

THE IPA NEWSLETTER

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

Winter 2022

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IT'S TIME TO RENEW YOUR MEMBERSHIP AND PAY DUES

It's time to renew your membership in the Indian Ponds Association (IPA) either as a **resident member** (if you reside within the area bounded by Race Lane, Route 149, Lovell's Lane, River Road, Bog Road, and Old Mill Road, including both sides of these bordering streets) or as a **Friend of the IPA (FIPA)** (if you reside elsewhere). The remittance envelope included with this issue of the newsletter can be used to renew your membership, to sign up for the first time, to pay the annual dues of \$25 per household, and to make an additional donation to the Schwarm Scholarship fund or the Pond Restoration fund. Both the membership dues and any donations are tax-deductible as the IPA is a 501(c)(3) organization.

If you so desire, you can also join the IPA, renew your membership, and pay dues and contributions by logging onto the IPA website (<https://www.indianponds.org/>) and clicking

"MEMBERSHIP" at the top of the homepage, which will show options for "How to join", "Membership application form", and "Payment information".

The IPA continues to depend on the generosity of its members to support the work of the organization. We publish a quarterly informative and educational newsletter that is distributed to over 800 recipients, which costs over \$4,000 per year for printing and postage. We support one or two Schwarm Scholarships per year at a cost of \$1,000–\$2,000. For several years, we funded a cyanobacteria monitoring program with the Association to Preserve Cape Cod at a cost of \$3,000–\$4,000 per year, and recently funded a nutrient study of Mystic Lake by Dr. Ken Wagner, Water Resource Services, Inc. at a cost of \$6,600. Other miscellaneous costs probably total close to \$1,000 for pond sampling equipment and supplies, annual meeting expenses, annual reporting fees to state and Federal authorities, and the like. Our important work would not be possible without the generous contributions by members. Since the above-mentioned expenses are unable to be covered by dues alone, we can only continue to carry out the important work needed to preserve and protect the Indian Ponds and the surrounding land and watershed if our members generously contribute. I hope we can continue to count on you.

Emory D. Anderson, President

NOAA FISHERIES REPORT ON RIVER HERRING

River herring history

The term "river herring" is a combined name for the alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*). River herring return to freshwater habitats to spawn, providing food to many species, nutrients to freshwater ecosystems. They play a pivotal role in regulating the food web structure. They also help support the conservation of the endangered Atlantic salmon, by being prey to predators and thus reducing the predation on salmon. Furthermore, river herring also contribute to a wide variety of important ecosystem services that benefit people.

These fish supported some of the oldest fisheries in the United States. Their historically high abundance, wide distribution, and migratory life cycle are intertwined with the human experience along the Atlantic seaboard of North America. They are culturally important to a number of Native American tribes, who celebrate the runs of river herring adults into freshwater spawning habitats along the East Coast.

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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 over 800, 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.

The Indians Ponds Association would like to announce that we are again offering a \$1,000 scholarship to a graduating high school senior who lives in Marstons Mills. The Schwarm Memorial Scholarship was established in 2005 in memory of Edward Schwarm, a former IPA director and officer, who loved the lakes. In his memory, the IPA annually selects one or two students who plan to 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 schools. Applications are available in the Barnstable High School Guidance Office, Sturgis Charter School, or on the IPA website. **Deadline for submission is April 1.** We remind our students to apply early.

Betsey Godley

LATEST APCC REPORT ON STATE OF THE WATERS

The Association to Preserve Cape Cod (APCC) recently released its report "State of the Waters: Cape Cod 2021", the third such annual assessment of the Cape's water quality designed to help understand water quality problems that we face and the actions needed to address these problems. Readers can access the details of the assessment methods, data, and results on the report's website (<https://capecodwaters.org/about/>). This annual analysis focuses on the water quality of coastal embayments, freshwater ponds, and public water supplies.

Here, we comment only briefly on the results for freshwater ponds. For the 2021 report, water quality data (Secchi disk values for water transparency, chlorophyll *a*, and total phosphorus) collected primarily via the Cape Cod Ponds and Lakes Stewardship (PALS) program for 2016 onwards as well as cyanobacteria monitoring data collected by APCC for 2020. A total of 109 ponds, mostly in the mid-Cape area, were graded out of a total of nearly 1,000 on the Cape. Only 36 ponds had sufficient water quality data with which to be graded, and 87 were graded only on the basis of cyanobacteria monitoring data. Nearly two-thirds of all graded ponds were deemed Acceptable, and the remainder Unacceptable.

