

THE IPA NEWSLETTER

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

Winter 2020

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THE IMPORTANCE OF THE CAPE'S LAKES AND PONDS

We sometimes take nature's gifts for granted, be they spectacular birds and animals, robust trees and plants of all kinds, scenic landscapes and views, beautiful sunrises and sunsets, or the precious freshwater lakes and ponds that so numerously populate Cape Cod. Visitors and many residents alike often consider the surrounding ocean and beaches to be the Cape's prize attributes. However, the Cape is blessed with nearly 1,000 freshwater lakes and ponds of all sizes, shapes, and depths ranging from the largest, Long Pond in Brewster and Harwich (over 740 acres), to the smallest of less than 1 acre. The Town of Barnstable has 182 lakes and ponds totaling 1,856 acres. The largest in Barnstable is Lake Wequaquet in Centerville at 596 acres, with adjoining Bearse Pond comprising 67 acres, followed by the three Indian Ponds: Mystic Lake (148 acres), Hamblin Pond (115 acres), and Middle Pond (105 acres). Close behind in size are Shubael Pond and Long Pond, both in Marstons Mills, and Lovell's Pond in Cotuit, each at 55 acres.

Why are the lakes and ponds so important?

1. They provide residents living nearby and visitors with recreational opportunities such as swimming, boating, kayaking, fishing, sunbathing, and scenic enjoyment.
2. They provide birds, fish, other aquatic animals, and some terrestrial animals dependent on them with food, habitat, and nursery areas for their young.
3. Very importantly, they remove nitrogen from the water using bacterial action to turn dissolved nitrates into nitrogen gas, allowing it to escape into the air. This process called denitrification is nature's way of removing excess nitrogen from the water and returning it to the atmosphere.
4. For all of these reasons, it is in our best interest to preserve the quality of the water in our ponds. Healthy ponds also translate into higher valuation for properties on or near them and hence higher residential taxes paid to the town(s) in which they are located. Degraded ponds lead to diminished property values and lower tax revenue to towns. For example, the 550 waterfront properties surrounding the eight large lakes and ponds in Barnstable mentioned above had a total assessed valuation of \$392 million in FY 2020. If you count the properties behind the waterfront lots, the valuation is considerably higher.

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COLOR**

GO TO THE IPA WEBSITE: www.indian-ponds.org

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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 approximately 700, is a forum for the exchange of ideas on matters concerning the IPA's mission, and the views expressed by authors of articles do not necessarily represent official IPA policy.

IPA HOSTS MEETING ON POND PROBLEMS

The Indian Ponds Association board of directors invited a number of guests to attend its February 5 board meeting to discuss problems confronting our lakes and ponds. These included representatives from the Wequaquet Lake Protective Association, the Evergreen Homeowners Association and the Sand Shores Association from Schubael Pond, the Friends of Long Pond in Marstons Mills, the Barnstable Clean Water Coalition, and the Town Department of Public Works, as well as Town councilors from Precincts 10 and 12. A lively two-hour discussion covered a range of topics including (i) the Town's sewer expansion plans relative to lakes and ponds as defined in its Comprehensive Wastewater Management Plan (CWMP), (ii) the Town's CWMP vs. state/federal Clean Water Act mandate to address pond and lake water quality issues, (iii) management of excess nutrients through advanced nitrogen-removing home septic systems, (iv) the need for meetings with Town officials to discuss remedies for pond problems, (v) Town staffing to deal effectively with issues confronting its 182 freshwater ponds, and (vi) ways for pond associations to individually and collectively convey their concerns to the Town and also to better educate the public on the need to reduce the use of nutrients on lawns and gardens.

Action items stemming from the meeting included scheduling meetings with Town officials, investigating possible sources of funding for pond water quality issues, and planning future meetings of all Town pond associations to better identify and articulate their common concerns so as to frame appropriate questions and proposals to the Town. This meeting, the first of its kind involving pond associations in Barnstable, was viewed by all attendees as a welcome first step in drawing greater attention to the problems facing our ponds because of excessive nutrients and in developing a more effective approach to stimulating more attention and action by the Town.

