

THE IPA NEWSLETTER

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

Winter 2014

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A SIGN OF SPRING: NEARLY TIME TO COUNT HERRING AGAIN!



Another season of herring counting is approaching fast. Before we know it those industrious, little fish will be making their way up the Marstons Mills River and into Middle Pond and Mystic Lake. Now that Annette and Bob Nichols have moved to New Hampshire, Three Bays Preservation will be responsible for assembling the data gathered by our dedicated volunteers. Annette was a wonderful organizer and her shoes will be hard to fill, but we are sure we can soldier on!

Last year was another wonderful year for river herring and alewives in the Marstons Mills River. We had a shorter run by 2 weeks in 2013 as compared to 2012. That year, the run began very early, on March 21, and lasted until May 16. In 2013, the run did not begin until April 1 and was over by May 19.

2006	719
2007	1,741
2008	5,232
2009	1,332
2010	478
2011	494
2012	87,308
2013	56,987

When you compare our totals with other runs in the area (see chart, p. 3), the Marstons Mills River is doing quite well! There are currently eight herring runs monitored on this side of the bridge. The Association to Preserve Cape Cod monitors seven of them and Three Bays Preservation the remaining one.

(Continued on page 3)

Marstons Mills River herring counts by year, 2006-2013.

HERRING RUN REPAIRS

During January, a volunteer crew repaired approximately 1,000 feet of the flume of the herring run that flows from Middle Pond to the Marstons Mills River under the supervision of the Town's Natural Resources Department. Braving steep and slippery ground, temperatures in the mid-twenties, and working in freezing water, volunteers, which included IPA members, toiled to shore up the walls of the run with sheets of plywood and lumber bracing. Amy Croteau of the Barnstable Natural Resources Department reports that, due to the great volunteer turnout, the team repaired 50% more of the run than she had anticipated and the work was completed in about half the time she had scheduled. Thanks very much to everyone who helped secure the fish passage. We are looking forward to another banner year for this spring's herring migration back to the spawning grounds in Middle Pond and Mystic Lake.

--Redmond Bansfield, BLT



Herring Run flume being relined and braced on a January morning.



A week later, work continues in the snow. On the left, IPA Treasurer Greg Cronin

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Scan the above QR code with your smartphone to go to the IPA website.

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

This newsletter, with a circulation of 700, 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.

IMPROVING THE IPA'S POND STEWARDSHIP CAPABILITIES

A Proposal for Continuing Bob Nichols's Work

Bob Nichols has shown us how to become better stewards of our ponds in many ways. First, by performing pond testing at least every two weeks from spring through fall, he developed a significant pool of data on how the ponds change through the three seasons. Second, by making use of technology for mapping *Hydrilla*, doing bathymetry, identifying algae, and taking photos underwater, he greatly enhanced our ability to generate reliable data about what was happening in the ponds. Third, by making pond data visible and publishable in photos, charts, graphs, and maps, he has shown us and the public what's going on and helped us develop understanding and draw informed conclusions. The fourth, and perhaps the most important example Bob set for us is by simply spending a lot of time out on the water, at various times of day, through the seasons, observing, inquiring, and learning to identify and understand the ecology of the ponds, from the birds and fish to the invertebrates and algae. Bob has a natural talent for doing field science and communicating about it. Over the past four years, he has shown us that these things can be done better than they were ever done before by the IPA. The question is: can the IPA continue the good work Bob started?

A proposal to do that is currently under consideration by the IPA Board of Directors. Bob owned and operated his own technical equipment: a boat that was suited to working on the ponds, a depth sounder/GPS combination for plotting soundings and mapping *Hydrilla*, an underwater camera, a digital microscope to identify algae and other pond organisms, pH testing gear, and software and computer skills to produce the mapping and other graphics we have come to rely on. Without a similar array of technology, it would be impossible to produce Bob's fine results, and the instruments he used are currently on the IPA wish list. Some of these items have been offered for the use of the IPA by members, notably a GPS and its mapping software and a digital microscope. A hand-held depth sounder, camera, and other small items could be purchased. Sufficient computer skill to produce acceptable graphics is available. And there are people willing and excited about doing the field work.