The three Indian Ponds were among those graded in 2019, 2020, and 2021. In the 2019 report, Mystic Lake was graded Unacceptable (Middle Pond and Hamblin Pond were graded Acceptable) based on an evaluation of water quality data for 2012–2016 (see the fall 2019 issue of this newsletter for full details). In the 2020 report, Middle Pond was graded Unacceptable based on cyanobacteria monitoring data, while Mystic Lake and Hamblin Pond were graded Acceptable. In the 2021 report, Mystic Lake was graded Unacceptable based on cyanobacteria monitoring data, while Middle Pond and Hamblin Pond were graded Acceptable. Although such results should not be viewed as definitive evaluations of the water quality status of any of the three ponds, the two Unacceptable grades for Mystic Lake in the 2019 and 2021 reports do, nevertheless, support the IPA's long-held view that Mystic Lake is in need of additional restoration treatment.

Emory D. Anderson, PhD

NOAA FISHERIES REPORT ON RIVER HERRING

(Continued from page 1)

Threats to river herring

Since European colonization, almost all migratory species in eastern North America have declined in abundance. Unfortunately, river herring populations are at historical lows as a consequence of dam construction, habitat loss, habitat degradation, and overfishing. The reduction in spawning habitat by dams is the largest disturbance based on the estimated yearly loss of river herring in the area. From Maine to Virginia, there are more than 14,000 dams across the 13 states! Juvenile river herring swimming out to sea, and adults in the river and swimming upstream to spawn, are all disrupted by dams. Dams are not the only barrier to upstream and downstream fish passage: culverts and road crossings also contribute. Other threats to river herring include:

- poor water quality;
- contaminants that contribute to habitat degradation negatively impact river herring eggs and larvae;
- changing temperatures associated with climate change, which can adversely affect river herring physiology, growth, migration timing, and survival.

How are we helping to restore populations?

Assessing river herring stocks is a daunting task. Both species use a variety of habitats from freshwater to open ocean and have broad ranges along much of the East Coast. Additionally, similarities in body shape and form between the two species add to the complexity of evaluating their stock structure. Most data collection programs and management actions to merge both species and also fish from different rivers and regions.

To help restore river herring, NOAA Fisheries and the Atlantic States Marine Fisheries Commission established a technical expert working group in 2013. It combines information about river herring and identifies needs to advance the science to help restore the species. "We were questioned when the working group was formed, but this group represents a critical step in river herring restoration by combining the knowledge and efforts of many experts and organizations," says Diane Borggaard of the Protected Resources Division at the Greater Atlantic Regional Fisheries Office. "This collaborative framework is an approach that has helped further needs for river herring and could serve as a model for other species."

In 2020, the working group was renamed the Atlantic Coast River Herring Collaborative Forum. The forum has been very effective in bringing together a broad

group of experts to better understand river herring and to consider the complexities of river herring restoration. The collaboration between NOAA Fisheries, the Commission, and New England and Mid-Atlantic Fishery Management Councils has facilitated a number of steps to promote the restoration of the two species.

Ecosystem approaches to restoration

There is a need for comprehensive science and management to help restore and maintain healthy river herring populations. This includes considering all the threats to river herring holistically. "River herring restoration is not a fisheries management issue, it is an ecosystem management issue and to be successful we need to apply ecosystem approaches," said Jon Hare, Science and Research Director of the Northeast Fisheries Science Center and lead author of the study. Collaborative efforts across all sectors are required to manage and restore healthy river herring populations. To help restore river herring through an ecosystem approach, river herring managers, researchers, and community groups from across the species' range need to collaborate to share and synthesize information to coordinate management and science efforts.

While there are still a number of unknowns remaining regarding how various threats and climate change will interact with conservation efforts, there is good news. One method is removing dams to increase river herring abundance by allowing them access to spawning habitats. For example, when the Edwards Dam was removed in 1999 river herring returns to the Kennebec River increased by 228 percent. When the Fort Halifax Dam was removed in 2008, river herring returns on the Sebasticook River in Maine increased by 1,425 percent.