Emory D. Anderson, PhD



We are killing our ponds if we continue to fertilize our lawns with phosphorus fertilizers. To learn more, check out these websites...

<https://learn.uvm.edu/foodsystemsblog/2018/03/21/managing-phosphorus-in-vermont-waterways/>

https://youtu.be/Y70I_kADGQY

<https://youtu.be/gMwQaHtK904>

THE IMPORTANCE OF THE CAPE'S LAKES AND PONDS

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The big problem facing lakes and ponds

Our ponds were created 12,000–18,000 years ago when the ice sheet covering this region began to melt and retreat. Ice blocks that remained created depressions in the ground and eventually melted leaving bodies of water called kettle ponds. Most of these ponds have no inlets or outlets; their water is part of the groundwater and is replenished by precipitation. Over the centuries, organic material containing nitrogen, phosphorus, and other elements has accumulated in the ponds and supported the growth of plants and algae, which produce oxygen needed by animals living in the ponds. Minus the influence of man, the quality of water in the ponds remained stable. However, when people began building homes close to ponds, wastewater containing nitrogen and phosphorus began entering the ponds through the groundwater. Now, with the Cape heavily populated and with many homes located close to ponds, both nitrogen and phosphorus from septic system wastewater, lawn and garden fertilizer, and agricultural waste (e.g. animal manure) are entering the groundwater in greater quantities. Although both nitrogen and phosphorus enter our lakes and ponds, of the two, **excess phosphorus is most responsible for causing the decline in water quality by fueling the growth of excessive amounts of algae, some of which (cyanobacteria) produce toxins harmful to humans and animals.**

Municipal sewer systems

At the present time, efforts are underway in some Cape towns, including Barnstable, to begin expanding existing sewer systems in order to eliminate ineffective home septic systems and to instead transport domestic wastewater to large-scale sewage treatment facilities where nitrogen, phosphorus, and other undesirable effluents can be removed. **The principal focus of all the sewerage efforts is the removal of nitrogen, the main cause of water quality degradation in saltwater embayments and estuaries.** The Barnstable Comprehensive Wastewater Management Plan (CWMP), as reported in the fall 2019 issue of this newsletter, is the Town's response to this Cape-wide effort mandated by the Cape Cod Commission's Cape Cod Area-Wide Water Quality Management Plan Update, or "208 Plan".

Groundwater in the Three Bays watershed, which contains the Indian Ponds, originates in Sandwich and flows southeasterly through several ponds in Sandwich before entering the area north and west of the Indian Ponds (see map). It then proceeds southerly towards the Three Bays estuaries and eventually Nantucket Sound. Along the way, some passes through the Indian Ponds, and some moves through other ponds such as Long Pond and Lovell's Pond, **but while passing through any pond, significant amounts of nitrogen are removed by means of denitrification.** Still other portions of the groundwater do not intersect any ponds and thus continue collecting nitrogen from septic system wastewater and other sources. Therefore, it is understandable why there is the desire and need to reduce the amount of nitrogen entering the bays.

However, a concern by the Indian Ponds Association with the CWMP is that its implementation, which will be done in three 10-year phases, does not include many of the waterfront and close-proximity properties surrounding the three Indian Ponds (see map), particularly those on the north and northwest sides of the ponds.

(Continued on page 5)



Delineation of the Three Bays watershed, taken from the CWMP, showing the Indian Ponds in the upper northeast side and the Three Bays estuaries towards the bottom.

RESIDENT ACTIONS TO REDUCE POND POLLUTION

While the IPA conducts proactive water quality monitoring and the Town periodically treats our waters, ultimately it's better to prevent a bloom from happening than remediate one that's already present. Non-point source pollution (NPS) is water pollution from many diffuse sources (such as animal waste and fertilizer carried into streams by storm runoff) rather than point sources. Wastes and chemicals from many small sources can combine to make big pollution problems for our bodies of water.

