

## Lakes Environmental Association

Protecting Maine Lakes since 1970

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# LEA Lake News

## Initial Results Show Water Quality Decline in 2017

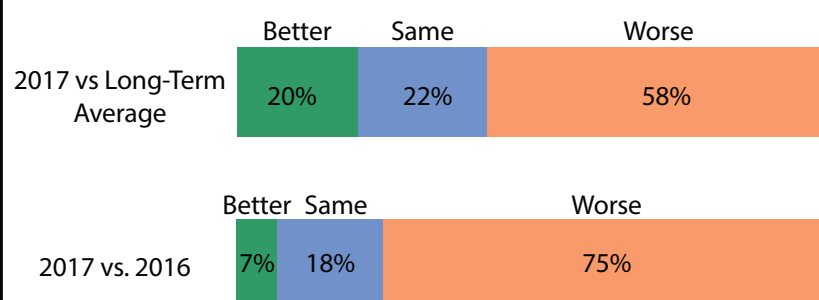
Preliminary analysis is pointing toward worse than average water quality for the 2017 season on many of the area's lakes and ponds. LEA tests 45 sites on 41 different lakes and ponds every summer, maintaining a database of long-term data which is used to track water quality over time. Following a very good year for water quality in 2016, average clarity was worse this year on 75% of lakes when compared to 2016, phosphorus was worse on 49%, and chlorophyll-a was worse than last year on 62% of the lakes and ponds in LEA's service area. The numbers were slightly better when comparing 2017 to long-term averages, which take into account the entire data record for each lake. In this comparison, both chlorophyll-a and phosphorus were worse on 38% of lakes, meaning that the majority of sites remained steady or improved. Clarity, however, was worse on most lakes (58%) as compared to long-term averages. Clarity was about the same on 22% of lakes. This category includes seven shallow ponds where Secchi disk readings often hit the bottom.

Clarity, total phosphorus, and chlorophyll-a are indicators that are used to determine a lake's water quality status. Clarity indirectly measures the amount of suspended material in the water – whether it be algae or other particles floating in

the water column. Higher clarity generally means better water quality. Phosphorus is an element required for algae growth. It is usually the least abundant “building block” needed to grow algae, which is why we put so much effort into limiting it from reaching our waters; if there is no phosphorus available, there can be no algae. Chlorophyll-a is an indirect measure of algae abundance. All algae contain this pigment, so its concentration can tell us approximately how much algae is in the water.

Weather is often the driving force behind water quality in any given year. A larger than average snow pack last winter meant high erosion potential in the spring when the snow melted. Water levels were certainly higher than normal at the beginning of the testing season. The winter seemed to drag on far into the spring, and the cold temperatures meant that lakes were still fairly well mixed into May. All of these factors contributed to lower than average water quality at the start of

The majority of lakes and ponds in our service area had worse clarity in 2017 when compared to 2016 and long-term averages



the season. Water quality improved toward the end of the summer, probably due to the few heavy rain events. However, the low clarity and high chlorophyll-a and phosphorus levels in May and June were enough to affect seasonal averages, resulting in a mediocre year for most lakes.

Full results from this water testing season, including continuous temperature, algae, and fluorescence results, will be available in our 2017 Water Testing Report. Look for it this winter on our website, [mainelakes.org](http://mainelakes.org).

## Double Your Money! Science Center Donations Can Be Matched Dollar-for-Dollar!

Thanks to the continuing generosity of an Anonymous Family Foundation, LEA has the opportunity to complete the Center Campaign in 2018. The Foundation has offered to provide a one-to-one match for gifts received by June, up to a total of \$100,000. The Campaign goal of \$1,450,000 covers Center purchase, construction, outfitting and staffing through 2020. Less than \$250,000 is needed to meet the goal, so if donors take advantage of this gift offer, we will be very close to the target!

If you wish to make a gift to the Maine Lake Science Center Campaign, please send a check made out to “LEA Science Center Campaign”. You can also contribute online via PayPal on LEA's website [mainelakes.org](http://mainelakes.org), or contact LEA's Office Manager, Jenny O'Connor, at 207-647-8580 or [jenny@leamaine.org](mailto:jenny@leamaine.org) for information on other payment options.



