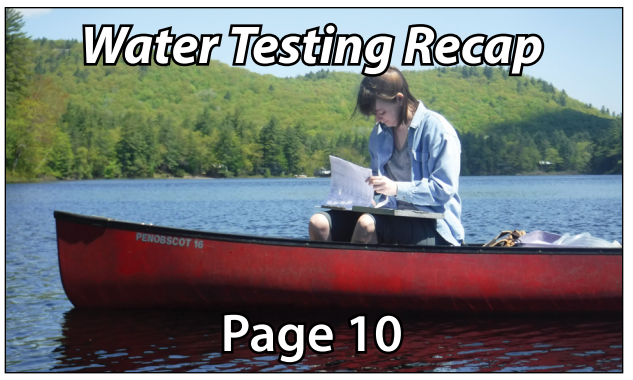

LEA Lake News

Free

A Publication of the Lakes Environmental Association

Protecting Maine Lakes Since 1970

Winter 2018-2019

Status quo will not keep invasives out of our lakes

The original "Milfoil Bill" of 2001 was an historic piece of avant-garde legislation. It made Maine one of the first states in the nation to take a serious step toward preventing the spread of these noxious water weeds. We were leaders then.

This law gave organizations the ability to hire local inspectors to check boats at launches and it provided funding to groups tackling expensive control work. These two programs and the boater education that went along with them have helped hold back the tide of aquatic invaders at our doorstep.

While this legislation and funding mechanism is clearly working, invasive plants are still being transported on boats and new infestations continue to be reported in Maine. For this reason, it is time to revisit milfoil legislation.

The fee structure tied to the "milfoil" sticker has not changed in 16 years and the amount of overall funding for the programming has increased cumulatively only 4% since its inception. For that same time period, minimum wage has gone up 74% and gas prices have gone up 90%. Even more confounding is that while income from invasive sticker sales remains relatively flat, the number of power boats in the Lake Region seems to be steadily increasing. **It is time to increase the sticker cost to help better cover the actual costs of invasive aquatic prevention and control.** Removal and inspection work is expensive and vastly underfunded. Every year associations across the state have to limit their boat inspection hours because of rising costs. This is a priority

continued on page 3

Mandatory boat inspection stations like this one in Wyoming are becoming more and more common across the country

Leap and the Net Appeared: Maine Lake Science Center Campaign Surpasses its Goal

LEA has a tradition of envisioning missing pieces and taking the risks necessary to fill the gaps in lake protection. This phenomenon has fueled our lake testing, landmark lawsuits, watershed education, legislative action, the Holt Pond Preserve, Pondicherry Park, the Highland Research Forest, updated land use policies, and water quality research at a marvelous new facility. Although the risks are carefully calculated, the outcomes are never certain. LEA, as a private organization with superb membership support, has the flexibility to act when the time is right without being paralyzed by lengthy procedures or bureaucracy.

Real estate agent training course on lakes held at the MLSC this past summer

In the winter of 2013-14, the LEA Board of Directors took initial steps to create the Maine Lake Science Center. This initiative was created to harness emerging lake testing technologies and techniques to research the impacts of challenges such as climate change. They hiked through the snow to visit a candidate site adjacent to Pondicherry Park in Bridgton. There were risks involved and the vision evolved as the project advanced. A final campaign goal of $1,450,000 was established, and site work and building renovations began in the fall of 2014. The hope was to have the new facility operating and funded for LEA's 50th Anniversary in May of 2020.

By the summer of 2018, members, businesses, and foundations had responded with donations exceeding $1,500,000! The campaign paid for the purchase of the 18-acre property, complete renovation and re-construction of the building, equipping the housing, offices, lab, and conference room, and staffing the Center through 2020. Two hundred forty-seven donors, thirteen foundations, and nineteen businesses contributed to achieve the dream. The work that has gone on since the opening in 2015 has galvanized Maine's lake protection researchers, agencies, organizations, and consultants. A common action plan was developed at the second annual researcher retreat held at the Center in January of 2017. Thanks to hard work, generosity, and the willingness to take calculated risks, the net did appear, and Maine's lake protection efforts have been dramatically strengthened.

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Inside

Of Swimming Squirrels, Oak Trees, and Population Ecology

by Kayla Gray and Amanda Pratt

This past summer, you may have caught yourself wondering: "Why are there so many more squirrels around this year?" Or perhaps you said to a passenger, "There seems to be a lot of roadkill…" Or maybe you noted in your journal that you've seen a lot of squirrels swimming.

Okay, maybe not that last one – but trust us, this is an actual phenomenon! Our milfoil and water testing interns did see several squirrels swimming in a few different lakes this summer. Some of our co-workers were skeptical until they saw it for themselves! This got us wondering why it was happening so frequently this year and why we had not seen it before.

The short answer is: 2017 was a mast year. A mast year is a year in which nut-bearing trees, like many oak varieties, produce a huge abundance of seeds (acorns, nuts, etc. are called "mast" in biological lingo). While the causes of a mast year are not completely understood, scientists believe that the ebb and flow of seed production is linked to the trees' energy resource allocation, which can either go towards growth or reproduction.

When oak trees focus on reproduction, it causes a mast year to occur. This makes an excessive amount of seeds available for various species, like squirrels, to eat. So now you're wondering, if there are so many seeds, why do the squirrels need to swim to find them? Well, the answer is: competition.

When squirrels have plenty of food, they are able to spend less time hunting for seeds and can focus their energy toward reproduction, thereby increasing the local squirrel population.

However, more squirrels means that the store of nuts from the previous winter is depleted that much more quickly. Even though there was an abundance of nuts, there was also an abundance of squirrels to eat them.

Squirrel swimming on Highland Lake

As a result, local squirrels have come up with more creative methods for finding food, which explains why LEA staff have seen numerous squirrels swimming across our lakes, ponds, and streams this summer. These imaginative methods for finding food require more risk-taking, leading to a decrease in the squirrel population (which also explains the increase in roadkill).

And all of this because of oak trees.

A Plan for Science at the MLSC

With the Science Center up and running and a growing network of partners and colleagues, we are now faced with the question of how to best reach our overall goals. To help lay a path for the future and identify and prioritize future projects, we tasked ourselves with defining a research agenda.

Threats to our lakes come from human and climate pressures, especially those that can cause algal blooms, water clarity losses, and biotic changes, like invasive species. Our overarching research goal, therefore, is *to understand current conditions, trends, and controlling factors of water quality and biological communities in lakes within our service area and around the region.*

The list below is a condensed and simplified version of the questions that define our research agenda. The agenda is a working document that has been developed over the past year with guidance, input, and oversight from university professors, private contractors, practitioners and our own staff.

1. What are local lake water quality conditions and trends, and can long-term data be used as early warning indicators of abrupt changes, like loss of clarity?

2. How much phosphorus and nitrogen are in (or enter) local lakes and what is the effect of those nutrients?

3. What is the abundance and diversity of algae and other plankton in local lakes and are those measures changing?

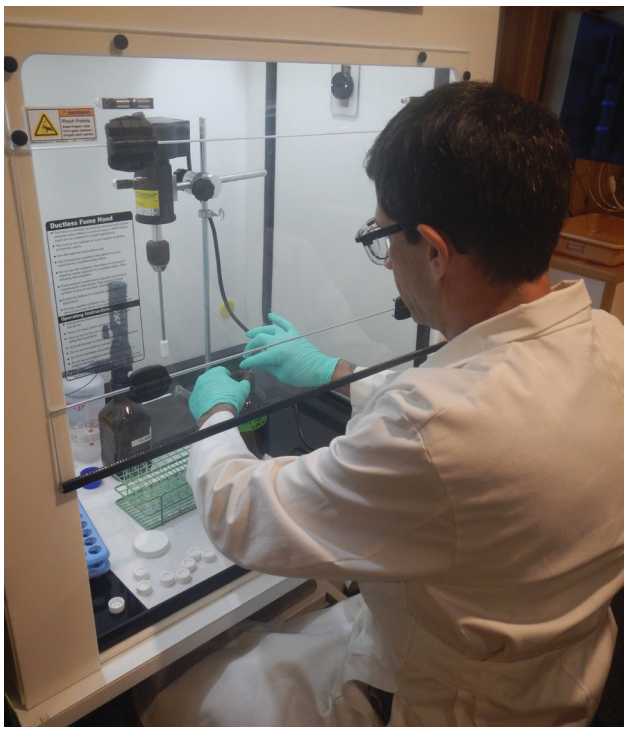
4. How does variation in temperature, wind, and precipitation affect lake water quality?

5. What is the impact on water quality and native plant and animal communities from human activities in lakes and surrounding watersheds?

6. What value do people place on lakes and watersheds and does that influence their behavior in adapting to environmental changes?

The questions that make up this list will be revised on a regular basis to meet the needs of emerging local and regional issues and following current trends in lake research.

After finalizing and incorporating comments from colleagues this fall, the full research agenda will be available on our website.



Research Director Dr. Ben Peierls working in the lab at the Maine Lake Science Center

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LEA's direct service area includes 6 towns

Highland Research Forest and Sustainable Forestry

by Colin Holme and Alanna Doughty

In 2016, LEA was gifted a 330-acre parcel of land on the northern end of Highland Lake. Since then, we've secured grant and private donor funding to do an ecological study of the area, develop trails and signage, host workshops and walks, and we are now working on a parking area and privy. We are heading toward a vision of a working forest, where visitors will be able to experience various stages of a managed forest and learn about sustainable forestry.

This idea stemmed from conversations with landowners concerned about forestry practices and their effects on water quality and from hearing about a long-standing bias that any logging is bad for the water. While poorly planned logging can impact water quality, common conservation practices combined with a good forestry plan can eliminate most of these issues. As our district forester, Shane Duigan, put it, "We all notice the bad logging operations because they look pretty terrible from the road, but you don't even see the logging operations that are well managed because they look like they are a natural part of that forest's progression."

Our District Forester, Shane Duigan, led intrepid hikers through the Highland Research Forest this past summer

What is often overlooked is that managed forestlands are actually good for water quality in the long term. Maintaining natural vegetation and uneven topography allows rainwater to be absorbed and filtered before it enters the downstream waterbody. Further, certain types of forest management can create and improve habitat for a variety of species. If owners become aware of these connections, more land could remain forested (as opposed to developed, which usually has permanent and lasting impacts on water quality) and our lakes and ponds will remain protected. Plus, these landowners will have access to a sustainable source of income.

