on the size of the individual fish. Spawning can occur both day and night, but more so at night. For any given wave of fish, actual spawning lasts only a few days, after which spent fish tend to move back downstream and out to sea.

Spawning habitat is generally in shallow water, sometimes as little as 6 inches, and ranges from areas with sand, gravel, or coarse stone substrate to those containing submerged aquatic vegetation or organic detritus. The actual spawning act usually consists of a single female swimming close to shore accompanied by several or many males. Such groups of spawning fish can sometimes be seen swimming rapidly in circles just below the surface. This so-called nuptial dance culminates in a matter of seconds in the simultaneous release of eggs and sperm that are randomly broadcast into the water column and over the bottom. The ritual ends abruptly by the fish creating a large splash and breaking off their circular swimming pattern.

The randomly broadcast eggs are slightly adhesive when first released and tend to settle and stick to bottom materials for a short time. When water-hardened, the eggs are about 1/32–3/64 inches in diameter. Alewife eggs are slightly larger than those of blueback herring, and do not contain oil globules. Hatching occurs in about three days at 72°F and six days at 60°F. When hatched, larvae are 1/8–1/4 inches long and contain a yolk sac that provides nourishment. About 3–5 days after hatching, the larvae begin feeding on external food sources (mainly microscopic zooplankton) and attain a length of about 1/4 inches in 10 days. They are

Blueback Herring

capable of forming schools within two weeks of hatching, transform to the juvenile stage at about 3/4 inches, and are fully scaled at about 1 3/4 inches in length. This writer recalls seeing, perhaps 10–15 years ago, a very large school of juvenile river herring moving like a proverbial and seemingly endless conveyor belt along the shore of Mystic Lake in a procession that continued for 5–10 minutes at least.

In spite of so many eggs being released by a single female and fertilized, only a few survive to the juvenile stage, and sometimes only as few as three juveniles produced by a single female survive to adulthood. Most of the mortality of eggs, larvae, and juveniles is by predation by other fish species in the pond or lake. This very high level of mortality is typical of nearly all fish species worldwide,

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THE INTERESTING LIFE OF THE RIVER HERRING

(Continued from page 4)

and is why most fish species produce and release such large numbers of eggs per female in Mother Nature's grand scheme of all organisms tend to maintain their respective appropriate equilibriums unless tampered with by man or man-made influences.

Young river herring, when provided unimpeded access, generally migrate back to the sea from around mid-July through early November at sizes ranging from as small as 1¼ inches to as large as 6 inches in length, depending on the availability of food in the ponds or lakes, the total number of young produced in a particular watershed, and the amount of time spent in the freshwater environment. The exodus from Mystic Lake and Middle Pond is usually in early autumn when the fishway ladder at Middle Pond is opened by the Town's Natural Resources staff. The ladder is normally closed in spring after the upstream herring run is complete and after the post-spawning adults have returned downstream to the sea. In dry years when the water level in the ponds is low, the entrance to the channel from Middle Pond to the fish ladder often becomes inaccessible to the migrating herring and has to be dredged to permit them to exit.

When adult river herring migrate into a freshwater pond or lake, there is an influx of phosphorus to the lake (in the bodies of the fish). However, the majority of the spawners return to the sea, taking their phosphorus with them. Additionally, young river herring that grow in freshwater ponds and lakes incorporate phosphorus from those ponds and lakes into their bodies as a result of their consumption of zooplankton. That phosphorus is removed from the freshwater environment when they migrate to the sea.

As we are all aware, the populations of alewives and blueback herring have been sharply reduced relative to what they were hundreds of years or even decades ago. Responsible factors include excess harvesting as well as construction of dams and degradation of freshwater spawning sites, impaired water quality, and damaged habitats. In response to recent concerns for the low population level, the Commonwealth of Massachusetts instituted a moratorium on the harvest, sale, or possession of river herring in 2005; the moratorium still remains in effect.

Even though we have witnessed greatly improved runs of river herring through the Mill Pond ladder in 2012 and 2013, compared to those of the several preceding years, which have obviously increased the production and downstream migration of juveniles in the last two years, this does not necessarily signal the recovery of these populations. The spawning runs beginning in about 2015–2016 will be exciting to observe as that is when the fish produced in 2012 and 2013 will become sexually mature and spawn for the first time. Then we will find out if survival at sea for the herring produced this year and last was good and if a hoped-for recovery will begin to materialize. Let's keep our fingers crossed!