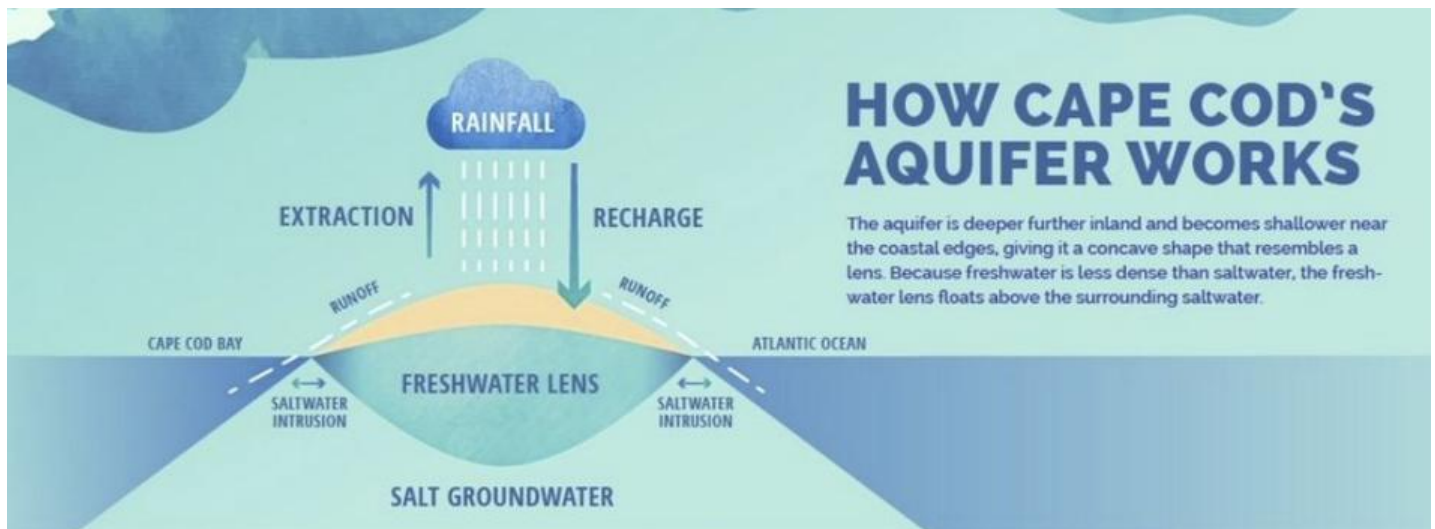
There were also signs of improvement from the 2012 to the 2017 stock assessments. Sixteen out of the 54 rivers in 2017 exhibited increased population trends compared to 2 of 54 rivers in 2012. Much progress has been made in the past 10 years, but important data gaps still need attention. That includes the effects of contaminants and land use on river herring productivity, and a better understanding of stock structure. The next steps are to focus on creating standardized stock assessments and to promote a collaborative framework to support long-term effective restoration and conservation of river herring.

NOAA Fisheries
Northeast Fisheries Science Center, Woods Hole

RISING SEA LEVEL: RISING GROUNDWATER LEVEL

Last August, NOAA's National Centers for Environment Information (NCEI) published a study showing the Gulf of Maine's water temperature rising at an accelerated rate of 0.05°C per year – sharply faster than 96.2% of the world's oceans. This is due, in large part, to rising water over Georges Bank. *Boston Globe's* 2019 special report "*Climate Change on Cape Cod: at the edge of the warming world*" described it well. The Gulf of Maine is located at the meeting point of cold-water masses from the Arctic and warm-water masses from the Gulf Stream. For millennia, Georges Bank's underwater plateau broke up waves from deep in the Atlantic, reducing their energy. But rising sea levels now allow more powerful waves to pass, so that warm waves from the south now overpower the cold waves from the north.

The Cape's median predicted sea level rise by 2100 is 6 feet (some say 10 feet). Per the Cape Cod Commission Sea Level Rise Viewer (<https://www.capecodcommission.org/our-work/sea-level-rise/>), a 6-foot rise would submerge 9% of the Cape, causing the loss of 795 businesses, 8,222 jobs, and 708 miles of roadway. The separation of the Outer Cape into an island at Eastham resulting from a 10-foot rise can be visualized at NOAA's viewer (<https://coast.noaa.gov/slr/>).