The greatest hurdle for the IPA Board is the boat. The type of boat that would lend itself to the variety of work to be done has been identified, and there is a lightly-used one currently for sale locally. However, it would be a major financial step for the IPA to purchase and insure an 11-15' rigid bottom inflatable boat with a 9.9 hp outboard and trailer, around \$5,000 for the boat and perhaps as much as \$1200/year for insurance. The IPA has borrowed members' boats in the past, but has often had difficulty obtaining a suitable boat, particularly on Hamblin Pond, where few people have boats, when and as often as it was needed. At the risk of sounding ungrateful, which we certainly are not, the arranging and scheduling issues raised by borrowing boats discourage frequent and consistent pond work. If access to a boat that can be used in all three ponds cannot be assured, it will be difficult if not impossible for the IPA to continue the high standards of pond stewardship that Bob Nichols established. Having its own boat would also give the IPA the opportunity to take more people out and involve them in the interesting, hands-on work of monitoring the health of the ponds.

The IPA Board has not yet voted on this issue, but we would like to hear from our members on this important subject. If you would like to express your views on the subject we would welcome your comments. Better still, if you would like to lend or donate a suitable boat or contribute to a fund to support the purchase of an IPA boat, please offer us a pledge in any amount, which we will earmark for that purpose pending the decision of the Board. Please email info@indianponds.org or contact Alex Frazee by phone.

Photography and Graphics Credits: Page 1 chart, Judy Heller; photos Holly Hobart, page 3 chart, Judy Heller, page 4 map, Three Bays Preservation; chart, Cape Cod Commission, page 6 photos, Betsey Godley.

SIGNS OF SPRING: NEARLY TIME TO COUNT HERRING AGAIN! (Continued from page 1)**Training for Herring Counters: March 8**

We have already set a date for the next training session for anyone who would like to be a counter for the 2014 season. This year, we are fortunate to have Elliott Carr as a featured speaker. He has written a wonderful book, "Herring Run – Life and Death at Stony Brook". It is a photographic book on the Stony Brook Herring Run in Brewster. Even though it's not about our local run, it truly describes the trials and tribulations of being a herring.

Run	Stony Brook Brewster	Herring River Wellfleet	Herring River Harwich	Marstons Mills River Barnstable	Mashpee River Mashpee	Quashnet River Mashpee	Pilgrim Lake Orleans	Red Lily Pond Barnstable
2006	No count	No count	No count	719	No count	No count	No count	No count
2007	30,252	No count	No count	1,741	No count	No count	No count	No count
2008	33,383	No count	No count	5,232	No count	No count	1,647	No count
2009	19,197	21,870	19,336	1,332	No count	No count	1,090	No count
2010	71,026	12,052	41,254	478	No count	No count	1,461	No count
2011	37,091	9,534	10,466	494	114,988	No count	1,370	No count
2012	41,028	11,653	101,624	87,308	226,754	No count	5,931	No count
2013	153,262	24,895	91,167	56,987	225,448	37,453	3,001	913

Cape Cod herring counts 2006-2013, by river.

So, please join us on Saturday, March 8 from 1-3:00 pm at Liberty Hall in Marstons Mills. We'll answer any of your questions and if you've never counted herring before, we'll show you how easy it is.

--Judy Heller, Three Bays Preservation

CALLING ALL HIGH SCHOOL SENIORS!

Time to Apply for an IPA Schwarm Scholarship

Do you have an interest and a track record of helping preserve our environment?

Are you a graduating senior with a strong academic achievement?

Are you planning on a future career that will help preserve and protect environmental and ecological systems?

If the answer is yes, then please apply for the IPA Schwarm Memorial Scholarship!

The Indian Ponds Association (IPA) is announcing that it will offer a \$1000.00 scholarship this spring to a graduating senior from Marstons Mills. The Schwarm Memorial Scholarship was established in 2005 in memory of Edward Schwarm, a former IPA director and officer. It is in his memory and to promote the goals of the IPA that we select a student who plans to balance a professional career with a continuing effort to preserve and protect our environment.

The scholarship is available to any graduating senior residing in Marstons Mills and attending either public or private high school. Applications are available at the Barnstable High School Guidance Office, Sturgis Charter School, or on the IPA website at www.indianponds.org.

Deadline for submission is April 1. We encourage our seniors to apply early!