Forests help to protect the quality of the water by holding the soil in place, building layers of organic duff (all those leaves, pine needles and woody debris) and slowing rain water down with uneven terrain, branches, and roots. Rain naturally sinks into the ground in a forest. This is generally the opposite of what happens on a smooth lawn, a rooftop, or parking lot (all high-energy runoff). In addition to water quality, we know that forests are home to many species of animals. From insects to migrating birds, mice to moose, billions upon billions of soil microbes and our beloved wood frogs and yellow spotted salamanders: they all call the forest home! As if this wasn't enough reason to protect forests, healthy trees store and sequester an incredible amount of carbon, pulling it out of our atmosphere. Simply amazing!

This is all part of what we want to share with you at the Highland Research Forest. Here is what you can expect from this space moving forward: a small parking lot and privy, canopied trails leading to Highland Lake and a large and unique wetland complex, sections of managed forest where you will be able to see various types of logging operations, and interpretive signage to help you make sense of it all. We will host regular walks, and this winter we hope to do some snowshoeing, winter tracking, and maybe even some crosscountry skiing. We are so grateful to be stewards to this special parcel on Highland Lake.

Save the Date – Sebago Lake Symposium

Saint Joseph's College and the Portland Water District have partnered to host the Sebago Lake Symposium this coming **February 2nd**. This event is a chance for stakeholders and scientists to interact and share their understanding of Sebago Lake. Data from the new Sebago Lake water quality monitoring buoy will be highlighted. The broad goals of the meeting are:

- To share the variety of ways the lake is monitored, what we've learned from historical and current monitoring, and aspects of the lake we could still learn more about.
- To provide a venue for landowners, shorefront property owners, and recreationalists to voice their knowledge, concerns, and interests related to the lake.
- To better understand how people engage with and understand lake water quality data.
- To strategize and learn about ways to keep Sebago Lake clean well into the future.

Our own Colin Holme and Christian Oren will be presenting on policies for lake protection and invasive species, respectively. Registration will be limited, so look for more information in the next few months through print and online media outlets.

Status Quo

Continued from page 1

and we are going to need your help and the support of legislators who recognize the value of lakes to move this issue to the forefront.

We also need another mechanism to encourage boaters to check their watercraft, trailer, and gear every time they are used. Courtesy inspections

Invasive plant and mussel "decontamination units" like this one in Minnesota are becoming common out west where clean and clear lakes are an iconic part of the landscape

and a handful of minor fines are not enough to force people to take this issue seriously. Vermont, New Mexico, Colorado, Idaho, Wyoming, Montana, Oregon, Washington and parts of New York, Minnesota, California, Nevada and Canada all require mandatory inspections of watercraft. Do these regions care about their lakes more than Maine?

The idea of "mandatory" inspections should not be thought of as an over-reaching long arm of the law. It is simply another tool in the tool box that needs to be used judiciously. Mandatory inspection stations could be temporarily set up at high use boat launches, on the turnpike, or near known infestations. **Having occasional, mandatory inspections (like truck weigh stations) will increase self-inspections and overall compliance with existing laws.**

In June, the Town of Naples worked with LEA to pass a landmark ordinance requiring large docking facilities and launch sites to be inspected on a yearly basis. Invasive variable leaf milfoil is found in several Naples waterbodies and this type of heightened vigilance is needed to prevent the growth and spread of invasives. Once milfoil was found in Long Lake, Naples was quick to act. It would be in the best interest of both Bridgton and Harrison to enact similar requirements.

Keeping our waterbodies free of invasives maintains property values, allows for more enjoyment of our lakes, and benefits our native flora and fauna. It is time for Maine to again lead and take action on three fronts by raising the sticker fee to reflect increasing costs, allowing for mandatory inspection stations, and encouraging regular monitoring of docks and shorefront by landowners.

President's Message

Dear Fellow Members,

Two years ago, I was asked to come back onto the LEA board. I had served on the board in the past and even as president, but when I came back on in 2016, the first thing I noticed was how much the organization has changed and grown.

If you attended the LEA annual meeting on August 21 at Camp Fernwood Cove, the review of LEA activities was both overwhelming and astonishing. Eight people could not possibly accomplish all that goes on. Besides water testing, invasive plant removal, educational programs for K-12 students, and training and scheduling Courtesy Boat Inspectors, they also partner with other non-profits to plan, operate, and evaluate programs affecting lakes over the entire State of Maine. They provide educational programs and workshops for municipal officials, contractors, real estate agents and the general public. At the Science Center, they are working on cutting edge research and connecting with state agencies and colleges involved in the study of lakes and how the community interacts with these beautiful and prominent features of our landscape. Perhaps you have seen our lake buoys sitting out in many of the surrounding waterbodies that capture information 24 hours a day. The organization is overflowing with ideas and programming and it is again a very exciting time to be president.

LEA has carefully stewarded our financial resources over time but as we grow, our operating expenses also rise. Our Board of Directors is very grateful for the support that our members and donors provide and encourage you to visit our office on Main Street to find out more about our programs, attend an event, or volunteer. **Most importantly, if you are not a member, please consider joining.** As a friend said to me recently, "Anyone living on or near any of our lakes owes it to themselves to join LEA."

With appreciation,

Anne Wold
President

On the evening of June 20th, 2019 we will be holding a gala for all the donors who made the Maine Lake Science Center a reality. After meeting and exceeding our campaign goal to fund the purchase of the property, complete building renovations, and operate the Center through 2020, it is time to celebrate! The night will include hors d'oeuvres, drinks, and entertainment, so please mark your calendar!

Build it and they will come: MLSC's Low Elements Challenge Course

Before the opening was even announced and celebrated, there had been a steady stream of "kids of all ages" checking out (and returning to!) the low elements challenge course on the **Pinehaven Trail at the Maine Lake Science Center**. In this day and age of digital technology, many people are not getting outside enough and reaping the many benefits that nature has to offer. Fortunately, not so for all. One local dad says that his kids ask to go to the Pinehaven Trail every Saturday! Scores of visitors to the trail know that time in nature provides us with a range of physical, emotional, cognitive, and psychological benefits by "playing" outside. The interpretive signs, created by LEA's own Alanna Doughty, even teach a bit about the natural surroundings.

The trail has had a progressive evolution, starting in 2016: the path was charted by Maine Master Naturalist Leigh Hayes and blazed by local Rotarians, boardwalks were built by Eagle Scout candidates Ryan Curtis and Tim Moore, and markers and wooden signs were made by LRHS students. Finally, the low elements challenge course was inspired and funded by Roy Lambert and Mary Maxwell and designed and built by Dave Kelly and Rick Sweetland of Denmark.

There is enough light under lake ice for algae to grow

Whole Watershed Thinking *by Alanna Doughty*

In Elizabeth Gilbert's semi-biography, The Last American Man, Eustace Conway is a man of long-term thinking. By the age of 17, he was living in a tee-pee in the woods, wearing skins of animals he had killed and eaten. He kayaked across Alaska, rode a horse across the United States, and when he was ready to settle down, he worked and saved to buy land, and realized that if he didn't protect what was upstream, his water source would be polluted. So he methodically worked and saved some more, and piece by piece eventually acquired the entire 1,000-acre basin of land where he lived, thereby protecting his watershed in perpetuity.

This is not new thinking, but it is something many of us have probably given little thought to unless it is our job. On a significantly larger scale, the New York City water system moves water from a network of 3 lakes, 19 reservoirs and thousands of miles of aqueducts and pipelines to the city, making it the largest municipal water supply system in the nation. Over a billion gallons of water flow through faucets in the city every day, 90% of which is unfiltered. It is treated with UV rays and chlorine, but so far has not needed a hugely expensive filtration system due to the excellent water quality. And, as we know dear reader, that fantastic water quality is all thanks to the land that surrounds it: the watershed!

In early 2018, New Yorkers invested $1 billion to protect this incredible resource and fund a myriad of programs covering wastewater treatment, private land-owner septic repair, land preservation, reducing runoff from farms and roads, monitoring systems, and students raising trout in the classroom, among others. This is a whole-watershed process. The folks at the table discussing clean drinking water are searching all the way up the watershed to the source, looking for potential issues all along the way, and putting funding where it is needed most: in preserving and protecting the vital resource to keep it clean from the start. There is no one simple solution, but a complex strategy of protection. While $1 billion might seem steep, estimates for filtration plants range from $8-12 billion to build, with a $350 million annual operating budget. $1 billion is a sound commitment!

Closer to LEA's Bridgton home, the Portland Water District extracts approximately 94 million gallons a day from Sebago Lake to provide water to 15% of Maine's population. Like the NYC municipal water supply, PWD does not need a filtration system, and also similar to NYC, they are working hard to keep it that way by investing in the 282,000 acre watershed. They are working with Sebago Clean Waters, Loon Echo and Western Foothills Land Trusts and other partners to protect the 81% of undeveloped land within the watershed, of which currently only 10% is conserved. As landowners age and land use changes, the risk of forested land being converted to developed land is extremely high, which would have a hugely detrimental impact on water quality. They are not interested in buying up all the land and conserving it, but instead, educating landowners about options that keep the land forested and keep the water clean.

We can follow Eustace Conway's footsteps and delineate a watershed for a specific body of water, like Highland Lake or Holt Pond, and get really excited about preservation projects around them, like the Highland Research Forest (check out the article on page 3!) or the Holt Pond Preserve. Or we can think larger, like the Sebago Lake watershed that starts in Bethel and includes the Crooked River and the land surrounding it, or we can back up even farther and think about the watershed that enters the ocean. In Bridgton, that is the Casco Bay watershed, which includes 12 major river and lake systems and flows into Casco Bay in the Atlantic Ocean.

Regardless of the size, there are things each of us can do to protect our watershed. One of the greatest polluters is soil. I know, crazy, right? It clouds the water and carries nutrients, bacteria and phosphorous into our streams and lakes. We can all work to mitigate erosion and manage runoff from roads and trails. Another concern is wastewater. As landowners, knowing where our septic systems are and keeping them maintained is vital for water quality, regardless of where we are in the watershed. If you have forested land, find out your options. You can talk to your district forester about your ideas and walk your land together, and he or she can connect you with other resources (this is free!). Also, and this might seem intuitive by now, know that all water – groundwater and surface water – throughout a watershed is connected. We all need water to survive, and it is in our best interest to protect it from the source to the sea. It helps if we think like Eustace Conway, in a long-term manner, and with regard to the whole watershed.