Such a sea level rise affects more than the Cape's coast. Ours is a sole-source aquifer where 100% of our drinking water comes from the natural store of water underground. As the sea level rises, the water table will as well. Fresh water is less dense than salt water, so the groundwater floats on top of the surrounding seawater in a kind of lens. Our aquifer has six of these lenses. A 2014 US Geological Survey study done in cooperation with the Association to Preserve Cape Cod (APCC), the Cape Cod Commission, and the Massachusetts Environmental Trust (<https://pubs.er.usgs.gov/publication/sir20165058>) predicts a 6-foot sea level rise will cause a 2.11-foot rise in the water table. According to a 2016 APCC report about that study (<https://apcc.org/resources/reports/sea-level-rise/>), "As the water table rises, hydraulic gradients and streamflow should also increase, causing streams, ponds with outlets, and wetlands to drain faster. This will help to dampen the increase in water table altitudes and may mitigate some of the adverse effects of higher ground water". Areas with less than 5-foot depths to groundwater, mainly low-lying coastal areas or those near stream and ponds, are vulnerable. APCC also noted that "changes in groundwater and streamflow have important implications for management of wastewater, water, natural resources and habitat."

Long-term monitoring of groundwater, streams, and sea level rise is needed. Cape Cod Groundwater Guardians (<https://www.capecodgroundwater.org/>) warns that the Cape Cod Aquifer is extremely susceptible to contamination from various land uses and activities. While the aquifer has been seriously impacted from military activities, gas stations, landfills, and a host of other activities, the groundwater of Cape Cod is fairly well protected – except for impacts due to the prevalence of residential septic systems. Our private wells should be tested annually both at the source and the tap, and septic systems should be maintained with vigilance.

Wendy Bierwirth

THE WREN FROM CAROLINA

As I believe I have mentioned before, some months ago my computer died and I lost all of the bird articles that I had written. Emory kindly sent me a list of all the birds that I have written about in the last few years. After checking that list, I found that I had never written about the Carolina wren, which is a regular visitor on my deck. I have a pair of them that come by every day when they are on the Cape. I began researching what information I could find, and one of the first things I discovered was that, while they will readily come to a suet feeder, they will not bother with bird-seed feeders. I thought that was rather strange since I was watching them alternate between my suet feeder and my seed feeder. I put safflower seeds in the seed feeder, since squirrels will not eat those, so there is your first tip for the day.

Carolina wrens are found along the Atlantic coast from Maine to Florida and as far west as all of Texas north to the Great Lakes and slightly into southern Canada. Being good tourists, some of them visit the Yucatan Peninsula in Central America. They are rather small birds and unless they are looked at closely, will be lumped together with other wrens, sparrows, or other small birds.

Carolina wrens are small, round reddish brown birds that have a long, narrow, pointy curved beak and a fairly long, narrow tail which, when they are sitting on a deck railing, they usually hold upright. Both sexes have a white eyebrow which runs from the end of its beak to its shoulder. Unless you are an ornithological expert, which



I am decidedly not, you probably cannot tell which is the boy and which is the girl.

The Carolina wren is a rather shy bird and, under most circumstances, is hard to see. It is not, however, hard to hear. Its voice delivers an amazing number of decibels for its size. While it visits my deck, its winter home is probably out in the brush behind my house. They gravitate toward overgrown swamps, wooded lots, and brushy suburban yards. They usually prefer to nest in open cavities up to six feet above the ground. Near houses, they are more versatile. They may make use of discarded flower pots, mailboxes, and a variety of other items. Males often build multiple nests before a pair decides on a final choice.

Insects and spiders make up most of the diet of the Carolina wren. This would include caterpillars, beetles, grasshoppers, and crickets. They will occasionally eat small lizards, frogs, or snakes. They also consume some plant matter such as seeds from bayberry or poison ivy.

Carolina wrens are common across their range, and their numbers are increasing. Their global breeding population is estimated to be in the vicinity of 14 million.

Keeping a brush pile in your backyard is a good way to encourage wrens to take up residence. They are on the Cape and are available for your enjoyment, so you might try to find some way to attract them to your yard.