## Milfoil in Long Lake *By Christian Oren*

Finding invasive, variable leaf milfoil in Long Lake came as a shock to everyone in the region, but was especially shocking to those at LEA who have spent so much time and effort trying to prevent this from happening. When we first discovered the plants in August, we feared the worst: that milfoil had spread throughout Long Lake and we would be unable to remove it all. Thankfully, after working the infested area and copious survey efforts, we believe the milfoil has been contained.

Milfoil was discovered after LEA staff received a tip about suspicious plants. Mast Cove was identified as an area with suitable habitat, and was the first stop for inspection. Upon arrival, LEA found over an acre of dense, mature plants at the Four Seasons Campground. The milfoil was growing up out of the water, directly in range of the many propellers on boats docked in their marina. Milfoil was also discovered at Colonial Mast Campground, and a few small patches were scattered around the deeper waters of Mast Cove. LEA had to act quickly to prevent the invasive plants from spreading any further into Long Lake. The Milfoil Control Team suspended their work in Sebago Lake to tackle this new infestation. Within one week of discovery, the Team had begun removal in Long Lake. LEA is fortunate to have a



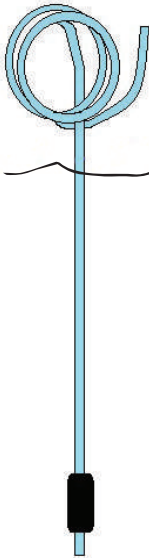
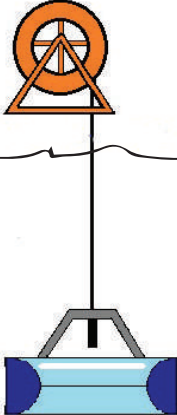


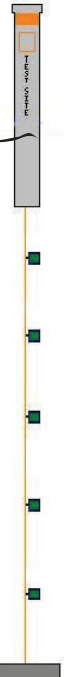
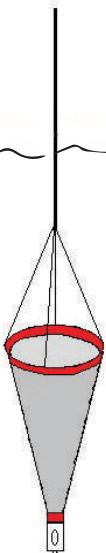

crew with extensive resources and experience. Their successful work on the Songo River proved they are up to this new task. The team laid 20 benthic barriers, and removed over two hundred bags of milfoil from Mast Cove in the three weeks of intense control work. *Continue on page 7*

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These are some of the tools LEA uses to conduct lake testing in the field

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Secchi Disk	Dissolved Oxygen and Tempe Meter	Integrated Core Sampler (Core Tube)	Van Dorn Grab Sampler	Remote Sensing Buoy (GLEON buoy)	Data Sonde	HOBO Data Loggers (on Buoy Line)	Plankton Net	Field Fluorometer
Easy, simple way to measure water clarity	Measures dissolved oxygen and temperature throughout the water column	Collects composite samples for measuring chlorophyll, phosphorus, and other water quality metrics	Collects water at a specific depth, used for measuring deep-water phosphorus concentrations	Remotely collects high-resolution water quality data on oxygen, temperature, chlorophyll, and other measurements	Simultaneously measures depth, temperature, oxygen, pH, conductivity, chlorophyll, cyanobacterial pigments, and turbidity	Used for high-resolution, remote temperature monitoring	Collects algae and zooplankton samples	Measures chlorophyll concentrations at various depths
								

The Maine Lakes Collaborative – Why Such a Big Deal?

Five years ago, LEA began developing the Maine Lake Science Center to accelerate lake research and protection in the state. We discovered Maine’s colleges and universities were hotbeds of research and technology that could help every lake association, conservation group and state agency do a better job of understanding and preserving our remarkable water quality. As we built our facilities and capacity, we tapped into dozens of scientists and researchers through a series of Science Center retreats. These were magical events that brought people doing wonderful and important things together to share information and ideas. Some had met only through reputation, but never in person. And many were introduced to new folks and resources.

Early in 2017, the creative process came alive in the Maine Lake Protection and Research Collaborative. This document had begun as LEA’s “Tipping Point Strategy”, but the Maine DEP’s Linda Bacon added dimension and substance, helping the concept reach its full potential. The importance of the Collaborative is that it spells out a precise action plan for protecting Maine’s lakes into the future. Dozens of tasks and partners are identified and progress is already being made.

The Anonymous Family Foundation and the Elmina Sewall Foundation have provided grants to LEA for our work in advancing the Collaborative. So many people and institutions are working in harmony toward a common goal. It doesn’t get much better than that!