--Emory D. Anderson

LOVELL'S POND IN COTUIT: ANOTHER TROUBLED POND

Lovell's Pond, a 54-acre pond adjacent to Santuit–Newtown Road in Cotuit that is noted for good trout and largemouth bass fishing, is in difficulty because of high levels of phosphorus that have produced unacceptable amounts of blue-green algal blooms and led to frequent closures of the Town swimming beach in recent summers. The pond's deteriorating water quality has been well documented since the mid-1990s.

In an attempt to improve conditions, a destratifying aeration system was installed by the Town in 2010 to inject oxygen into the bottom layers in order to prevent the release of phosphorus from the bottom sediments into the upper waters (phosphorus regeneration) where it would fuel the production of algal blooms. Such a system mixes the entire water column from surface to bottom (maximum depth of Lovell's Pond is 37 feet) and eliminates the natural thermocline. Even though the aeration system, when it was functioning properly, resulted in excellent oxygen levels near the pond's bottom and in mixing from top to bottom, the severe algal blooms continued. The aeration system, powered by an onshore electrical generator, has proven to be expensive to operate, unreliable, and subject to breakdowns and vandalism.

In March of this year, the Town issued a request for proposal (RFP) for a qualified consultant to conduct a supplemental study of Lovell's Pond at a cost not to exceed $15,000. The stated purpose of the study is to (i) update the existing understanding of the pond's water quality issues and (ii) identify methods (e.g. an alum treatment) to be implemented together with, or instead of, the existing aeration system to prevent phosphorus regeneration and subsequent severe algal blooms. The RFP specified the following elements of the scope of work of the study to be done over a 5-month period beginning around June 1, 2013:

- review of current physical, biological, and chemical data available for Lovell's Pond;
- sampling as needed for water quality and sediment phosphorus;
- determination of a recommended alum dose to limit phosphorus regeneration from the sediments;
- costing out of an alum treatment for Lovell's Pond;
- assessment and evaluation of problems with providing consistent aeration to the pond, scoping out a new compatible compressor with the system's designer, and costing out of that improvement;
- a final report by November 1, 2013 summarizing the results of the study.

On May 17, the Town awarded the contract for the study to Dr. Kenneth Wagner of Water Resource Services, Wilbraham, MA. Dr. Wagner is very familiar to the IPA as he was also contracted by the Town to plan and oversee the alum treatment of Mystic Lake, which

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BANNER YEAR FOR 2013 HERRING COUNT

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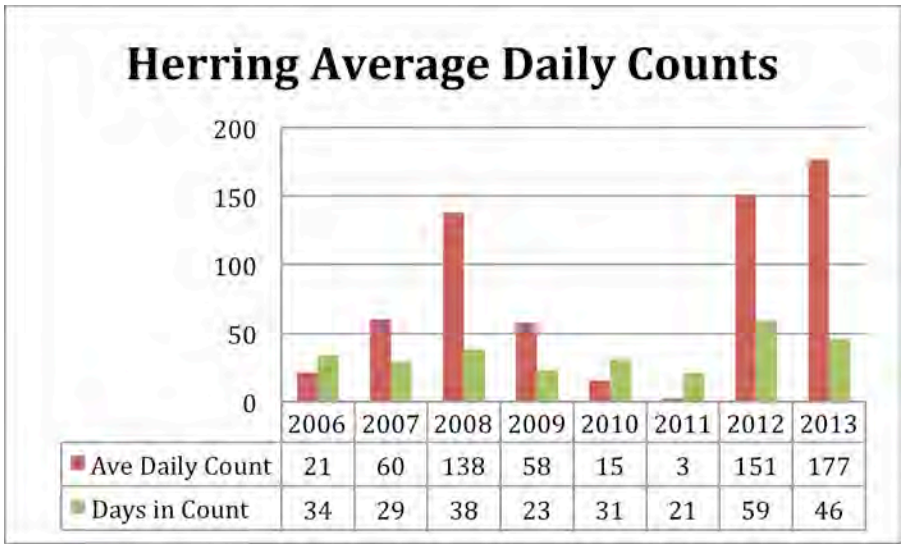
Now that we have this data, we should be able to start to make some meaningful analyses. Ideally we will be able to start to identify trends. However, it's still too early to say with certainty that the river herring population is recovering. The years 2010 and 2011 were very poor runs, and many of the other years were weak runs. Therefore, two years of positive data is too short an interval to establish a trend.