Dave Reid

VOLUNTEER HERRING MONITOR TRAINING SESSIONS

Barnstable Clean Water Coalition (BCWC) and the Town Natural Resources Program will hold two training sessions via ZOOM for volunteers interested in monitoring herring at three runs in Barnstable: Mill Pond and Middle Pond in Marstons Mills, and the fish ladder at Boat Cove Creek in West Barnstable. The monitoring begins April 1 and concludes June 1.

ZOOM training webinars will be offered on Monday, March 7 at 12 pm and Thursday, March 10 at 5 pm. Volunteers only need to attend one of the webinars.

Like last year, the counting process is equipment-free (no thermometers, no clickers, no notebooks), and data will be collected and sent to BCWC via a Google docs form.

Anyone interested in attending one of the Zoom training webinars can RSVP me at hrockwell@bcleanwater.org.

Heather Rockwell, BCWC

OPPOSITION TO LONG PERMANENT DOCK ON MIDDLE POND

The leadership and numerous members of the Indian Ponds Association (IPA), the Indian Lakes Estates Owner's Association (ILEOA), and the Herring Run at Indian Lakes Homeowners Association Trust (HRILHAT) collaborated recently in opposing a proposed 72-foot permanent dock at 24 Flume Avenue, a waterfront property at the south end of Middle Pond. Nearby homeowners brought their concerns to the attention of the three associations last fall. The proposal ended up being on the agenda for three meetings (November 23, December 7, and January 4) of the Barnstable Conservation Commission (ConComm) before a decision was finally rendered at the third meeting. Earlier concerns had been raised by local residents during summer and fall following almost complete removal of vegetation in the 100-foot buffer zone of the property, which had been approved previously by ConComm, but deemed by most local residents as excessive and inappropriate. Even later, the entire house was demolished, including part of the existing foundation, an action that had not been originally authorized. Consequently, the subsequent request for the long and permanent dock only served to further agitate local residents and augment their opposition to this proposal.

Organized opposition to the proposed dock was expressed in numerous comment letters, including a petition signed by 57 members of the ILEOA, submitted to ConComm in advance of the three meetings, and in oral statements by 5–10 individuals during the public comment portions of the meetings. Concerns covered a wide range of topics such as depth of water required for mooring boats at the dock, appropriate length of dock, interference to traditional recreational activities and boating, absence of any previous docks on that portion of the Middle Pond shoreline, lack of precedence for a long and permanent dock, and adverse impacts on endangered mussels and movement of river herring fry.

As a result of the opposition voiced by so many concerned citizens (far more than the number opposed to most proposals considered by ConComm) as well as by some of the commissioners, ConComm finally approved a shortened 56-foot dock minus the 8-foot x 12-foot L-shaped platform at the end and with seasonal deployment annually between April 1 and November 1. Although the preferred outcome was no dock at all, the shorter seasonal dock is viewed as a mitigated compromise to the original proposal for the associations and individuals who participated in opposing it.

Emory D. Anderson, PhD

NEW TECHNOLOGIES FOR SEPTIC SYSTEMS

The freshwater ponds on Cape Cod are under a significant threat from excess nutrients: nitrogen and phosphorus. Excess nutrients coupled with the warmer temperatures that the Cape has been experiencing has manifested itself in cyanobacteria blooms on many of our ponds. Both Long Pond and Shubael Pond in Marston's Mills have been closed for swimming during the last two summers because of these blooms. The three Indian Ponds have had only minor encounters with these blooms in part thanks to alum treatments in Hamblin Pond (1995 and 2015) and Mystic Lake (2010). Looking to the future, our goal needs to be to keep these nutrients from ever entering our freshwater aquifer in the first place.

The Indian Ponds Association (IPA) boundaries include in excess of 500 developed parcels with Title 5 or lesser septic systems. Septic systems installed to this standard are very good at neutralizing harmful bacteria, but do not remove nitrogen and phosphorus from their effluent. The Town of Barnstable is addressing this Town-wide problem with its 30-year Comprehensive Wastewater Management Plan (CWMP), which has a billion-dollar price tag. **This plan does not address the sep-**

tic systems that lay within the IPA boundaries. Currently, the only way to reduce the nutrient loading from our septic systems into our groundwater aquifer is by onsite or clustered "alternative/innovative septic systems"¹. This article provides a brief discussion of the exciting new technologies being explored to remove phosphorus from onsite septic systems.