Milfoil Control Update

By Christian Oren

In addition to all of the work done in Long Lake, LEA’s Milfoil Control Team had to protect vast areas in Brandy Pond, the Songo River, and Sebago Lake last summer. Although Long Lake may have received the milfoil attention, the work the Team did in these other areas was no less impressive.

Brandy Pond and the Songo River both looked good last summer. Less than two dozen plants were found in Brandy, all of which were at marinas. In the Songo River we had a couple of small patches to contend with, but these, like the few plants in Brandy, were easily remediated. LEA does regular surveys to remove re-growth, but this process is much less time consuming and costly than battling large, dense infestations.

With resources from the towns surrounding Sebago Lake and individual landowners, the Milfoil Team has moved onto this lake in recent years. Frye Island is a great example of success in Sebago. The Island’s coves were choked with the weed years ago, and now there are just a few remaining patches. We also surveyed areas around Sebago that have not yet had milfoil control, like the Northwest River and the Sticky River. These areas have acres of mature milfoil that will require weeks of labor to manage. Unfortunately, the Milfoil Team already has its hands full with the project in Sebago Cove. This cove has one of the worst infestations in the state and we expect control work to take at least ten years.

However, LEA has made strong headway in Sebago Cove over the past two summers. We laid our barriers, and pulled hundreds of bags of the weeds from the Cove’s shallow waters. By mid-summer we had about 30% of the area



controlled. However, after the discovery of milfoil in Long Lake, the work in the Cove was suspended temporarily to deal with this new infestation. The unforeseen work pulled our limited crew off Sebago Cove for about a month, which resulted in milfoil re-establishing in some areas we had already harvested. This was a setback, but the project still made a net gain of territory this year. Now that the situation in Long Lake has been addressed, we should be back on track in Sebago Cove for next year.

The Milfoil Team was staffed by an amazing crew this year. Veteran crew members Derek Douglass, Tommy Chagrasulis, Lucien Sulloway, and Abe Wiblin were joined by newcomers Kevan Mellow, Andrew Ferris and Devyn Hatch. The success of our Team depends on the work of these young men and, of course, maintaining adequate funding from the community.



# Reflecting on LEA and Projecting Forward *By Peter Lowell*

When Phil Chute asked me to follow him as LEA President in 1971, I was not even an LEA member. Joanne Diller, Michelle Ordway, George Packard, Ed Simpson and I had been pushing the boundaries of the new environmental movement as members of the Bridgton Conservation Commission. Phil took note and was looking for young leadership for his new organization. This is how my LEA story began - a busy collection of events, people, adventures, risks and wonderful results. Along the way, many great people have contributed, each in their own unique way. No article could succeed in covering all of the important events or in recognizing everyone who deserves mention. There have been some surprising allies and equally surprising opponents, adding interest and unpredictability to the mix. The progression from very primitive to highly sophisticated is the real tale. It began with bulldozers freely ravaging fragile shorelines on Long Lake, and has culminated with a powerful blend of science, diverse partnerships and a universal determination to protect our lakes. If you want a checklist to track some of this, see “LEA’s 40 Top Accomplishments (see page 16).

The sequel to my indescribable “ride” is already writing itself in the perpetual motion of daily events, challenges, opportunities and characters. Colin Holme is belted in to direct how LEA navigates the future. There is no more exciting and



challenging job imaginable. It demands expertise in myriad fields: human resources, politics, sciences, technology, the law, finances, fundraising, public relations, education, writing, graphics and even construction. It would have been impossible for me to exit this magical career had it not been for Colin’s incredible skill set and dedication to LEA. It is time for change, and the ideal successor had served his full apprenticeship.

LEA’s greatest over-arching resource is the diverse group of individuals, businesses, agencies, organizations and foundations that have provided a solid emotional, financial and social base. You now

have a new leader to support with your same dedication, generosity and sense of purpose. The biggest challenge for “The New LEA” will be to convince hundreds of landowners and businesses who benefit from LEA’s work to become members and to support us. Imagine what could be accomplished if even a simple majority of lakeshore landowners joined! See the chart below for some rather shocking statistics, but ones that signal the potential. It seems unthinkable that a non-member was able to become LEA President and Executive Director. Becoming a member is a far simpler process!