Cyanobacteria and Algae Blooms: A Constant Threat to our Lakes

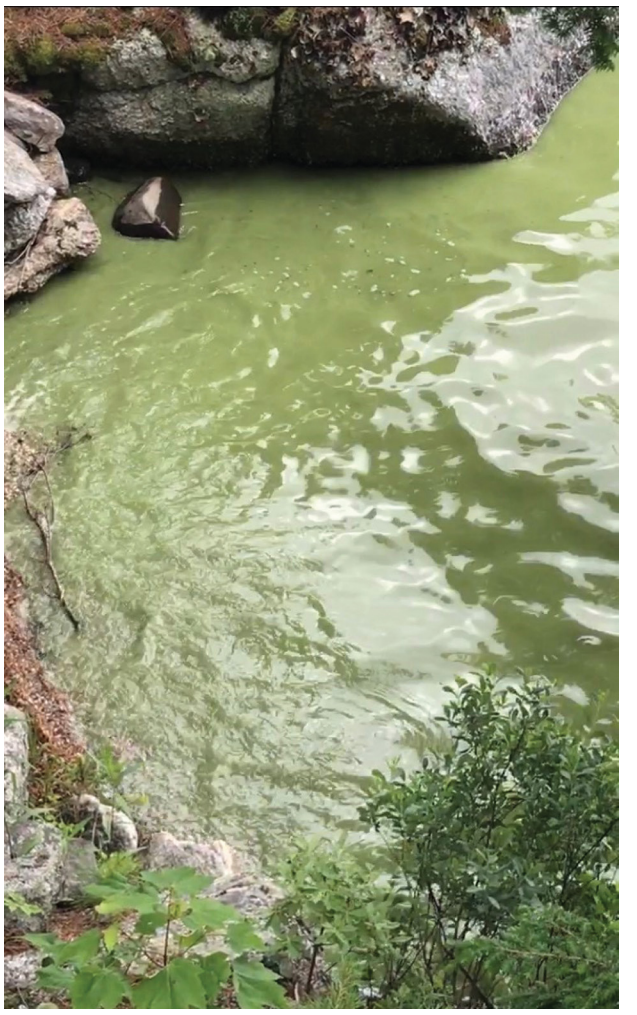
Algae blooms – or more accurately, cyanobacteria blooms – are the dread of lake lovers everywhere. Preventing chronic blooms of toxin-producing cyanobacteria (photosynthetic bacteria often lumped together with algae, also called blue-green algae) is a primary goal of many lake associations, including us here at LEA.

This past summer was uneventful bloom-wise in LEA's service area but seemed to be a particularly poor year for other lakes in Maine and New Hampshire. The New Hampshire Department of Environmental Services issues warnings whenever a lake experiences cyanobacterial concentrations of over 70,000 cells per milliliter. In 2017, there were 19 advisories on 17 lakes. This year the numbers jumped to 28 advisories from 24 different lakes. In Maine, three lakes in particular – Lake Auburn, Georges Pond (located in Franklin), and East Pond in the Belgrades – made algae-related news this summer.

Lake Auburn experiences high levels of the cyanobacteria *Gloeotrichia echinulata* in the summer, and after a large fish kill in 2012, has been under close scrutiny for any changes in water quality. After the 2012 incident, the Auburn Water District obtained a permit to apply algae-killing chemicals, which was used for the first time this past September. Georges Pond had its worst-ever cyanobacteria bloom this year, following its first documented bloom in 2012 and a less severe one in 2015. East Pond also received an over one million dollar alum treatment to prevent current and future algae blooms (see article on page 6).

Closer to home, there are a handful of lakes in our service area (Long Lake, McWain Pond, Keoka Lake, Moose Pond, and a few others to a lesser extent) that experience elevated levels of *Gloeotrichia echinulata* (the same species that affects Lake Auburn). Populations in these lakes are not generally high enough to constitute true "bloom" conditions. An algae bloom is defined by the Maine Department of Environmental Protection (DEP) as occurring when lake clarity (as measured by a Secchi disk) is less than 2 meters (or about 6 ½ feet). LEA's *Gloeotrichia echinulata* monitoring for 2018 showed that levels of the cyanobacteria were within typical ranges in each of the lakes that were monitored.

Although none of our lakes have recurring algae blooms, many lakes begin to see bloom conditions suddenly and with little warning. Weather patterns in certain years can often increase the chances of water quality issues. Because of the unpredictability and suddenness with which blooms appear, it is important to realize that no lakes are safe from this threat. Keeping shorelines as natural as possible and minimizing human impacts are the primary ways we can protect our lakes.



The cyanobacteria bloom in Georges Pond last summer turned the water pea-soup green. Photo courtesy of Brian Friedmann of the Georges Pond Association.

Phosphorus levels above 15 ppb put a lake at risk of algae blooms

Take Two Alums and Call Me In a Decade: Prescription for a Blooming Lake *by Ben Peierls*

The sky was threatening rain on the cool, mid-June afternoon that Colin and I met the crew of Colby College's floating lake laboratory, the *Colby Compass*. We were there to observe the application of alum to East Pond, in Kennebec County. East Pond, the 1700-acre headwater lake in the Belgrade Lakes Watershed, has had a history of algal blooms and reduced water clarity, so the alum treatment was part of a watershed-based management plan to reduce phosphorus within the lake and prevent more from entering. We were invited by Colby researchers Whitney King and Vicky Hepburn and project coordinator Charlie Baeder to oversee the alum process and the chemical monitoring they were doing.

People and gear were ferried out to the school's customized pontoon boat moored just offshore and soon we were headed out toward the middle of the lake to rendezvous with the working boats. The company hired to do the application was using a 30-foot barge and a smaller skiff to pump the aluminum-based chemicals into the lake. The *Colby Compass* followed the trails of both boats, which were made obvious by the milky plume behind each vessel; this was the alum treatment in action.

Alum, also known as aluminum sulfate, turns out to be an effective way to bind phosphorus and prevent it from fueling the growth of algae. Lakes and ponds have been treated with alum since the early 1970s, and while expensive for this lake (ca. $1 million), it is cost effective considering the alternatives. When the alum is added to the lake, it reacts with water to form a solid called aluminum hydroxide (the visible plume), which then further reacts with phosphorus found in the water or the sediments to form aluminum phosphate. Phosphorus is immobilized in this compound and gets buried by lake sediments. Several lakes in Maine have had decades-long water quality improvements using this treatment, though East Pond is the largest project to date.

View from drone of the plume created by the alum addition in East Pond

Research Director Ben Peierls attaching our sonde to Colby College's V-fin sampler to monitor water quality conditions on East Pond during an alum treatment

We had one of our sondes along with us, and we mounted it in a device called a V-Fin that allowed us to tow the sonde at a constant depth using the boat's crane and winch system. Rain began in earnest as we collected sonde data, but we were excited to see the changes as we moved through the chemical plumes. Turbidity increased in the plume, which confirmed our visual observations, but the water briefly became more acidic as well. This is normal for the process and is why a second chemical, sodium aluminate, is added as a buffer to keep the lake pH at normal levels.

Meanwhile, the Colby researchers took other measurements and collected water samples for more detailed chemical analyses. This was part of regular monitoring being done before and during the alum addition which would continue afterward to determine changes in lake water quality; I just received word that East Pond water clarity was much improved this past summer, so the project seems to be a success so far.

We dried off for the ride home and thanked our hosts for a fascinating trip. I hope we don't have to turn to this treatment for lakes in the LEA service area, but we certainly are more informed and prepared if it does come to that.

Hatch Family Donates 80 acres to Highland Research Forest

In the spring of 1968, Ron and Brooke Hatch moved to Bridgton. Ron's parents had property in Belgrade and Brooke's uncle owned a piece of land on Little Moose Pond in Waterford, but something about Bridgton appealed to both of them. However, they weren't the only ones looking for an ideal piece of land in unspoiled western Maine. When they walked into Chalmers Real Estate and Ron said they were interested in buying a "100 acre farm", the receptionist retorted that "he was the third person with that request today!"

But the young couple did not give up that easily. Ron, while serving in the Navy, had been stationed up at Schoodic Point for a few years and was a third generation dentist. He had heard that Dr. Noble's house was also up for sale. Noble was the local dentist and the property could be an ideal spot to open a new practice. At the mention of Dr. Noble, Herb Chalmers quickly appeared from the back office and offered to give the couple a tour of the well-known Noble House.

While that property turned out to be outside their price range, they did end up buying a house on the upper ridge that was built by artist Charles Fox

continued on page 8

Ron and Brooke Hatch's grandchildren enjoying a summer day on Highland Lake

Milfoil: Control and Compromise in 2018 *by Christian Oren*

LEA's milfoil program has experienced another productive summer, but we are still struggling for resources and funding to keep aquatic invaders at bay. Despite some setbacks with malfunctioning equipment and stretched staff, we were able to work well into October and Long Lake, Brandy Pond, and the Songo River are all well controlled. The massive infestation in Sebago Cove still needs more attention, time, and funding, and while progress was made in several infested areas of Sebago Lake, more work is needed.

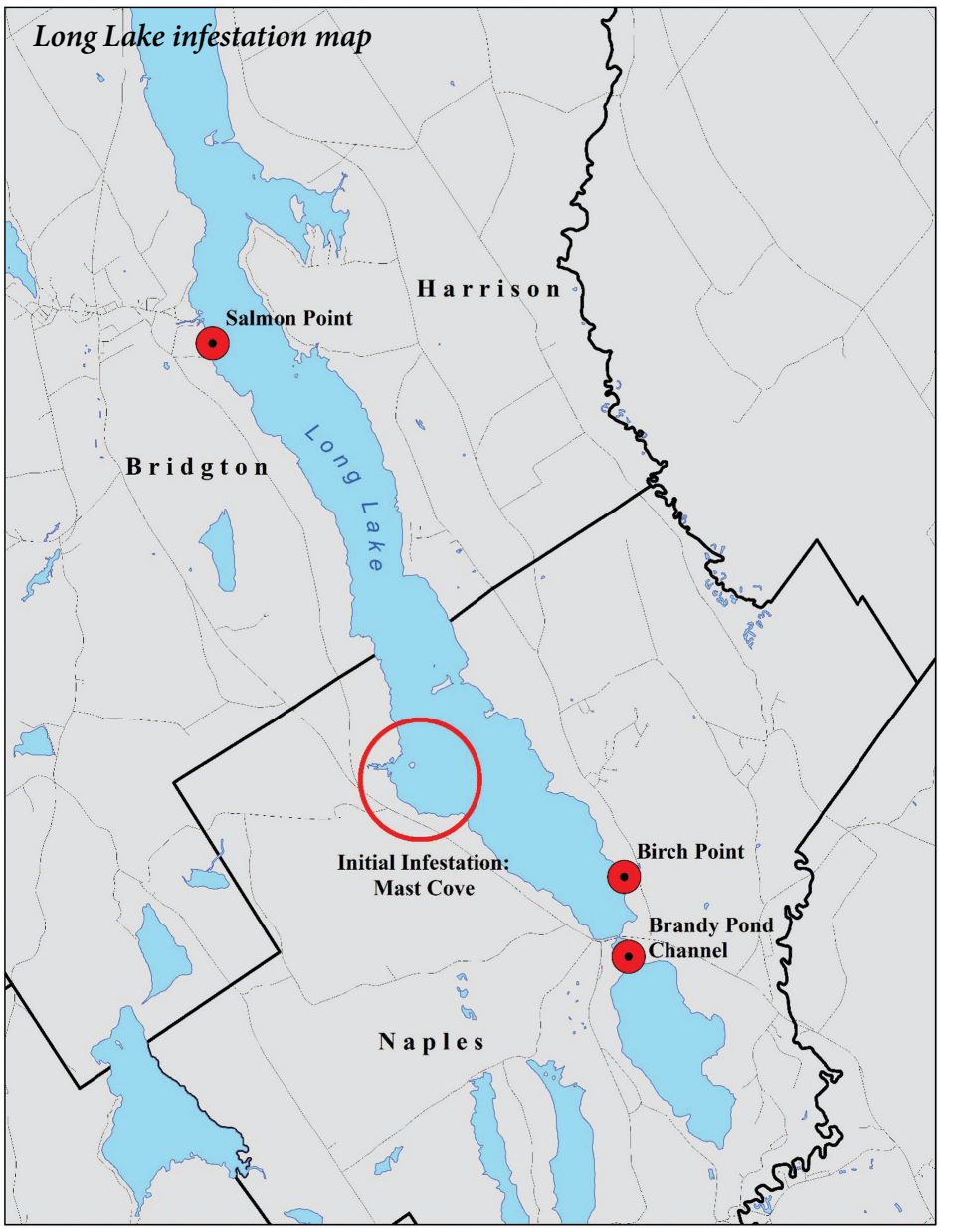
Veteran diver Lucien Sulloway inspects benthic barriers in Sebago Cove