	2006	2007	2008	2009	2010	2011	2012	2013
Ave Daily Count	21	60	138	58	15	3	151	177
Days in Count	34	29	38	23	31	21	59	46

--Annette Nichols

Gus Crosby and Smitty at Mill Pond. "These two gentlemen talked about how many fish had been in the run historically and how they used to take a dozen or so at a time and use them for bait." –*Annette Nichols*

STILL SOME ISSUES WITH PHOSPHORUS IN MYSTIC LAKE AND MIDDLE POND

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Sediment Phosphorus

In Mystic Lake, six sediment samples were collected from three of the locations where sediment samples had been collected prior to the alum treatment. There was some inconsistency in the lab results, but overall they show about a ten-fold reduction in phosphorus that is available for release under anoxic conditions. The two locations which had the highest pre-treatment sediment phosphorus, and which were treated with the maximum alum dosage permitted by Natural Heritage, showed somewhat higher than desired available phosphorus levels in this post- treatment sampling. This indicates that a higher dosage would have been beneficial in those two areas.

In Middle Pond, two sediment samples were collected from the deep sampling point, and this represents the first sediment phosphorus sampling to be performed in this pond. These samples showed very low levels of phosphorus available for release under anoxic conditions. This is an important result, which shows that the somewhat increased levels of phosphorus measured in Middle Pond water sampling in recent summers is likely not caused by release from the sediments. This leaves the likely causes of the increased phosphorus to be from the decomposing mussels and possibly inputs from Mystic Lake. Both of these inputs should reduce in time as the mussel phosphorus works its way through the system and the alum treatment of Mystic Lake reduces its input.

The PALS water sampling this August and in subsequent years will be essential in helping to identify the longer-term trend these ponds develop.

--Bob Nichols.

LOVELL'S POND IN COTUIT

(Continued from page 5)

was done in September-October 2010. He was also the guest speaker at the 2011 IPA Annual Meeting. In preparation for the above study, IPA Vice President Bob Nichols, at the request of Rob Gatewood, Town Conservation Director, has volunteered to take biweekly water quality measurements of Lovell's Pond.

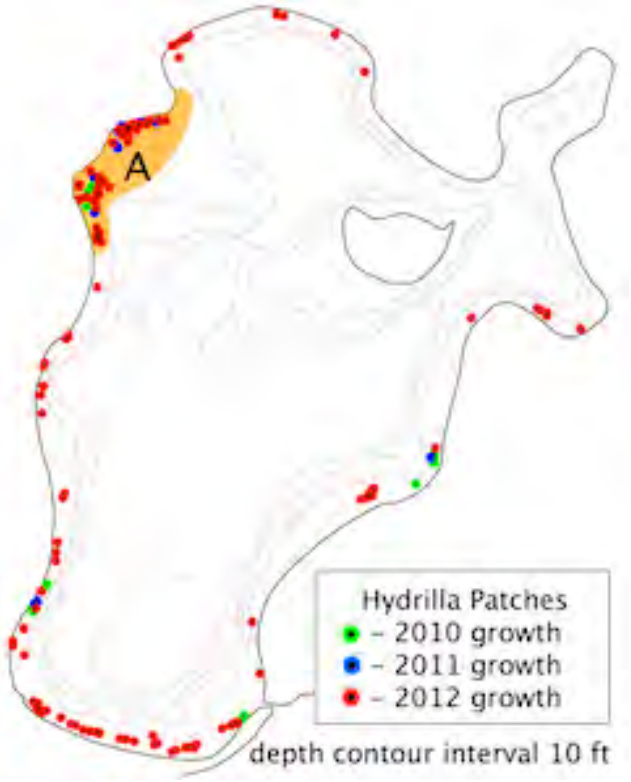
We look forward with interest to learning about the results and recommendations of Dr. Wagner's study, which we hope to report in a subsequent issue of this newsletter, and also anticipate a successful solution to the present water quality problems of the pond. *--Emory D. Anderson*

Editor's Note: Dr. Emory Anderson received his Ph.D. in Fisheries Biology from the University of Minnesota. He currently edits two scientific journals of marine science. He was President of the IPA from 2004 to 2008, after retiring from a 35-year career in various aspects of fisheries science.