Disposal of this waste is not "somebody else's" problem. Here are some actions each of us can take to help combat NPS and protect our precious ponds and streams:

1. Soil can absorb and break-down many pollutants, so flowing rainwater should be slowed by vegetation wherever possible. Implement landscaping strategies like xeriscaping that increases groundwater filtration before water enters the pond or lake.
2. Install rain barrels to reduce polluted runoff.
3. For your lawn, Chris Stokes at Country Garden advises:
 - Use organic fertilizer with slow-release nitrogen that won't leach away if properly applied. Espona has a 4-step program that starts early spring.
 - Aerate your soil once a year to give roots the air and freedom they need to establish deep roots into the soil.
 - Mow (with a mulching blade) no less than 3" high to encourage a deeper root system; 4" is even better. The longer the blade, the longer the root, the stronger the factories to absorb nutrients and water, the better the soil to absorb pollutants.
 - Water deep and infrequently to encourage deep root growth: 1" at a time every 7–10 days for 20 min. watering encourages shallow roots. It may take cycles of 1 hr. or more (To determine how long your system requires, see how long it takes each sprinkler zone to fill a tuna can with water).
 - Use corn gluten as a natural herbicide in spring when the forsythia are blooming and again in late August to September.
 - Improve the organic matter in your soil by leaving your grass clippings on the lawn throughout the season and a thin layer of mulched leaves in the fall. Mow over 1/3 of your leaves with a mulching mower once or twice and spread it on the lawn, so the warmth of spring will turn it into compost.
 - Invest \$20–26 and have your soil analyzed at UMass extension. (<http://soiltest.umass.edu>) to determine the correct calcium/magnesium ratio. A ratio of about 7:1 helps keep the soil from compacting, encouraging deeper roots and discouraging weeds.
- Country Garden is holding a talk **Saturday April 4 at 1 pm on organic lawn care and best practices for Cape Cod.**
4. Have your septic system pumped every 1–2 years and have it inspected at the same time to ensure it is working properly. This will make it less expensive to maintain in the long run.
5. Never dispose of toxic and hazardous chemicals in your septic system or dump them on the ground or down a catch basin. Take gas, antifreeze, motor oil, paint, bleach, poison, paint remover, pesticides, etc. to the next hazardous waste pickup day (April 6, 9 am to noon). Or give unwanted chemicals to friends who can use them. For more information, visit Cape Cod's www.loveyourlocal-water.org.
6. Avoid chemical additives for septic system maintenance. Research indicates most of these products do not improve a system's performance and are absolutely unnecessary. Some of them are not biodegradable, and a few contain environmentally harmful chemicals.
7. Use boiling water instead of drain cleaners.
8. Read labels to make sure you're using phosphate-free cleaners and soaps. Substitute baking soda for abrasive scouring powders.
9. Don't use in-sink garbage disposals; they deposit food waste into the water system, which can lead to "nutrient loading" into lakes. Land composting is a much better option for kitchen waste.
10. Cooking oil, fat, and grease can cause accelerated clogging of the leaching facility and should be discharged with solid domestic wastes.
11. Do not feed wild waterfowl. It causes them to concentrate in unnaturally large flocks and interrupts normal migration patterns. Geese, in particular, may stop their southward migration short of their traditional winter grounds.
12. Pet waste is a common source of excess nutrients and bacteria. Left on pavements, it will be carried by stormwater into streams. Walk your pets in grassy areas, parks, or undeveloped areas. Pick up and bag your pets' wastes and dispose of them in your garbage.
13. When boating, use on-shore rest rooms and pump-out facilities.
14. Use extreme caution to prevent spills when applying cleaners, paint, and antifouling compounds to your boat and avoid using them where possible. When cleaning or scraping your boat, make sure residue does not fall into the water.