Our accomplishments in Long Lake cannot be overstated. Last summer's discovery of milfoil in Mast Cove was a shock to everyone invested in Long Lake's future. Invasive variable leaf milfoil is a threat to tourism, recreation, property values, and the ecosystem. As soon as we identified this invader in Long Lake, LEA began an intensive, rapid response effort to remove the plants and prevent the spread. We spent weeks of work and tens of thousands of dollars tackling the area and removing hundreds of bags of plants from the infested marina. However, LEA staff remained worried milfoil was not controlled in the area. We continued to find new patches spread throughout Mast Cove and fragments were washing up near the Causeway in Naples.

Thankfully, our control team was able to turn the tide this summer. We laid a large number of benthic barriers in and around the infested marina and continued harvesting the remaining area. This consistent approach appears to be working, as we only found four small plants outside the marina in our last survey. Inside the marina, milfoil continues to lurk, but it is no longer the dominant plant. The invasive milfoil is generally tucked away in hard-to-reach areas or rocky shallows we are unable to tarp. The risk of the plants spreading further into Long Lake is low, but the crew will continue to patrol this area until the plants are completely suppressed.

On the rest of Long Lake, our crew and volunteers surveyed the entire shoreline for invasive species. Only two areas were found to have plants: Salmon Point Campground in Bridgton and Birch Point in Naples. Both of these areas had benthic barriers placed over the plants. No plants were found when we revisited either site at the end of the season, but they will continue to be monitored for regrowth. Finding so few plants outside of the original infestation site gives us hope that we have successfully prevented this infestation from spreading.

Because of limited resources and a short summer season, we were unable to spend as much time in Brandy Pond, Sebago Lake, Sebago Cove and the Songo River. These areas showed significant regrowth, and that meant the team had to scramble to cover as much ground as possible. Many spots in the Songo River that had been cleared of milfoil for years showed re-growth in 2018, showing the resiliency of this invasive plant. At the end of the season, we were able to refocus on Brandy and the Songo and this helped tremendously with these infestations. Our year-end surveys showed very few plants, and we are happy with the current state of these waterbodies.



We were unable to spend as much time as we had hoped in Sebago Cove, and the milfoil experienced strong regrowth. We have managed to maintain control over some areas, but in others the milfoil grew back to near its original extent. This was extremely disheartening to our crew that worked so hard to gain a foothold in the Cove and is a cruel reminder of how insidious variable leaf milfoil can be.

This work requires long-term thinking, making tough choices, and prioritization of goals. This summer, we were able to make large strides in Long Lake, but we are going to need to recalibrate our technique and strategy on Sebago Cove. Looking ahead, the remaining control work on Long Lake will require much less time, and more crew time will be available for the Cove next summer. Long Lake, Brandy Pond and the Songo River are all in good shape, and while much work still needs to be done on Sebago Cove, we are optimistic about the future. Please help us reach these goals by volunteering or donating!

Divers removing a large milfoil plant from Long Lake with the suction harvester

Check our website for upcoming events!

Stopping Invasive Species is a Team Effort *by Mary Jewett*

The Courtesy Boat Inspection (CBI) program is working. Since piloting the program in 2000, inspectors have found and removed hundreds of invasive plant fragments from boats and trailers. This summer, at the end of July, an LEA inspector discovered Eurasian milfoil on a boat launching into Long Lake in Harrison. The boater had traveled from Lake Champlain in Vermont, a lake known for a high rate of invasive plants and animals. Knowing the likelihood of finding invasive plants is higher when a boat is coming from out of state, the inspector, Addie Casali, did a thorough inspection.

But here's the problem: she didn't need to. The foot long fragment of milfoil was easily visible at first glance, wrapped around the propeller for all to see. It wasn't tucked away in the wheel well or caught on the anchor. Eurasian milfoil is highly invasive and can survive a trip across two state lines and infest a new lake. While this was an exciting save for Addie and a victory for the CBI program, it was also a wake-up call. This boater should have removed that milfoil before leaving Vermont. Lake Champlain has a huge invasive aquatic species program. They have signs, inspectors, and boat wash stations all around the lake. On his journey, the boater had to travel through New Hampshire, where it is illegal to transport any invasive plant species, and into Maine, where you can find big signs along the highway stating that it is illegal to transport plants here as well.

Eurasian milfoil found on Long Lake with attached zebra mussel

So what happened? Why did it take so long for this plant to be removed? What if LEA hadn't had the funds to cover that particular shift? What if the boater had launched 15 minutes before Addie had arrived? Would they have checked their own boat before launching? If not, how long would it be before we discovered a new infestation in Long Lake?

We will never know the answers to these questions, but one thing is clear: many boaters are still not taking responsibility for checking their boats and trailers for plants. One of the scariest things is that the threat of invasive aquatic plants is getting worse each year. This summer there were several important "saves" in the state. An inspector on Pennesseewassee (Norway) Lake found Eurasian milfoil on a boat coming from Connecticut. Even more alarming was the discovery of a tiny invasive mussel clinging to the milfoil, almost too small to be seen without magnification. This was a double whammy, early in the season, when many boat launches aren't staffed full-time yet. Not only was there a plant but also an invasive animal, which has not yet been found in any Maine lakes. With this find came a push for inspectors to encourage boaters to drain and dry their boats before launching into a new waterbody, to keep microscopic animals living in standing water out of our lakes. Many boaters have complied with this request but seemingly few think to do it without being asked.

On top of these "saves", two different invasive plants were discovered in Cobbossee Lake in August. The first was Eurasian milfoil, a super aggressive invader throughout New England. However, it was only a minor infestation at a marina and the Department of Environmental Protection (DEP) is optimistic that it can be controlled. While working on that infestation, European Frog-bit was found in the lake. This is the first time this invasive plant has been found in Maine. It is a lily pad that grows in mats that cover the water's surface, and was found in a remote part of the lake. The DEP has determined that the Frog-bit had been in the lake for years.

So what does all this mean? The upside is that

Courtesy Boat Inspector Addie Casali

there are people throughout the state inspecting, doing plant control, and generally caring about this issue. The hard work of everyone involved has been astounding, exhausting, and expensive. And these dedicated people doing the job have certainly slowed the spread.

The downside is that we need more help. Specifically, **we need boaters to check their equipment when leaving a lake and when entering someplace new. We need them to drain and dry their boats and trailers to reduce the risk of spreading invasive fauna. And we need law enforcement to give out tickets to any boater found with an aquatic plant on their boating gear.**

It is against the law to transport any aquatic plant in the state of Maine, with fines ranging from $100-$5,000. However, enforcement is lacking. Very few people have received these fines, and those who have were ordered to pay the minimum fine. Boaters need to inspect their own craft, and if they don't, they should receive a fine for carrying plants.

LEA and other organizations around the state will continue to do inspections and manage infestations in our service areas. But it will take the involvement of the entire boating community to prevent our lakes from being overrun with invasive species.

Hatch Donation

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and Curtis Perry in the early 1900s. Although they initially toyed with the idea of opening a dentist's office on this property, Marnie Chalmers told them frankly that "people won't be able to get up there in the winter". Still, they loved the land and the view and over the years acquired several more pieces of property nearby where they raised horses and a couple of cows.

When LEA received the 330 acres of land on Highland Lake from the Hancock Family Foundation, we noticed that our new abutters were Ron and Brooke Hatch. In fact, they owned a good-sized chunk of forested land that fit perfectly in place next to our new lot. As long-time LEA members and community philanthropists (they recently gave 150 acres of land to the Western Foothills Land Trust), we decided to include them in our discussions and planning in hopes that one day we might be able to add on and "square off" our new preserve.

After discussions about goals and plans for LEA's new property, the Hatches decided in October to donate their two abutting parcels containing 80 acres to the Highland Research Forest. Like the rest of the Research Forest, this acreage will remain open to hikers, hunters, and fishermen and will be used to demonstrate sustainable forestry practices. While the Hatches had no plans to develop the property, it will now remain protected as forestland for future generations and will continue to filter and clean the water that enters Highland Lake and all the lakes and rivers downstream.

Avid rowers and longtime property owners on the lake, Ron and Brooke have had many good times on Highland Lake with their children and grandchildren. Their wonderful and generous donation will help assure that many more families can do the same in the future. True stewards of the land and water, they asked for nothing in return for their gift. As Brooke put it, "The joy was ours to give."

Upgrades and Updates for the Field and the Science Center

by Ben Peierls

LEA has been fortunate to have such a supportive membership and community, and we have benefitted from the generosity of numerous philanthropic organizations. The capacity for advanced lake science at LEA and the Maine Lake Science Center has grown by leaps and bounds with grants from organizations like the Nine Wicket Foundation, the Kendal C. and Anna Ham Foundation, the Maine Community Foundation, and Patagonia.