A STATUS REPORT ON WASTEWATER PLANNING

Finding Alternative Solutions for the Three Bays and Centerville River Watershed

The Background

The bays, coves, and estuaries of Cape Cod are dying. People who were here during the 1950s-60s vividly remember seeing minnows, blue crabs, scallops in the autumn, mussel beds, and carpets of green eelgrass in the calm, shallow waters of the Cape's bays and estuaries. Such vibrant communities of living things are increasingly rare today. What has caused their demise? The culprit in salt water is the element nitrogen, which behaves in salt water much as phosphorus behaves in fresh water, as a fertilizer that encourages profuse blooms of algae. Fueled by excess nitrogen, algae cloud the water, blocking the sunlight required by eelgrass. When the algae blooms die, they form slimy mats that smother the eelgrass and the vast community of organisms that depend upon it for food and shelter. Mats of dead algae, accompanied by dead fish and crabs, also wash ashore on beaches and salt marshes, creating unpleasant odors and repelling swimmers and sunbathers. As this process of overfertilization, algae bloom, and decay continues year by year, the estuary loses dissolved oxygen and gradually becomes a dead zone.

What is responsible for this excess nitrogen? Nearly all of it comes from development, which shifted into high gear on Cape Cod in the 1970s and has continued ever since. Nitrogen gets into the Cape's groundwater through stormwater runoff, fertilizers applied to lawns, golf courses, and crops, and in the urine which leaches from septic systems, including Title V systems. Cape Cod has 123,000 septic systems, and these individual systems account for 85% of the Cape's wastewater.

Nitrogen is one of the most abundant elements on the planet. In its gaseous form, it comprises 79% of air. Bonded with other elements, it is found in all plants and animals, where it is a component of proteins. It is essential to life. It also exists in soil and rocks. Nitrogenous compounds are naturally recycled ("attenuated") into nitrogen gas (N_2) by bacteria in the oceans and in ponds, lakes, streams, and bogs. The problem occurs when there is too much nitrogen in one place for nature to handle, which is what's happening in our estuaries.

This situation creates a serious economic problem for Cape Cod. Beaches fouled by rotting algae and dead fish are not attractive to tourists, nor to people who enjoy living on or near the shore. Dead estuaries translate into lost dollars and falling property values. 60% of the assessed value of Cape property is either on the waterfront or within 1 km. of it. If impaired water quality reduces the value of those properties, the taxes collected by towns will fall more heavily on the inland properties. Estuaries are also an important breeding ground for fish and shellfish, providing support for industries and food for our tables. Clean water, whether for drinking, in ponds, or in salt

water bays and estuaries, is the lifeblood of Cape Cod's economy, so the cost of doing nothing is high and increasing.

Initial Stages of Research and Planning

The federal Clean Water Act of 1972 requires the states to determine which of their waters are impaired by pollution and to determine the Total Maximum Daily Load (TMDL) of each pollutant a particular waterway can accept without violating the state's clean water standards. These standards differ depending on how the water is to be used, for drinking, fishing, swimming, etc. SMAST, the School for Marine Science and Technology at UMass Dartmouth, is responsible for performing the research and analysis on which TMDLs are based. This has been done with input and oversight from the communities involved. The development of TMDLs for Cape Cod's bays and estuaries was begun in the 1990s, and resulted in the determination that 57 of these embayments were impaired by nitrogen.

The Clean Water Act also requires that each state develop a Comprehensive Wastewater Management Plan (CWMP) to remediate each waterbody that is impaired by pollution, including nitrogen. Since the early 2000s, the Cape has been struggling to produce a plan (or many separate plans) to correct the problem. So far, these plans have recommended installing sewer piping and central wastewater treatment plants for the entire Cape, the costliest possible solution. This conventional, "one size fits all" solution has been overwhelmingly rejected by voters as too expensive. *(Continued on next page)*



Map of Three Bays and Centerville River watersheds.

(Continued from page 4)

One Size Doesn't Fit All

The present planning effort is being sponsored by the Cape Cod Commission (CCC) and takes a different approach to the problem than previous plans have done. The new planning process, which has been underway for the past six months and will be completed by this summer, has as its goal meeting nitrogen TMDL requirements at the least possible cost. It recognizes new wastewater treatment technologies that have been developed and tested in recent years.