Wendy Bierwirth

THE IMPORTANCE OF THE CAPE'S LAKES AND PONDS

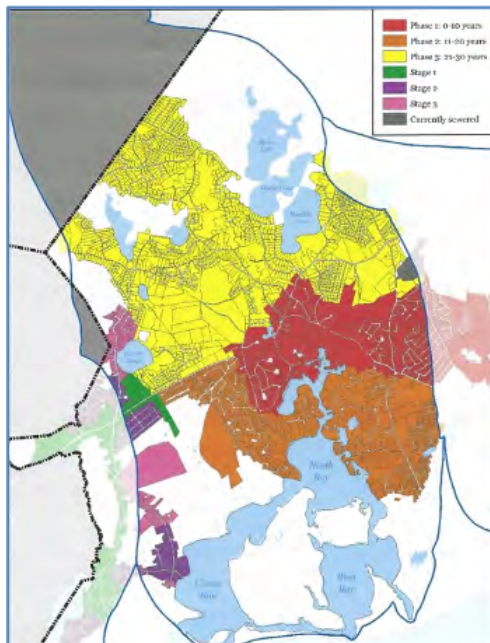
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Alternatives

For the homes and neighborhoods not slated to be connected to the expanded sewer system, particularly those in the vicinity of a pond, the CWMP encourages the installation of innovative and advanced nitrogen-removing septic systems as a way to reduce the amount of nitrogen entering the groundwater. While such systems have been demonstrated to substantially reduce the amount of nitrogen entering the groundwater from home septic systems, **present technology has not been developed to effectively reduce phosphorus**. An article in the February 7, 2020 issue of *The Barnstable Patriot* quotes Andrew Gottlieb, executive director of the Association to Preserve Cape Cod: "The notion that there's an alternative that doesn't include some amount of sewerage is wrong. If you sewer, the nitrogen and phosphorus never go into the ground in the watershed of the sensitive resources we are trying to protect – it's the only solution that can solve the problem in its entirety." The article goes on to say that "**while alternative septic systems can reduce nitrogen, they don't necessarily do the same for the phosphorus, which limits their effectiveness for water quality problems in lakes and ponds.**"

Nitrogen is recognized as the prime culprit in the saltwater estuaries responsible for the growth of algae and for deteriorating water quality. However, **in freshwater, phosphorus has long been acknowledged as the key nutrient**

responsible for the growth of algae and reduced water quality. Advanced nitrogen-removing septic systems in homes surrounding the Indian Ponds will not, in our opinion, be very effective in improving pond water quality. Nature's own process of denitrification removes a lot of nitrogen from pond waters and at no cost to property owners who will be faced with costs of \$10,000–30,000 for such a system, depending on whether it would be an add-on to an existing Title 5 septic system or new construction. Testing has shown that water flowing out of Middle Pond into the Marstons Mills River via the herring run is carrying low levels of nitrogen. This is most likely also the case for groundwater leaving Mystic and Hamblin. Therefore, there is a natural advantage when groundwater enters and moves through deep ponds, such as the Indian Ponds, as they assist via denitrification in reducing the amount of nitrogen.



Sewer expansion plan in Three Bays watershed, taken from the CWMP.

How to deal with excessive phosphorus

If sewerage homes around most of the three Indian Ponds (as well as Long Pond and Schubael Pond) is not to be considered in the Town's CWMP, and if the proposed advanced nitrogen-removing septic systems are able to effectively remove only nitrogen from wastewater, **what options remain to curtail or suppress the excessive phosphorus levels in the ponds?** This question applies to homes around all ponds in the Town where sewerage is not being considered. Decreasing the use of phosphorus-containing fertilizers is, of course, a sensible and responsible thing to do. However, **it is widely felt that septic discharge remains the primary source of new phosphorus entering the ponds.**