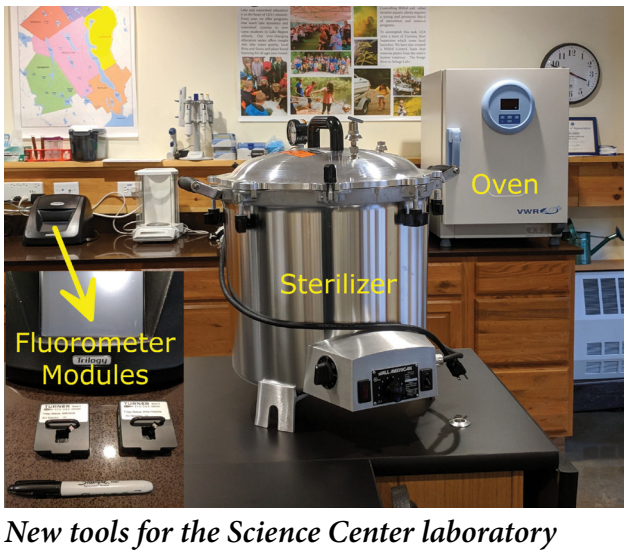
Intern Jake Moulton collecting depth data, while the sonde flow-through system operates in the foreground

In July, we were awarded a grant from the Nine Wicket Foundation to acquire new field and lab equipment. We now have an underwater light sensor and associated data logger that can measure visible light or photosynthetically active radiation (PAR - what algae and plants use for energy). Use of this PAR sensor will shed new light (pun intended) on local lake water clarity and its effect on algae and aquatic plants. By quantifying the reduction (or attenuation) of light with depth, we get an objective measure of water clarity that improves on the somewhat subjective Secchi disk technique. We plan to use the PAR sensor this winter for measuring under-ice light levels and attenuation.

The Nine Wicket grant also provided for new fluorometer accessories and a steam sterilizer. The benchtop fluorometer measures chlorophyll-*a*, one way to quantify algae in lakes. Two new modules will allow us to measure ammonium, an important plant nutrient, and optical brighteners, or compounds in detergents that if detected in water bodies, can indicate septic or sewage system failures. The sterilizer, which is essentially a big pressure cooker, will enable us to analyze samples for total phosphorus and will be a necessity if we take on bacteria testing.

Part of a recent grant from the Ham Foundation funded the purchase of a drying oven, an essential laboratory component, which we have already put to use in making permanent archives of algae samples. This grant also helped us get new temperature/oxygen sensors to replace failing units on the Highland Lake monitoring buoy. The new sensors are working well, and despite a modem problem early on, the data streams from both the Highland and Long Lake buoys have been very consistent this year, giving us better insights on lake dynamics.

In past issues, you may have read about our bathymetry project, funded by the Maine Community Foundation, to collect high resolution lake depth data. Our second year of the project was quite a success, with our intern, Jake Moulton, returning for a full season of data collection and working with community citizen scientists. We surpassed our goal and now have depth data for 21 of our service area lakes and several maps as well. Well done, Jake!



New tools for the Science Center laboratory

New underwater light sensor and data logger being used in the field and close up of the sensor itself (inset)

Finally, we are pleased to announce that we received an environmental grant from Patagonia, which will fund a more capable boat and propane motor for our sonde work, in particular the flow-through system used for high resolution mapping of surface water quality data. The new grant will help us upgrade the system's pump and plumbing to advance performance and flexibility.

We are so grateful for the generous support from these and other organizations and are eager to put these new tools to work on understanding and protecting Maine lakes.

Kids Need to be Outside by Alanna Doughty

If we created a flowchart of all the things that we feel are negatively affecting our kids and tried to find potential solutions, I think all the solution arrows could point to "spend more time outside". Pretty simple flowchart. From anxiousness to eye issues, balance to focus challenges, from obesity to sadness to hyperactivity, if kids spend more time outside it could positively affect them in a profound way, not to mention increase their connection to place, and to nature. Entire books now cover this "phenomenon": Last Child in the Woods and The Nature Principle by Richard Louv, Balanced and Barefoot by Angela Hanscom, How to Raise a Wild Child by Scott Sampson – they all share a basic premise: kids don't go outside, and they are suffering as a result. So what gives?

Culturally, some expectations of parents have shifted in the last thirty years or so. While it was once perfectly acceptable for parents to let their kids roam free and wild in the woods for hours (I came home for dinner when my mom hollered down to the brook), sometimes it is frowned upon to leave your children to the elements. "What if something happens?" Well, probably they would figure it out, learn to be independent and responsible, see that actions have consequences, and that they can solve a problem. Maybe there is some pain and suffering involved in the process, like when my kid fell in the freezing cold spring brook water and filled his waders and had to shlep himself back to the house. Let me make myself clear, for those of you who just gasped audibly, I did not send my kids down to play in the Saco after ice-out. Our brook is about 6 inches deep and only five hundred yards from the house. And he is totally fine, he miraculously kept all his limbs, and now has an appreciation and newfound respect for cold spring water. In fact, he came in and changed, put his waders on the boot dryer and headed back out. There is a freedom in the woods when kids are allowed unrestricted play. They learn by doing and observing. And then they show me the things

Journal sharing at Eco-Explorers camp

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2018 Water Testing Season Recap *by Amanda Pratt*

LEA conducts water testing twice a month from May to September at 26 sites on 22 different lakes and ponds. Another 19 ponds are sampled once a year in August. Water testing consists of clarity, oxygen, temperature, chlorophyll, phosphorus, pH, alkalinity, color, and conductivity measurements. Most of this work is undertaken by high school and college interns.

Additionally, LEA conducts monitoring for the cyanobacteria *Gloeotrichia echinulata* in July and August on the 22 lakes and ponds that are tested bi-monthly. Several of those 22 lakes are part of our "advanced testing" program: these lakes have associations that pay for algae sampling, high-resolution temperature buoys, and fluorometer profiles (the fluorometer allows us to estimate chlorophyll concentrations at various depths without having to collect and analyze samples). We also have automated monitoring buoys in Highland Lake and Long Lake that collect and transmit water quality data to our offices in real time.

Results from all of this testing are analyzed in the fall and summarized in LEA's yearly water testing report, which is usually released in January or February. Here is an overview of the 2018 season and a sneak peek at some of our results:

Water testing intern Kayla Gray collecting a fluorometer profile

The year started out with poor clarity because of the large snowpack we had over the winter. Ice-out occurred shortly before the testing season began. The melting snow and ice caused runoff that added silt and sediment to the lakes, thus reducing clarity. The summer of 2018 turned out to be another especially dry one, and we noticed low lake levels at several sites toward the end of the testing season. Because of the lack of rain, clarity rebounded on many lakes, leading to some very good clarity readings later in the season.

Water testing results, overall, were better than in 2017. Clarity was deeper on 62% of lakes when compared to long-term averages. About 22% had similar clarity, and the other 16% were less clear in 2018. Total phosphorus, a measurement of the nutrients that feed algae, was lower than the long-term average on a whopping 76% of the lakes in 2018, and worse on 24%.

Averages for chlorophyll, which is a measure of how much algae is in the water, have not been calculated yet because we are still waiting for some lab data to come in. Based on the data we do have, we expect most lakes to have lower than average chlorophyll results for 2018.

Advanced testing results for 2018 are still pending as well. *Gloeotrichia* samples are still being counted and our monitoring buoys are still collecting data. All algae samples have been counted, and all indicate normal water quality conditions. The fluorometer profiles we collected in 2018 show some interesting patterns that will be the subject of a spring newsletter article, so look for that in our next edition. And keep your eyes peeled for our full 2018 water testing report, which will be available on our website and at our main office at the beginning of 2019.

Kids Need to Be Outside

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they have discovered and created out there on their own.

That being said, we didn't get there overnight. Here are a couple of guidelines that we have a mutual understanding of: If you are going alone, someone needs to know where you will be. Otherwise, go together, no brook time before the ice is completely out (one fell through the ice while I was there – again, 6 inches deep, still scary), don't climb trees too high (yes they've fallen out before), and make good choices. That's about it. They know our property, they know not to eat anything or drink the water, they are 9, 10 and 12 and are three smart, responsible, outdoors-loving kids and they usually take the dogs. It's pretty ideal. If that sounds terrifying to you, start slowly. Be outside while they are exploring the edges of the yard into the fringes of the woods so you can hear or spot them, explore with them in the beginning if you want, or if they are particularly young. If you have an only child, have extended playdates with other children interested in being outside too, set clear expectations and boundaries, teach them how to be safe, and overcome your own fear of them being outside and then leave them be.

Learning how to ice fish

Kids are miraculous creatures with an incredible capacity for imagination as long as we don't go butting in and telling them how to have fun and play in the woods. Another major point of all of the literature is building the foundation of environmental stewardship; the first step is a connection to a natural place – it could even be an overgrown parking lot – where kids have the freedom to explore and build a love of the outdoors. This is not rocket science or something only certain people can do. This is something we all need, and can do easily.

But what about some other barriers? We know technology and screens take up plenty of our time. Here's the solution: unplug it. Stop being afraid of the "I'm *BORED*!!" Kids who are constantly entertained will need to practice stretching their imagination muscles – let them. And take a peek at your calendar – if you are on screech mode getting your kids to dance, robotics, band, hockey, horseback riding, basketball, etc. and feel crazy, I bet they feel crazy too. Where is the time for creating? Imagination? Moving slowly and quietly? You could both benefit from clearing those busy days out, slowing down, and going outside. Block out times on your calendar to be outside, and hold yourself to them. Maybe you are scared of the woods yourself – totally okay. Make it an adventure for your whole family. Go on a nature walk with a local land trust, Audubon chapter, or LEA, do some research about what you might see out there, connect with other parents who go outside, start small and build on it, but please, for you and your kids, start somewhere.