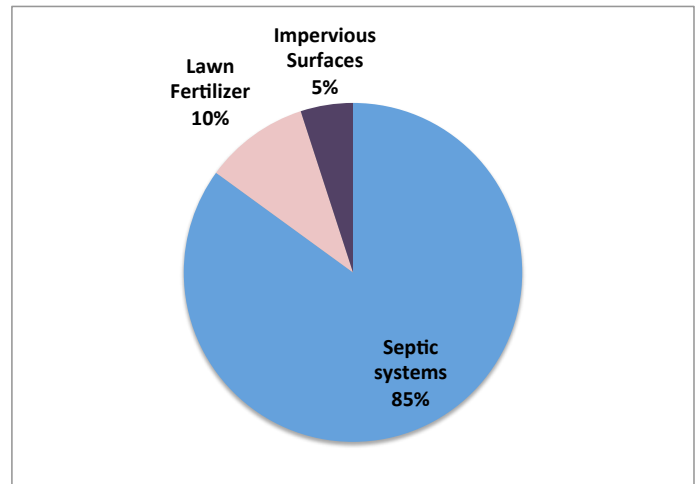
It also recognizes that each of the Cape's watersheds is a unique combination of land uses, land forms, permeable and impermeable surfaces, and population density and distribution. Many watersheds extend across town boundaries. By applying a variety of approaches and technologies to individual watersheds, it attempts to develop a plan to accomplish the nitrogen reductions required by law at the lowest possible cost to the taxpayer.

Watershed Working Groups

In order to focus on individual watersheds, eleven Watershed Working Groups (WWG) were created last fall, one group for each impaired watershed, all across the Cape. These groups of about 60 are composed of town officials, members of organizations concerned with water (such as the IPA and 3Bays), conservation groups (such as BLT), and other interested citizens, some invited, some self-selected. The groups have met three times during the fall and winter, each meeting lasting about four hours. The meetings are led by facilitators from the Consensus Building Institute, with presentations by Commission people and representatives of local environmental consultants such as AECOM. The amount of material, both oral and written, to be absorbed by WWG participants is staggering, as the problem is an extremely complex one, embracing not just nitrogen but also money, and communities, not only the present but the future, and involving the use of unfamiliar technologies and computer modeling methods. Backing up the WWGs are other planning groups of professionals focusing on finance and technology.

The IPA is located in a watershed that originates in Sandwich in the area of Triangle and Lawrence Ponds, from which groundwater flows into the Three Bays. This complex of bays and coves is impaired by nitrogen and in need of remediation. The current nitrogen load on the Three Bays has been calculated to be 48,000 kg/year from controllable sources. Approximately 37,000 kg/year of this comes from wastewater, 8,000 kg/year from fertilizer, and 3,000 kg/year from stormwater. Nitrogen loading must be reduced by 22,000 kg/year to achieve the desired TMDL of 25,000 kg/year.

At this point, halfway through the yearlong process, some conclusions have been reached. First, go for the low-hanging fruit, the solutions that can be implemented cheaply and quickly. Simply looking at the numbers above tells us that reducing the loading from fertilizers and stormwater by 50% would get us to 66% of our target. These reductions can be implemented (and to some extent are already) without additional cost to the community, in the form of ongoing town stormwater mitigation projects and local regulation of fertilizer use.



Sources of excess nitrogen in Three Bays estuarine system, based on information from the Massachusetts Estuaries Project, 2006.

Studying the watershed itself yields additional clues to solutions. Groundwater flowing through the Three Bays portion of the watershed reaches salt water through and around the Marstons Mills River, which provides a convenient choke point for trapping nitrogen and preventing it from reaching Prince and Warren's Coves. There have been two proposals made for doing this. One is to dredge the Mill Pond to allow it to remove 4,000 kg/year of nitrogen by attenuation. The second is to implant one or more Permeable Reactive Barriers (PRB) in the ground that will denitrify the groundwater as it flows through. Other proposed sites for PRBs are in Osterville near the Eel River and on Grand Island. The costs per kilogram of nitrogen removed vs. the benefits of PRBs are currently being calculated, although it seems likely that the cost would not approach that of sewerage. Falmouth is presently conducting an intensive study of PRBs which may provide more information on this technology.

Other solutions that appear promising are shellfish beds, constructed wetlands, and fertigation wells, which trap nitrogen from irrigation water. Such wells are already being used by golf courses in the area. So far, sewerage appears to be needed in only a few sites close to the water, which could be served by local cluster systems or other small-scale solutions at relatively low cost.