Until recently, alternative/innovative septic systems were focused on removing nitrogen from the waste stream and did not address phosphorus. This occurred primarily for two reasons. First, the Cape Cod Commission created the Section 208 Area Wide Water Quality Management Plan with a focus on reducing the nitrogen being deposited in the coastal bays of Cape Cod. Secondly, phosphorus is much more difficult to remove from a wastewater stream than nitrogen. Nitrogen can simply be turned into a gas and expelled into the atmosphere. Phosphorus must be physically removed from the effluent.

George Heufelder, Environmental Project Specialist at Barnstable County's Department of Health and Environment, outlined four broad classes of approach for on-

site removal of phosphorus from septic systems²: (1) electro chemical, (2) polymer binding, (3) reactive iron dissolution, and (4) soil-based systems. These technologies are in various stages of permitting and pilot testing by outside vendors, and none are approved for general usage in MA. There is a fifth approach that is tested, approved, and less expensive.

1. Electro chemical technologies run current through metal, either iron or aluminum, freeing up the metal ions and allowing them to chemically bond to the phosphorus. The resulting phosphate then precipitates out, either in the leach field in the case of a iron precipitate or into the septic sludge in the case of the aluminum precipitate. Both systems can be retro installed into a current Title 5 septic system³.

2. Polymer-binding technologies utilize a polymer with embedded metals which bind to the phosphorus. Eventually the polymer becomes used up and will need to be replaced. Unlike the electro-chemical technology, this does not require electricity. The downside is that the effluent will need to be pretreated before it enters the chamber containing the polymer sheet. Because the binding is not very strong, the possibility exists of releasing phosphorus and reusing the polymer sheets⁴.

3. Reactive iron dissolution technology uses metal plates placed in a chemical environment that solubilizes the metal, freeing up ions that then bind with the phosphorus. This then precipitates out into another chamber with a sand filter. As this sand filter becomes used up with the phosphorus precipitate, it has the potential to be used as a slow-release fertilizer⁵.

4. Soil-based system technology uses a leach field that is placed closer to the surface than is currently allowed and is larger than is currently required. This process utilizes three systems: biological recycling through surface plant growth; physical binding on fine soil particles; and chemical binding with the metals (iron) in the soil. By placing the leach field very close to the surface, the plant roots are being fertilized from the bottom up⁶.

5. Composting toilets and urine diversion systems have not received acceptance by the general public; however, they prevent 80–90% of the nutrients from ever entering the wastewater stream. The nutrients are then recycled as fertilizers. These systems are already approved for general use and cost a small fraction of that for the above technologies to install, maintain, and operate.

Should you want to pursue any of these options, the Barnstable County Department of Health and Education obtained a grant from the Massachusetts Department of Environmental Protection to run a pilot project to determine the effectiveness of selected technologies and strategies to reduce phosphorus from septic systems in the watersheds of ponds. This project provides some funding to the homeowner and a year of free testing for a qualified pilot system installation. For more information regarding participation in this study, please contact Emily Michele Olmsted at 508-375-6901 or emilymichele.olmsted@barnstablecounty.org

Butch Roberts

¹On a happier note, while the Barnstable CWMP installation costs are \$88,000 per household, these systems are between \$8,000 and \$15,000 installed per household.

²In a recent webinar sponsored by the New England Wastewater Environmental Association (NEWEA) and the Barnstable County Department of Health and Environment entitled "Onsite Phosphorus Removal Systems" on June 9, 2021, more details were provided on this topic.

³Waterloo Biofilter's technology is called Waterloo EC-P. They have pilot-use approval and use iron as the metal into which the current is run, and the resulting phosphate precipitates into the leach field. Premier Tech Aqua's technology is called Rewatec DpEC and uses aluminum as the metal, and the resulting phosphate precipitates into the sludge which is then pumped. Potentially, the phosphorus could be removed from the sludge and recycled into fertilizer.

⁴Fujiclean USA calls its technology CRX II, and the second player is Norweco with its Phos-4-Fade process. Both companies need to obtain approval before their technologies can be pilot tested.

⁵Lombardo Associates technology is called PhosRID. It has pilot-use approval and is currently being used in systems on Nantucket.

⁶American Manufacturing Company, Inc has a process called Perc-Rite Drip Disposal, while Geomatrix Systems LLC calls their process GeoMat. Both systems are approved in MA.

"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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