Since the Town is delegated the responsibility by the Commonwealth to manage the lakes and ponds within its boundaries so as to keep them viable, healthy, and safe for public use, the Town's alternative must be the continued use of various treatments tailored to the unique features of the pond in question. This will include reducing the levels of phosphorus that fuel the growth of excessive algal blooms (e.g. cyanobacteria) in almost every pond. This will mean the continued allocation of substantial funding to cover the cost of such treatments (e.g. alum or other measures for reducing or suppressing phosphorus levels, fluridone for combating the invasive *Hydrilla* in Mystic Lake, Middle Pond, and Long Pond in Centerville). Over the years, the Town has responded positively to such problems confronting the Indian Ponds. **With more and more ponds now experiencing phosphorus-based troubles, the Town will need to "up its game" in order to deal more effectively with what is clearly a mounting problem.**

PUFFINS OF THE WORLD



Atlantic puffin

With the lack of any requests for a specific type of bird, I am left to telling you about birds that I have enjoyed seeing in my travels. Please remember that I am willing to research any species of birds that you would like. Just let Emory Anderson (emoryanderson@comcast.net) know what you would like to read about.

We have been fascinated by puffins in our travels around Great Britain, Iceland, Greenland, the Svalbard Islands, and, of course, Maine. There are three species of puffins. They are Alcids (which are a type of auk) and are all members of the genus *Fratercula*, which is Latin for little brother and is a reference to their black and white plumage, which resembles monastic robes.

Only one of the three species, the Atlantic puffin, is found in the Atlantic Ocean, while the other two, the horned puffin and the tufted puffin, are found in the North Pacific Ocean. All three species have mostly black and white plumage, a stocky build, and large beaks. There are several extinct species, Dow's puffin, that was found on the Channel Islands of California until the Late Pleistocene or Early Holocene and a type of tufted puffin found in North Carolina during the Miocene and Pliocene.

The name "puffin" was applied in the mistaken idea that the birds were related to the Manx shearwater (*Puffinus puffinus*) which were formerly known as Mank's puffins. They are not related.

Puffins breed in colonies on coasts and islands. The male Atlantic puffin builds the nest, while both sexes of the horned puffin and the tufted puffin participate in the construction of the nest. Both the horned puffin and the tufted puffin of the West Coast nest in burrows. The burrow for the horned puffin is usually about 3 feet deep, while that of the tufted puffin can be up to 9 feet deep. The Atlantic and tufted puffin usually dig their burrows in soft soil, while the nesting sites of the horned puffin are rock crevices on cliffs. Where rabbits breed, sometimes Atlantic puffins use their deserted burrows as breeding sites.



Tufted Puffin



Horned Puffin

Puffins form long-term bonds. The female lays a single egg annually, and both parents incubate the egg and feed the chick (puffling). After fledging, the chicks spend the first few years of their lives at sea, returning to breed about five years later. After breeding, all three species winter at sea, usually far from coasts and often extending south of the breeding range.

Puffins eat both fish and zooplankton, but feed their chicks primarily small fish, either sandeels or sea herring.

Puffins are hunted for eggs, feathers, and meat. Their populations drastically declined during the nineteenth and early twentieth centuries. They continue to be hunted in Iceland and the Faroe Islands. The Atlantic puffin forms part of the national diet in Iceland where the species does not have legal protection. Their meat is commonly featured on hotel menus.

CALLING ALL COLLEGE-BOUND HIGH SCHOOL SENIORS

The Indian Ponds Association (IPA) is pleased to announce that it will again offer a \$1,000.00 scholarship this spring to one or two graduating high school seniors 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 the goals of the IPA to select a student or students who will balance their professional careers with a continuing effort to preserve our environment.

The scholarship is available to graduating seniors residing in Marstons Mills and attending either public or private high schools. 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.