# In the Field with the New Multiparameter Sondes *By Ben Peierls*

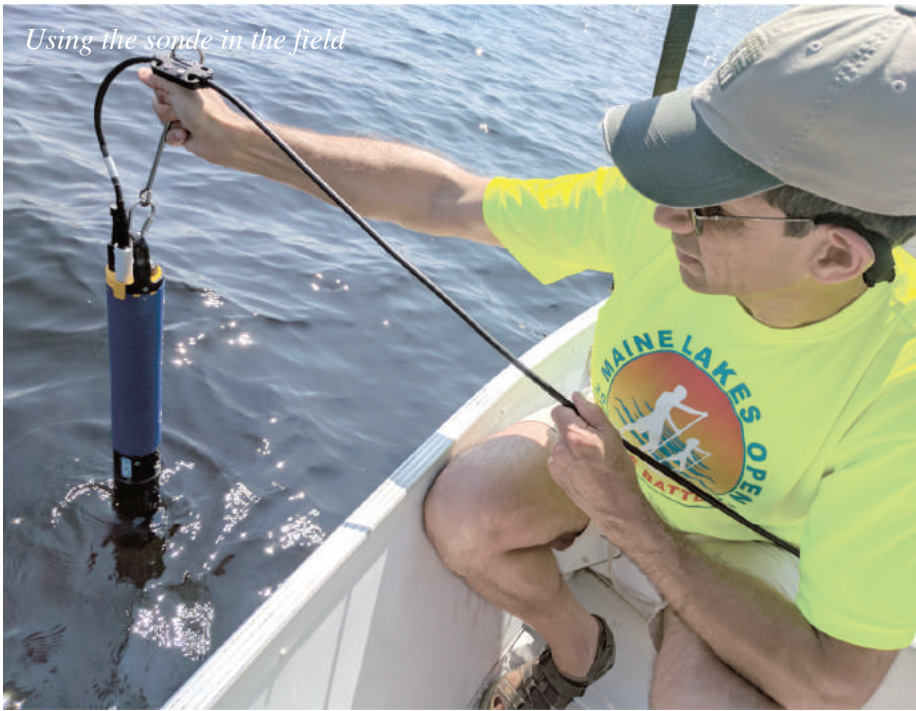
2017 saw the addition of multiparameter sondes to LEA’s toolkit for lake science. We received a generous grant from an anonymous family foundation to purchase two YSI EXO2 sondes, along with the necessary cables and data loggers. The new instruments were outfitted with sensors for the simultaneous measurement of seven water quality parameters: temperature, dissolved oxygen (DO), conductivity (relates to mineral content), pH (or acidity), turbidity (particle-based clarity), chlorophyll (a pigment common to all plants), and phycocyanin (a pigment common to blue-green algae). Along with the water quality information, the data loggers record depth below the surface, barometric pressure, and GPS coordinates (location on the earth).

Throughout the past testing season, I collected 46 sonde-based water profiles on 17 different lakes. Some lakes had multiple locations and six lakes received repeat visits. Each profile consists of data captured at from one-half to one-meter intervals, extending from the lake surface down to just above the sediments. All told, over 8,700 individual measurements were recorded.

We conducted the sonde-based profiles in conjunction with the LEA water testing work.

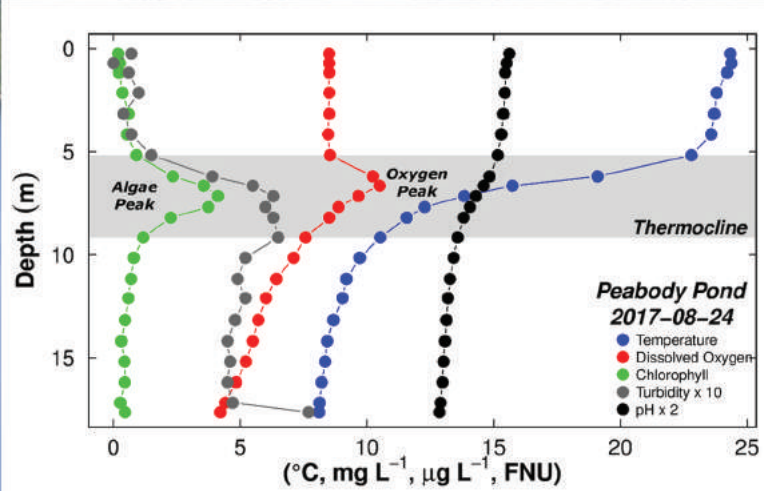
This was done to take advantage of the parallel algae and water chemistry data that would be available and to compare the sondes to the conventional lake testing oxygen meters. These more basic meters measure oxygen and temperature and, in most cases, agreed very well with the sonde data. The sonde did become a source of backup data during the testing season when one of the older DO meters malfunctioned.