Eco-Explorers camp at Holt Pond

 Fill out a volunteer interest card on our website or at our offices

Zeroing in on One Million – LEA and the Genesis of Maine's Milfoil Program *by Peter Lowell*

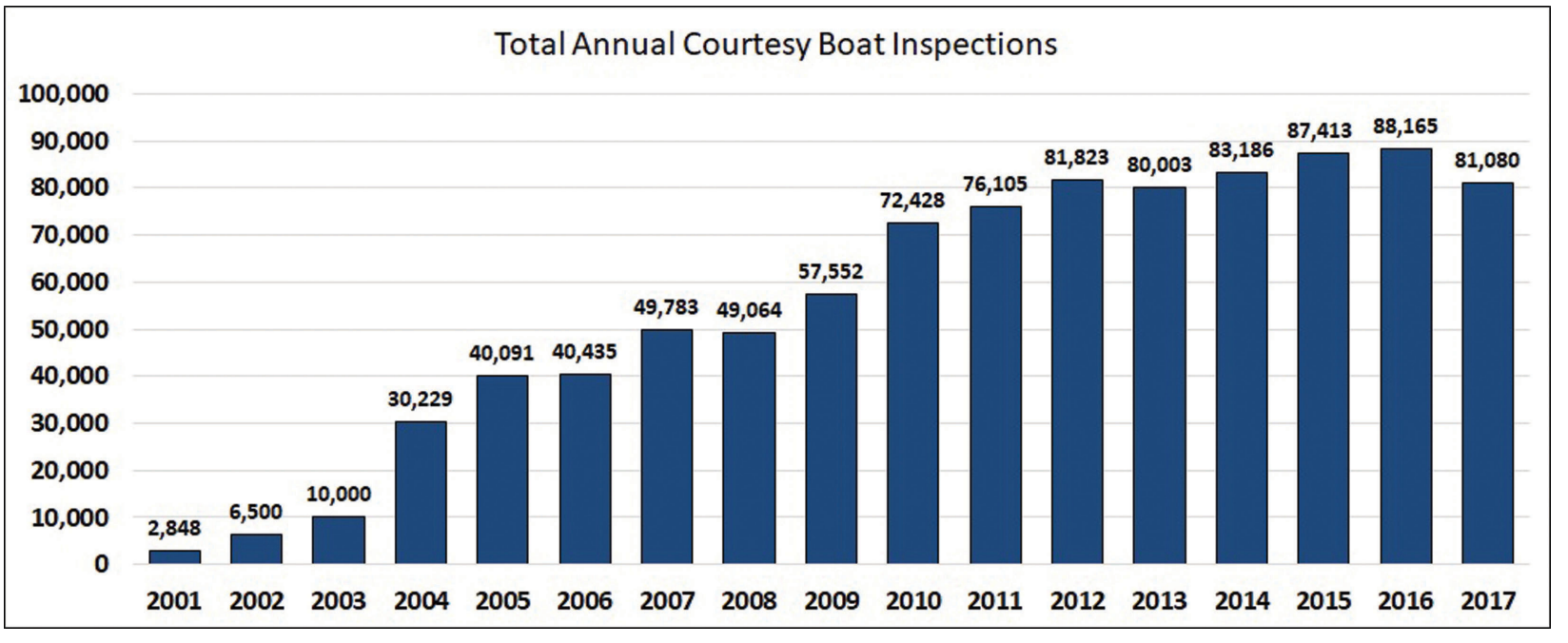
Sometime in the waning days of summer 2018, the Courtesy Boat Inspection program likely surpassed a remarkable milestone – the one millionth boat inspection. If not, we will end the year very close and will certainly hit the mark early in 2019. It is the success of the program itself that makes it virtually impossible to track and locate that special boat and the inspector involved. There are simply too many inspectors, too many launch sites, and too many boats coming and going each summer to allow real-time identification and reporting.

The roots of the program were at Long Lake in Harrison. There, in 2000, LEA piloted the new concept that has now spread throughout New England. Intern Beth Packard was charged with program design and implementation after LEA staff realized that invasive plants were a significant and serious threat to Maine's lakes. LEA wanted to do something meaningful and practical to prevent the introduction and spread of these insidious plants. A small group of lake experts already understood the threat, but few resources had been dedicated to addressing the problem or spreading the word.

During that inaugural year, LEA also sparked another initiative by working with Representative Rich Thompson of Naples to pass the first "Milfoil Bill". This landmark bill identified eleven plants that threatened Maine waters and made it illegal to transport them. Following that success, LEA's Peter Lowell, Howard Corwin from Lovell, and Shippen Bright of the Maine Lakes Conservancy (now part of the Maine Lakes Society) formed a political action committee to develop a bill to address the issue of invasive aquatic plants.

2000 was a magical year because so much momentum was building. LEA organized the first Maine Milfoil Summit to hear from other organizations and agencies throughout the Northeast who had already established programs. Mainers attending the Summit were in awe of what had been done elsewhere, but Maine quickly moved to a leadership slot when the new, comprehensive "Milfoil Bill" passed in 2001. We had succeeded, but the fight was anything but easy. The bill passed the Maine House by only one vote. The Maine Lakes Society (then COLA), Maine Audubon, and the Natural Resources Council of Maine had joined with LEA and dozens of lake associations to achieve this outcome.

In the years following that flurry of activity, the DEP's Invasive Aquatic Plant Program was developed and inspections expanded yearly. In 2017, the latest year with a full DEP report available, 50 lake groups and 48 Bass Clubs participated to inspect over 81,000 boats. Between 2003 and 2017, Courtesy Boat Inspectors intercepted over 3,000 plants and identified an infestation in Annabessacook Lake. The DEP program also funds plant surveys and plant identification classes by the Lake Stewards of Maine. Volunteer surveyors have discovered six existing infestations, including variable leaf milfoil in the Salmon Point Campground marina in Bridgton. DEP staff provide technical assistance statewide, including divers to help with plant control projects. Grants for boat inspection programs, plant surveys, and plant control work are funded by the milfoil sticker. Amazing progress has been made since 2000, but the threat is expanding and a new offensive is certainly warranted, especially to help fund plant removal. LEA will continue to take a leadership role in assuring that the maximum resources are dedicated to keeping Maine lakes clean and free from invasive plants.



No Swimming Allowed! *by Colin Holme*

It was hard to miss it in the news. It was the summer of beach closures. The epidemic was prominently covered multiple times in the *Bridgton News*, in the *Portland Press Herald*, on *Maine Public Radio*, and on local TV news. The first reports made headlines in the heatwave right after the fourth of July. Almost one hundred people became sick after swimming at the Woods Pond public beach. While E. coli was initially thought to be the cause, tests later confirmed that the gastrointestinal issues that visitors experienced were a result of a strain of norovirus. Then came the Highland Lake beach closure on July 31st and then a second occurrence on August 10th. Unlike Woods Pond, these closures were both a result of high E. coli levels. Similar findings from other lakes around the state were also reported in 2018.

E. coli, short for *Escherichia coli,* is a type of bacteria that is found in the intestines of people and animals. Most strains of E. coli are harmless but certain types cause mild to severe gastrointestinal issues such as vomiting and diarrhea. E. coli exposure is usually a result of contact with contaminated food, water, people, or surfaces. Getting test results for E. coli samples from lakes takes about 24 hours. In freshwater, elevated E. coli concentrations are usually a result of contamination from human or animal feces. Unlike some water quality characteristics which have uniform concentrations throughout a waterbody, E.coli levels are typically elevated around contamination sources and are much lower elsewhere.

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No swimming signs, like this one at Highland Lake, were seen at several area beaches in 2018

Interview with our Local District Forester, Shane Duigan

1. What made you interested in forestry?

I met a forester when I was 10 years old. I was cutting firewood with my dad in Connecticut, and one day a forester showed up with his paint gun and his dog, and in talking to him he described what his day looks like, walking around the woods marking trees, and I decided that's what I want to do, right then. He had a yellow lab, I can still picture it. At that age, I probably hadn't thought that much about working, but I knew I liked being outside. I spent a majority of my youth just running around in the woods. I think that I, like a lot of forestry students, thought being a forester meant disappearing into the woods and not having to interact with people. It takes a bit to realize that forest management is actually a social science – though there is a great deal of hard science that informs decisions, it is really about working with people, their goals and values and hopes and dreams, really. They did not teach us that at forestry school.

2. What drew you to Maine and what makes Maine's forests special?

I ended up in Maine because we used to visit up here when I was a kid. Then in looking for a forestry school for college I found the New England Regional Program, which all the state schools in New England participate in, so I was able to go to the University of Maine in Orono for in-state tuition as part of the program. I ended up feeling like the forest management program was not really what I was looking for, and didn't actually get an undergraduate forestry degree. I shifted my focus and got a broader ecology degree that I thought would provide good underpinnings should I want to continue with forestry later on. After working in the woods out west for a few years, I came back east and got my Master of Forestry (MF) at the Yale School of Forestry and Environmental Studies. Maine has so much forest, and the majority of it is privately owned in smaller parcels. Our state is still pretty close to 90 percent forested.

Maine's forests are unique because we live where two ecotones overlap: the northern temperate forest and the boreal forest, which creates a lot of diversity and locally rare species and makes management interesting. Compared to when I worked out west in northern Idaho I think there were basically 7 species of trees, and here it is not uncommon to see 20 species on a single woodlot.

3. What challenges are forests up against and what has the greatest impact?

My top three are development pressure, invasive species, and climate change. Development pressure is one because it's hard to pay the taxes on forest land, which unfortunately makes it hard to keep the forest a forest. Invasive species, both plants and insects, dovetail with climate change – invasive species are a concern, but together with climate change it becomes a really big concern. In my particular job we work with all political stripes, so I tend to use the term "global weirding," a term I co-opted from college, instead of climate change or global warming. We don't have to get into the politics of it, but we can pretty much all agree that something weird is going on. The best thing we can do is make sure that our forests are as age and species diverse as possible. One of the best ways we can manage for climate resiliency is through species diversity.

4. What is your favorite thing about being in the woods that you wish you could share with others?

It never stops being interesting to me. We think about forests in terms of thousands of acres and woodlots in terms of tens or hundreds of acres, but it really changes every 10 feet. Something that I really love about Maine woods is the connection on our land to the past and the mysteries that are all around us, piecing the puzzle together of stonewalls or foundations, or the big rock with little rocks on top which indicates a hay field. The history is rich and the forest has so many stories for us.

5. What is the connection in Maine between forests and clean water?

On my old truck I had a bumper sticker that said "well managed forests = clean water". I have to remember to get another one. The forest acts as a big filter for the water. A poorly managed forest is a source of sediment and warm water, while a well-managed forest delivers clean and cool water to the lower reaches of the watershed.

Shane Duigan disscussing forestry issues in the field

6. What is a district forester and what is your range?

A district forester is an outreach forester from the state, so I like to say I am your tax dollars at work. In effect it makes us your free forestry resource because you've already paid the bill. We do education and outreach for landowners, loggers, and school kids from elementary to college level. We are primarily responsible for water quality in the district that we represent, so if the mud ends up in the brook it is my phone that rings. We work by compliance through cooperation, so we educate, figure out how to stop that mud today and make a plan with the logger and landowner for tomorrow. We also help folks interpret and comply with the Forest Practices Act and Shoreland Zoning laws as they pertain to forest management, so we figure out how they apply for a particular landowner.