Betsey Godley

UPDATE ON MIDDLE POND HERRING RUN RECONSTRUCTION

The Natural Resources Conservation Service (NRCS) is funding a portion of construction to supplement the Town's existing budget. Final approval and review by NRCS is required as part of this funding agreement. NRCS has hired a fishway consultant to review the project. This review is currently underway. Upon completion of the review (completion date unknown at this time), the Town will address comments and finalize the project design. An updated construction schedule will not be known until the NRCS review is completed.

*Griffin Beaudoin, P.E.
Town Engineer*

NEW IPA WEBSITE

The new IPA website is in the works. We're looking for good photos and videos of the ponds and their wildlife (especially pictures of the bald eagles that are frequenting the ponds). Please send any you'd like to share to: IndianPondsWebmaster@gmail.com.

Eutrophication

Eutrophication Is killing our lakes Eutrophication We are playing high stakes	Summer and phosphates Are cyano's best friends They grow and they grow Life seems without end	A cloud of green algae Too much growth and decay Along with their toxins We can no longer delay
Phosphates in the run-off Phosphates in the land Fertilizing phosphates We don't understand	Consuming the oxygen Dissolved in the lake Cyano and algae Don't have any brakes	We don't need more phosphorus In the land or the water Too much of this element Is just out of order
Phosphates are needed As a backbone to health Yet too many phosphates Kill our ponds on the stealth	A cloud of green algae Now shuts out the light Using up all the oxygen And now there's no life	Eutrophication is killing our lakes Eutrophication is playing high stakes Eutrophication is about the phosphates

Jim McGuire, MD

TIME TO PAY YOUR DUES

It is now that time of the year to pay your annual membership dues to the Indian Ponds Association (IPA). Enclosed in this issue of the IPA's quarterly newsletter is a remittance envelope for payment of your membership dues and other contributions. Annual dues for a family or household membership is \$25, which is a \$5 increase from the previous level, which had been in place for many years. Rising operating expenses – particularly for postage and printing of our quarterly newsletter – have exceeded dues income in recent years forcing us to dip into the Pond Restoration Program funds. Therefore, the board of directors considered it prudent to implement this modest increase in dues.

As before, members are also encouraged to contribute to the Edward Schwarm Memorial Scholarship fund which provides one or two \$1,000 scholarships for college-bound graduating high school seniors residing in Marstons Mills. In addition, contributions to our Pond Restoration Program help support the IPA's work in protecting the quality of the Indian Ponds. For example, your contributions last year funded our cyanobacteria monitoring of the three ponds done in collaboration with the Association to Preserve Cape Cod (APCC). This monitoring program, costing around \$4000 per year, is expected to be continued in 2020. As the IPA continues to consider and possibly pursue other opportunities and activities aimed at improving the water quality of the three ponds, additional costs may be incurred. Therefore, it is important that you consider investing in the Pond Restoration Program.

Since the IPA is a 501(c)(3) organization, your membership dues and other donations are tax-deductible. Thank you for your past support of the work of this important organization, and we look forward to your continued support.

Emory D. Anderson



Annual Marstons Mills River Herring Counter
Information and Training Session

Saturday, March 7th from 9am-11am
Osterville Village Library, 43 Wianno Ave., Osterville



Barnstable Clean Water Coalition (BCWC) and the Barnstable Department of Natural Resources (DNR) are looking for volunteers to assist with the annual spring herring count beginning on April 1st at the Mill and Middle Pond fish ladders.

Amy Croteau (Barnstable DNR) will provide an update on the town's herring runs.

John Sheppard, Diadromous Fisheries Biologist for the Massachusetts Division of Marine Fisheries (DMF), will talk about how DMF estimates herring run sizes using visual count data collected by volunteers.

Following the speakers, there will be a brief training and refresher session for all new, interested and returning volunteers.

To volunteer or for more information, contact Heather Rockwell at hrockwell@bcleanwater.org or 508-420-0780.

BCleanWater.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.” IPA Mission Statement

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FORWARDING SERVICE REQUESTED