INCREASED TOWN FUNDING FOR *HYDRILLA* CONTROL

(Continued from page 1)

The proposed herbicide is Aquathol K, which has been widely used in Florida to control *Hydrilla* and also was used last year to control *Hydrilla* in the Cayuga Lake Inlet in New York. The herbicide will be applied at very low concentrations and the manufacturer places no restriction on swimming, boating, or fishing following the application. ACT suggests a one-day closure on the day of application. Also, use of pond water for irrigation will be restricted for 7 days following the application. If the herbicide alternative is chosen, the entire shoreline will be posted with signs warning of the treatment and the temporary restrictions, although only a very small area of the pond will be treated.



Shaded Area A is where Diver Assisted Suction Harvesting or herbicide will be used to control *Hydrilla*

The IPA will continue its management efforts on the more scattered *Hydilla* outside of Area A using hand pulling and benthic barriers. Volunteers are always welcome to help in this activity and can contact by sending email to info@indianponds.org.

--Bob Nichols

PHOTO CREDITS: Page 1, chart, Annette Nichols; page 2, Gay Rhue; page 3, charts, Bob Nichols; page 4, Emory Anderson; page 6, chart, Annette Nichols; photo, Betsey Godley; page 7, map, Bob Nichols; photos, Dave Reid; page 8, Betsey Godley.

ROBIN, ROBIN

Not even three feet outside our front door, a mother robin has chosen to construct a nest and fill it with three little blue eggs. This got me to thinking.

I had always heard that the American Robin was named that because it looked like the European Robin and that, sometime around the year 1703, people began calling it a Robin without any scientific reason for during so. Before last year I had never seen a European Robin, so I didn't question the logic. Last year we spent a week in Sterling, Scotland with some old friends and while sitting in their conservatory, gazing out into their garden at the abundance of avian life, I inquired what a little grey bird was. I was promptly told that it was a Robin. Surprise, surprise. There isn't really much of a resemblance.

The American Robin (left) is between 9 and 11 inches long, while the European Robin is 5 to 5.5 inches long. The American Robin has a red breast, while the European could be said to be wearing a red bib. While the European is predominanantly a light grey, the American has a black head and dark gray to black back. I guess the resemblance was sufficient for the people in the 1700s. The American Robin is a member of the Thrush family (*Turdus migratorius*), while the European Robin is a Chat and a member of the Flycatcher family (*Erithacus rubecula*).

The American Robin is the second or third most abundant bird and is widely scattered across North America. It winters south of Canada, and no population residing south of Canada still migrates. On Cape Cod, you will notice that Robins mob up during the winter and spread out during the spring. They are among the first birds to mate and produce offspring, and at this time of year, they can best be described as being kamikaze. The way they flash past the front of your car as you are driving makes it seem as though they have a death wish.

The European Robin (right) is as widely scattered in Europe as our American Robin is in North America. They occur from Great Britain south to Spain and the Azores and east to Western Siberia. They are smart enough to get out of Siberia when the winter starts, migrating to Western Europe.

Both species have similar diets. They are both omnivorous, eating earthworms, grubs, and grasshoppers as well as wild and cultivated fruits and berries. Both hunt visually and can be observed running and stopping. Presumably, the running simulates the sound of raindrops and causes those delectable worms to rise to the surface where they can be added to the menu. While the American hunts and feeds during the day, the European is diurnal and may be observed hunting by moonlight or artificial light.

--Dave Reid

IPA members save the date! IPA members save the date!

IPA ANNUAL MEETING, SUNDAY JULY 14, 4-6 P.M.

470 TURTLEBACK ROAD
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JOIN THE JULY 4TH BOAT PARADE!

Decorate your boat with flags, banners, lights, or anything in the spirit of the occasion and meet at the Race Lane Beach at 2:00 p.m., July 4th.