(Continued on page 6)

IPA ATTENDS NEW ENGLAND AQUATIC PLANT MANAGEMENT SOCIETY MEETING

The Northeast Aquatic Plant Management Society's annual conference held in Westbrook, CT from January 21-23 featured presentations on topics of major concern to members of the IPA: *Hydrilla* and cyanobacteria. The conference is held each winter and attracts academics, government officials, contractors, aquatic herbicide and equipment manufacturers, and lake association representatives. Holly Hobart and I braved the coastal blizzard to attend.

A full day was devoted to presentations on *Hydrilla*, underscoring the threat (and commercial opportunities) posed by the noxious weed that we know all too well in Mystic Lake. A few of the speakers briefly touched on mechanical and biological controls, but the day's focus was on systemic and contact herbicidal treatments. Systemic herbicides, most commonly fluridone (trade name Sonar), are slow acting, involving reapplications during a treatment period of 30-90 days. Contact herbicidal treatments, such as endothal (Aquathol K), involve a much shorter treatment period—a single treatment should result in significant plant death. (Aquathol K was applied in the northwest section of Mystic Lake last summer.) In some cases, the two methods have been combined. Both types of treatments are thought to be generally safe to humans, fish, and waterfowl, but will damage native aquatic plants (which will die off in any case if *Hydrilla* takes over.)

Dr. Mark Heilman of SEPRO (manufacturer of Sonar) outlined the general principles of invasive species management: monitoring, prevention, early detection/rapid response, and control. He recommended setting an adaptive but clear goal—either eradication or containment. Because of the lengthy viability of the tubers, thought to be at least 7 years, eradication has proven to be elusive. He pointed out that because of *Hydrilla*'s propensity to spread both near and far, multiple problems down the road will be avoided by every successful treatment.

A recurring theme throughout the day was that the key to treatment is understanding the phenology (seasonal growth cycle) of the plant. Typically, *Hydrilla* begins to grow prolifically in June when the water temperature reaches 68°F. Tubers in the sediment sprout and growth is vigorous over the next couple of months. Herbicidal treatment should be timed for that "sweet spot" in the plant's growth cycle when most tubers have sprouted but before new tubers have formed in the late summer or early fall.

A panel discussion at the conclusion of "Hydrilla day" featured an update on infestations in Maine and Massachusetts. Keith Gazaille of Aquatic Control Technology (ACT) discussed the eight waterbodies where *Hydrilla* has been found in Mass.

Long Pond in Centerville is a rare case where *Hydrilla* appears to have been eradicated—after 9 years of treatment with Sonar there were no tubers found in sediment samples last year. Keith is the ACT biologist who has been most directly involved with treatment at Mystic Lake. Holly and I had a chance to talk with him and will probably be seeing him again this summer if ACT is again awarded the contract to treat *Hydrilla* in Barnstable.

Another Mystic Lake veteran, Dr. Ken Wagner, of Water Resource Services Inc., conducted a workshop on algae and discussed a variety of methods for algae control. The bottom line: to prevent algae blooms, phosphorous concentrations need to be less than 10 ug/L. The more algae present, the higher the probability of cyanobacteria along with the cyanotoxins which some of them produce. Cyanotoxins have been implicated in the recent catastrophic mussel die-offs in Mystic Lake and Middle Pond.

Our takeaway from the conference is that we all have much to learn and that we face daunting challenges in confronting the aggressiveness of *Hydrilla* and in understanding the complex issues posed by toxin-producing cyanobacteria.

--Greg Cronin

STATUS REPORT ON WASTEWATER PLANNING

(Continued from page 5)

The WWGs raise many questions, which are recorded in the minutes and addressed by CCC planners. One is about future growth. Growth management experts estimate that the Cape could grow by about 30%. The cost of dealing with the nitrogen added by this additional development has been calculated at 40% of the total cost of sewerage, but has not yet been addressed in the current planning context. Another question is whether any non-traditional plan would get through the state and federal permitting process, which involves many different agencies. Yet another concerns the problem of emerging contaminants, for which no TMDLs or other standards presently exist. Rising sea levels are also a potential problem, as a sea level rise of six feet, which has been predicted by the end of this century, would raise the water table by a corresponding amount. Often the task of planning in the face of so much uncertainty seems totally futile, but what else is one to do?

One answer is "adaptive management", which creates protocols for monitoring results and making responsive changes to the implementation process to increase the probability of success.