There are 10 district foresters around the state and my district covers Cumberland (except for greater Portland), Sagadahoc and Androscoggin counties. In the State there are Forest Rangers who are responsible for fire detection and suppression and enforcement of forestry related laws, timber trespass, burning regulations, etc. I am not that guy, I am the guy who comes and listens to you about your woodlot and we make a plan together. As district foresters, we typically work with landowners who have at least 10 forested acres, but if you have less than that you can still contact us for consultation and we will see how we can help.

7. What are some options for landowners who want to find out more about forest management plans, harvesting, or keeping their land the way it is?

The Maine Forest Service website has a number of resources under the publications tab, and when you are ready, give your district forester a call. Other states have similar programs, but I am not sure how they work. A lot of time they are called service foresters. If you are in a state outside of Maine you can look up your state's forest service for more info. Here are some resources for Maine:

Maine Woodland Owners (used to be SWOAM): http://mainewoodlandowners.org/

Maine Forest Service: https://www.maine.gov/dacf/mfs/

Are you in Shane's service area? Email him at shane.p.duigan@maine.gov.

Visit LEA's trails and preserves!

To Be A Steward *by Alanna Doughty*

I keep hearing this term being thrown around: steward. Sometimes I even toss it about. In fact, I used it in another article in this very newsletter! I say things like, "It is important for our students to go outside so they can learn to be environmental stewards!" And I mean it with my whole heart. But what does that even entail? And how do we *become* stewards of the environment?

Tony Butterall, who has served on numerous town boards and committees is also the president of the McWain Pond Association and a long time advocate for the pond.

The word steward first appeared during the Middle Ages and referred to a profession; a steward was a manager of a large household who was entrusted with its care. It has evolved a more long-term meaning of careful and responsible management. When we are talking about environmental stewardship we mean careful and responsible management of our natural resources, *entrusted to our care.*

We have specific reasons with which we might coerce ourselves into being stewards – resources are finite and need to be responsibly managed, or we tell ourselves it's for our grandchildren, or for the animals or even for the land itself. Maybe we make those choices because we feel it is simply the right thing to do. But sometimes I fly to Montana to see my brother and his family, and I usually drive to work every day because I live in a rural area. And recently I got a new phone. Do those things make me less of a steward? How do I navigate environmental stewardship when I am surrounded by MORE! Bigger! Faster! Now! I-mean-Yesterday!

For every choice that comes across my desk, I try to figure out what makes the most long-term sense. And I try really hard not to get sucked into the immediate and fleeting. Although, during a driving trip to Arizona, I tried to recycle some bottles at a gas station and was met with a blank stare from the cashier. I said, "What are my options?" and she shrugged. I went back to the truck both despondent and upset.

I understand that my two bottles don't make a difference in the grand scheme of things. But when I think about how many people stop at this gas station and simply throw away their bottles (because there is no other option) and expand this thought to gas stations all around the country… it is easy to start feeling pretty down. And that's just bottles at gas stations. We have become a culture of ephemeral products, many of which are not even needed in the first place. It has become so commonplace to use something once and throw it away that we've stopped even noticing. It is overwhelming when you think about it for more than four seconds.

So I stop and take a deep breath, and decide. Maybe the biggest thing we can all do to help is to: stop and think. And then act. Decide if you really have to drive, and if so, then what are some other things you can do along the way (my mother never drove us anywhere unless we had three things to take care of, no joke). Decide if you are

Young stewards participating in an Earth Day cleanup

Barb Beeson's 3rd grade class at Stevens Brook Elementary School

simply going to expire on the way home without an iced coffee, or in actuality can make it to your house and remember to bring a travel mug tomorrow.

Decide if you absolutely have to have a new pair of jeans or if you can wait until the weekend and go to a rocking thrift shop in town (and take care of at least two other errands while you are there, thanks Mom!). Decide where you buy your food and who and what you want to support, and what you want to put in your body. Decide how you are going to spend your time. Yes, it's dark out. Have you gone for a walk with your kids carrying flashlights before? It's awesome, and it's totally okay to scream at squirrels that make too much noise walking through the woods and scare you. Decide if you really need a new phone, or if you just think you do. This same principle could be applied to any consumable: a waffle iron, shoes, car – it is called perceived obsolescence. If what I am saying strikes a chord, then I would suggest checking out the "history of stuff" videos on You Tube. Seriously.

If we all made more time to get outside, to volunteer, to walk or bike, plant native plants, to read and learn, and to stop and think, our community would be a better and more livable place.

Change starts with one person and one bottle. You can do it, and there are so many ways to be a steward or an ambassador for stewardship. What is one small change you can make today? For you, for your grandkids, for the animals and the land itself, or simply just because.

Swimming

continued from page 11

Norovirus is a highly contagious virus that can be spread through food, water, contact with a contaminated surface, or close contact with an infected person. It can cause sudden and severe nausea, vomiting, and diarrhea, and symptoms can last for several days.

Although E. coli and norovirus are different types of pathogens, both are linked to contact with or consumption of contaminated water. At public beaches, the contamination is often elevated because of increased use by people. Poor hygiene and children not yet potty-trained often increase the risk. Portland Water District, which regularly monitors E. coli levels around Sebago Lake, routinely finds higher levels of this pathogen on the beaches where swimming is allowed compared to those beaches that are within the "no-bodily contact" limit.

This past summer, we had record high temperatures and many people were drawn to the water to cool down. The water was also very warm, which can allow bacterial and viral pathogens to survive longer without a host.

There is typically very limited monitoring of E. coli and other pathogens at public beaches. Often the monitoring is a result of users reporting illness. If more monitoring is done, we would expect more beach closures, especially if samples are taken during peak use times.

The best way to reduce the occurrence of these outbreaks is to increase education about their sources. With air and water temperature both increasing and our summer population growing, this problem is likely to continue so it is important for everyone to realize sources and how to minimize exposure.

Lakes from 30,000 feet – Statewide Lake Issues *by Colin Holme*

Statewide Policy meetings like this one held at Maine Audubon in Falmouth enabled lake advocates to share ideas and brainstorm solutions to current issues

In the past year, LEA convened four regional meetings on lake issues at different locations across the state. These meetings were part of the Maine Lakes Collaborative, which is a project aimed at raising the bar for lake protection, understanding, and monitoring through diverse partnerships. These gatherings allowed people from all over the state to express their viewpoint on lake issues and share information on projects and findings that could benefit others.

As a participant at all these meetings, it was truly eye-opening to hear the diversity and breadth of topics that came up. The sense of personal connection and place that people derive from living in and around lakes was palpable and a driving force for action and involvement.

While there isn't room here to cover all the topics that came up, some issues surfaced multiple times during these discussions. While some of the time these issues were specific to one particular waterbody, most of the topics had broad applicability and offered the rest of the lakes community an opportunity to learn from the trials of others. Below are some highlights from these meetings.

Proper enforcement of existing laws may be more important than creating new laws. Maine has many well-crafted environmental laws. That said, lakes are still falling victim to algae blooms and invasive plants. While new laws may help, these roundtable meetings revealed the universal feeling that existing laws are poorly enforced across the state. Proper administration of these regulations takes time, resources, and support at both the local and state level. If one of these pieces is missing, violations often go unchecked. To remedy this problem, attendees suggested more use of photographic documentation during permitting, regular photo inventories by lake groups, more access to training for Code Officers, and more funding for Department of Environmental Protection (DEP) staff.

Maine DEP is not checking projects to see if they meet state stormwater standards. While we have long known that the Maine DEP's review and compliance staff are over-burdened and underfunded, these meetings revealed that the *"DEP role in permitting review is to assure that professionals are using the correct procedures and formats in the application, and not to check to see if the application meets any other engineering or design standards."* This news is particularly alarming since local town planning boards rely heavily and sometimes exclusively on the DEP's review of large projects. Until this problem is addressed, town review boards should require third-party review of stormwater plans to make sure they comply with current standards.

Invasive fish are largely ignored. Invasive plants like variable leaf milfoil and hydrilla have received lots of attention thanks to efforts from groups like LEA and the passage of the "Milfoil Bill" in 2001, but invasive fish seem to be swimming below our radar. The most notorious of these finned invaders is Northern Pike. This relative of our native chain pickerel is a voracious predator that grows quickly and alters food webs. It has been linked to declining landlocked salmon populations and has been expanding its foothold in the Sebago Lakes Region. Unfortunately, pike have been illegally introduced by fishermen and can relatively quickly move to new connected waters. Avid sportsman and outdoor enthusiast George Smith suggested that the key to controlling this nuisance species is education and prompt action by the Department of Inland Fisheries and Wildlife when new infestations are found.

Boat inspections are working. Courtesy Boat Inspectors are not just catching invasive hitchhikers before they get into our lakes; these "lake docents" have vastly raised awareness about this issue. If Maine wants to win the battle against invasive aquatic plants, we need to continue to support this program and look at ways to make it more efficient. Increasing the invasive aquatic sticker fee and more use of technology like tablets and smartphones to quickly acquire and analyze data will help to stem the tide of invaders.

Public involvement is necessary for action. If we want lawmakers and local officials to pay attention, landowners need to stand up for their lakes. While regional lake organizations like LEA can help define and articulate a message, in the end, legislators need to hear from landowners who will ultimately be affected by the laws they craft. Public participation is the key to a working democracy. If you feel strongly about a lake issue, please get involved. Our lakes need your help!

Paddle Battle II

Our second annual Paddle Board Race and fundraiser on Highland Lake was another success and again a boatload of fun for contestants and spectators. A steady wind from the north this year added to the challenge, but it was a beautiful, sunny day on the lake and smiles, laughter and comradery abounded! The kids' race in the cove was a real hit too! Be sure to mark your calendar for next year's Paddle Battle scheduled for Saturday, July 6th at Tarry A While Resort!

We could not have had this spectacular event without help from our sponsors including: Tarry-A-While Resort, Sportshaus, Sun Sports, Henry's Concrete, Shawnee Peak, the Szymanski Jellnick Wealth Management Group, Patagonia, Dyer Excavation, Chaco, Keds, Camp Wigwam, Rolfe Corporation and Hayes True Value. Thank you so much!

Stop by LEA for your copy of Lakes Like Less Lawn

Learning for Lakes by Alyson Smith and Ben Peierls

There is no end to education. It is not that you read a book, pass an examination, and finish with education. The whole of life, from the moment you are born to the moment you die, is a process of learning. -Jiddu Krishnamurti

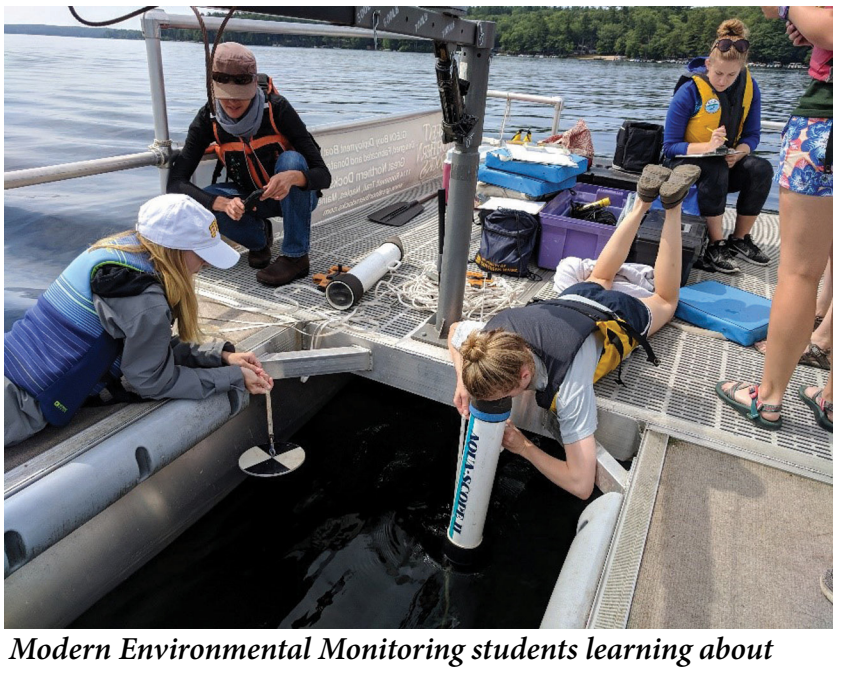
Many of LEA's activities revolve around environmental education, mostly at the K-12 level, but there are also plenty of life-long learning opportunities. With generous funding from the Morton-Kelly Charitable Trust and the Onion Foundation, we were able to develop and implement "Lake School" courses at the Maine Lake Science Center throughout this past year, providing learning opportunities on topics related to lake water quality and local ecosystems. One of our goals was to reach out to a diverse audience, and these courses inspired contractors, students, real estate professionals, teachers, science professionals, and the general public. It is vital for LEA to be a resource to all who are interested in our lakes and water quality, and part of that is offering a breadth of opportunities to the community.

Modern Environmental Monitoring students with educator Alanna Doughty

In November of 2017, LEA hosted a Watershed Educators Retreat for twenty educators from around the state. In the spring of 2018, we offered three courses for area contractors on erosion control, waterfront regulations, permitting, and gravel road maintenance. A total of 65 contractors attended.

In June, we partnered with the Maine Lakes Society and the Law Office of Eaton Peabody to offer an accredited course for real estate agents on lakes, water quality, and property values. "Maintaining the Market Value of Lakeshore Properties in Maine" was attended by 22 real estate professionals; we plan to offer that course again in 2019.

This summer for the first time, we offered a series of courses designed to give students hands-on experiences in environmental monitoring, bolster college and early career resumes, and provide an overview of issues affecting Maine waterbodies. The first, called *Modern Environmental Monitoring*, developed by Ben Peierls (Research Director), Amanda Pratt (Staff Researcher) and Alanna Doughty (Education Director), was a three-day course that focused on water quality monitoring, lake ecology, and stream bioassessment. Teaching and learning was a combination of indoor and outdoor experiences. We are planning to offer this again in the summer and are also thinking about opportunities for adults who are interested in learning more about how lakes work. In the words of Martin H. Fisher, "All the world is a laboratory to the inquiring mind," so don't forget to sign up!



Modern Environmental Monitoring students learning about water monitoring techniques on the MLSC pontoon boat

As part of this same series, we offered two courses in August on how to build your own monitoring equipment using low cost microprocessors. The use of these systems is rapidly gaining in popularity because of their versatility in a wide range of applications.

The last course in the series was on identifying and differentiating native and invasive aquatic plants found in this region. This course started with identification techniques at the Science Center and then moved to Moose Pond for plant collection and identification. At the end of the day, students visited the LEA's milfoil crew as they demonstrated removal techniques on Long Lake.

During the first week of August we offered a four-day camp entitled *Eco-Explorers* for children geared around investigation of nature through hands-on activities and outdoor games. The first two days of the camp were held at the Science Center and the last two days were held at our Holt Pond Nature Preserve. Students can look forward to camp again next summer!

Do-it-yourself sensor building workshop

In mid-September, we hosted a presentation on the effects of wakes and boating on shorelines and bottom sediments. With the increasing popularity of wake surfing, there is a growing concern about the impact of boat wakes. In October, we hosted Maine Audubon for a "Stream Smart" workshop geared toward contractors, public works employees, loggers, and landowners interested in minimizing the impact of road crossings on streams.

LEA is dedicated to supporting lake research and resilience. The establishment of our Maine Lake Science Center "Lake School" allows education and training events for larger audiences and substantially increases our capacity to serve Maine's lakes, enhancing LEA's tradition of engaging students of all ages to safeguard their natural resources and local economies. Many benefit from these natural resources environmentally, economically, and for physical and emotional well-being. To be good environmental stewards, we need to understand our environment. As Benjamin Franklin said, "Tell me and I forget. Teach me and I remember. Involve me and I learn." We want to know what interests you in order to better our educational programming! Please contact our Education Director with ideas: alanna@leamaine.org.

Thank You LEA Volunteers!

Invasive Plant Patrol volunteer

This summer LEA was fortunate to have a large number of great volunteers, who logged over 700 hours of volunteer time. Some of the projects we were able to do with their help were depth mapping, trail work at Holt Pond and the Highland Research Forest, 32 LakeSmart evaluations, and Invasive Plant Patrols on four lakes. Contact LEA if you would like to join any of these efforts!

Trail Day volunteers

Consider LEA for your end-of-year giving

TD Bank Affinity program continues to be a success for LEA

LEA is pleased to announce that we received a check from TD Bank's Affinity Program in October for $3,639.35. Since its inception we have seen a steady yearly increase in participation. Thank you very much to those of you who have taken the time to sign up at your local branch. This giving program is a great way for TD Bank to donate to the charities that their customers care about. Thank you TD Bank for your generosity!

Help us keep this successful program growing by going into your local branch and signing up today. Simply give the LEA code for the Affinity Program: Code **AF30**

Here is how it works: If you have an existing checking account TD Bank will donate $10 to LEA. If you open a new checking account TD Bank will donate $50 to LEA. For new or existing savings accounts the bank will donate a percentage of the annual average balance. The more Lakes Environmental Association supporters that bank with them, the more money we earn to support water quality on the lakes we all love. It is important to note that the bank shares no personal information with LEA and that we are not notified as to who the participants are. **Remember, this is at no cost to the participant!**

A Lifetime Dedicated to Lake Protection

by Alyson Smith

When one's vocation and occupation are the same, important work gets done. With a crowd of appreciative members, friends, and family joining Peter Lowell at the Bear Mountain Inn in Waterford on the summer solstice, it was clearly evident the level of appreciation they have for Peter's life work at the Lakes Environmental Association. The Inn provided a summer-perfect setting, overlooking Bear Pond and Bear Mountain, to a record-breaking crowd of more than 200 people (more would have attended had there been room at the inn!) for an "absolutely lovely" (according to Peter) evening. Peter was "overwhelmed by the whole organization of the event and the variety of people who took the time to attend. It was truly a magical atmosphere."

Peter's retirement party doubled as a fundraiser for a project that is near and dear to his heart: the Maine Lake Science Center. After the confetti settled and our books were tallied, the event brought in more than $17,500 of revenue for the Center.

Musical entertainment in the circa-1850 barn was generously donated by the local group Hobson's Choice. In addition, a special song, "The LEA Empire", written by successor Colin Holme and performed by Colin, Ben Peierls, and Justin Ward, resounded with a resemblance to Johnny Cash's "Ring of Fire".

Former education director and center consultant Bridie McGreavy recounted the story of her first day of work at LEA (decades ago) when Peter worked side by side with staff and interns building boardwalks at the Holt Pond Preserve. In fact, six days before the "Peter Party", Peter was again, at age 70, working side by side at Holt Pond with staff and board members replacing planks and cinder blocks, weed whacking, and making sure all had a part in sprucing up the trails at the preserve. Peter's "leap and the net will appear" attitude has resulted in a multitude of special places and beneficial programs at LEA over the last 47 years.

Phyllis Ginzler, Maine State Representative and LEA board member, presented Peter with a legislative sentiment of appreciation for his 47 years of work and dedication to the protection of the lakes of Maine.

What's next? Peter has transitioned to being a consultant. Spending fun time with kids and grandkids has increased. And, circling back 50 years, Peter is running The Cool Moose in Bridgton once again. When asked about what he liked most about working for LEA, Peter shared, "The ability to make dreams reality". Luckily for the Lakes Region, his dreams coincide with those of many!

Photo Courtesy of Bear Mountain Inn

Connect with Us!

There are many ways for you to interact with LEA and keep up on what we are doing as an organization year-round. Watch our summer water testing interns as they work or our educators as they teach the wonders of our watershed by liking us on Facebook and following us on Instagram (@lakesenvironmental). Don't forget to check our website, mainelakes.org, for the latest water testing results on your favorite lake. You will also find our current events calendar, information on invasive plants, news of the Maine Lake Science Center, and more! Please don't hesitate to call us at our Main Street office if you have any questions at 207-647-8580.

Another way to support LEA at no cost to you is by shopping with Amazonsmile and selecting LEA as the beneficiary. They will donate a percentage of each sale to LEA. This is an easy way to support us while buying the things you need anyway.

amazonsmile
You shop. Amazon gives.

Are you an LEA member? Please help us protect our lakes!

You can join LEA with a contribution of any amount. Just mail this form and a donation to LEA, 230 Main Street, Bridgton ME 04009.
You can also join or renew at www.mainelakes.org.

Name_____

Winter Address_____

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I am interested in information on estate planning and planned giving: ☐

Donation Information

☐ $1000 Benefactor
☐ $500 Patron
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☐ $150 Lake Sponsor
☐ $100 Family
☐ $50 Individual
☐ $____ Other Amount

I would like to make an additional donation to the:
☐ Maine Lake Science Center $____
☐ Mifoil Fund $____
☐ Environmental Education Fund $____

☐ Anonymous Gift (We occasionally acknowledge our donors publicly. Check this box if you would like your donation to remain anonymous.)

☐ Check enclosed ☐ Charge my credit card $_____
Credit Card # _____ Expiration Date ___ /___
CVC _____ Signature _____