(Continued on page 7)

A PARLIAMENT OF OWLS

Recently Cape Cod has begun to have a mini-invasion of a very special species of owl. I know I just did an article on owls, but this one wasn't even on the radar at that time. I am, of course, referring to the Snowy Owl.



The Snowy Owl is the largest owl, by weight, in North America, but Claire and I had to go to Scotland to see our first one. They are one of the few owls that can get even non-birders out to see them and I am sure, by now, that most of you have seen some of the ones we have this winter on Cape Cod.

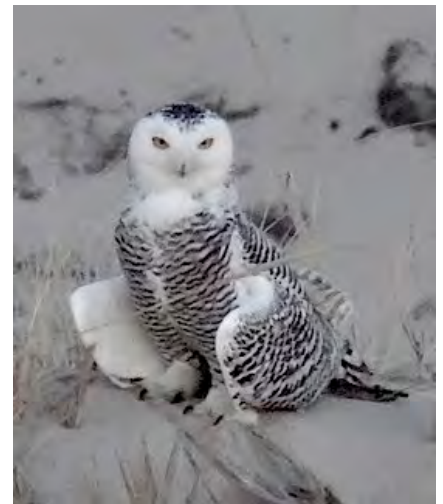
In years when the lemmings are abundant inside the Arctic Circle, Snowy Owls can produce clutches that are two and three times the normal size and ornithologists are speculating that this is what happened during the last breeding season. Fully grown adult and breeding birds remain in the Arctic year round, but the younglings have not learned to find food during the extreme winters up there, so they fly south to a place where they can find food. Of course, there are some adults in the mix that come South but, for the most part, it's the young owls that we see.

In any year they can be found in Boston at Logan Airport, but this year the invasion has been so large that wildlife people have been forced to trap them at Logan and relocate them for everyone's safety. The last number that I heard for birds relocated was 65. Some of those were brought to Cape Cod for our enjoyment.

I had the pleasure of going out to Sandy Neck with some people from Mass Audubon's Long Pasture Wildlife Sanctuary. When we finally reached the end of the beach and walked up a dune we were able to see four Snowys. They had seen three here and three there before but until that time they had not seen a group of four in one place. One of them flew in and landed while we were watching and I want you to know that they are huge. I believe that a recent special on television said that they can have a wing-span of ten feet but my reading for this article indicates that it really is more like five feet. In any case, I would have been ready to believe that the one we saw had a ten foot span.

They do breed and fledge their chicks in the Arctic and are very good and attentive parents. The female does most of the coddling of the chicks while the male does most of the hunting for himself and the chicks. He switches off with the female on occasion so that she can go off and find food for herself. Once the chicks become more mobile both male and female go off to find food for them. These owls are diurnal and hunt 24/7. They are territorial, returning to the same nesting area and, in some cases, even defending a hunting area. Drawings of Snowy Owls have been found in Neolithic cave paintings in Europe.

--Dave Reid



[The owl photos accompanying this article, of young female Snowy Owls, were taken by IPA Director Betsey Godley at Sandy Neck. You can see them—and all Newsletter photos—in color on the website, www.indianponds.org. —Ed.]

STATUS REPORT ON WASTEWATER PLANNING *(Continued from page 6)*

Another, as previously mentioned, is prioritizing low-cost solutions with short implementation timetables, low regulatory hurdles, and high public visibility, using pilot projects and phased implementation.

Although the Watershed Working Groups will complete their tasks by summer, the planning process involves many more steps and will probably continue indefinitely, or at least until its funding runs out. Meanwhile, testing, pilot projects, and implementing the smaller, easier changes will also be happening. Stay tuned.

--Holly Hobart

N.B. A list of sources and references for this article will be found on www.indianponds.org.

"To preserve and protect the natural environment and ecological systems of the Indian Ponds and surrounding parcels of land and watershed and to participate in studies and work with other agencies, individuals, and groups to educate the public, serve the community, and promote and preserve the Indian Ponds and surrounding areas."

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Annual Herring Count Training Meeting

Have you counted herring in the past? Would you like to be a counter this year?

Then join us to learn all about being a herring counter and why it's so important for us to count! And if you've counted in the past, please come by and sign up again!

This year, we are so pleased to have Elliott Carr joining us with his newest book:

Herring Run: Life and Death at Stony Brook



When: Saturday, March 8, 2014 from 1:00-3:00 pm
Where: Liberty Hall, 2150 Main Street, Marstons Mills
(Next to the Library)