Multiple years of testing data show many lakes in our area stratify due to the heating of surface waters. The colder bottom waters often lose oxygen throughout the summer, which affects availability of fish habitat and causes increases in sediment phosphorus release. This is well-known lake behavior, but now the



in this zone due to the scattering of light by the algal cells. The pH value decreased below the thermocline in parallel with the oxygen, which indicates more respiration and production of CO2 in the bottom waters.

Looking ahead, I plan to capture how water quality features develop over the course of a year by repeating these advanced measurements multiple times within some lakes. We may also try deploying a sonde at a fixed depth for several hours or days to assess short-term variability. Another goal is to collect multiple profiles within one lake to assess how water quality varies spatially around the water body. In a related project, we are developing a special, boat-mounted, flow-through system that will allow us to create detailed maps of the sonde data across the entire lake surface. In addition, the sondes have room for more sensors, which we may add in the future. I am excited about these possibilities and look forward to reporting the results in coming issues.



Profile of water quality data in Peabody Pond

sonde data provides new insights into lake characteristics. For example, the profile collected on Peabody Pond (see the figure) shows a peak in algae (based on chlorophyll concentration) at about 7 meters deep and within the thermocline, or region of greatest temperature change. Water becomes denser as it gets colder, so algae that sink may collect at this interface. The algae were actively growing as evidenced by the peak in dissolved oxygen (the product of photosynthesis) in roughly the same location. Turbidity was also elevated



# Finding His Way from Intern to Executive Director

by Leigh Macmillen Hayes

For Colin Holme, the journey from internship to executive director has been a gradual path, with many opportunities along the way.

Colin was on a UMaine exchange program at Humboldt State University in California during his senior year when he first learned about LEA. And he has his parents to thank for the introduction. As LEA members, his mom informed him that there was an internship opening which seemed to fit with his studies in Environmental Science.

He grins broadly as he explains that his concentration was in marine science, and that he had to ask his professors to explain milfoil. Because he was late in contacting Executive Director Peter Lowell, who had already hired five interns, he was only able to get a two day per week internship. The year was 1999.

When the other interns returned to school at the end of the summer, Colin, who had graduated, was able to stay and help complete the water testing program. The following year Colin reapplied and was again hired for an internship. By August, he was hired full time to run the water testing and Clean Lake Check Up programs. Within a few years, he learned GIS (short for geographic information system designed to capture, store, manipulate, analyze, manage, and present spatial or geographic data), which he used to create shoreland zoning and natural resources maps for the surrounding towns.

As time went on, Peter introduced Colin to the planning board.. At first Colin found it difficult to attend planning board meetings as Peter's substitute, because he was young and his knowledge of local ordinances was limited. That spurred him to conduct his own research and make sure he understood what he was saying and why. In time he gained confidence in looking at ordinances and making logical recommendations to the boards.

Over the years, other minor and major assignments were added to Colin's job and his understanding of the inner workings of LEA led Peter and the Board of Directors to promote him to assistant director. Of course, in Colin's wit, he comments, "It's just a drop of one word—Assistant Director to Director."



Colin Holme - The Next LEA Executive Director

Or is it? The switch actually comes in the form of two words: "assistant" to "executive," and with the latter comes even more responsibilities. And time commitment. Peter has been training him for the past few years, and though Colin is more than ready for the next step, his biggest concern is time.

While Peter's style has been to shoot from the hip and stay focused on a topic, Colin likes to do the research and come prepared with background knowledge in order to make his reasoning sharp and his arguments strong. He also knows that board-related items require a lot of time.

Despite his concerns, his climb up the ladder has given him an understanding of all the programs that are part of LEA. And he's well known in the towns LEA serves, as well as across the state. "Am I well suited for the job?" Colin asks. "We'll find out."

Indeed, we will, but having just finished serving on the board for the past nine years, I know the answer. He is. Yes, he'll have Peter's big shoes to fill, but Colin will find his way. "I'll fill my own shoes," he says. "I'll take my own path as I work toward the same goals. I won't be the same director Peter is, but I'll find what works for me. It will end up being a slightly different equally strong a strong LEA."

For Colin, the benefits of working for LEA go beyond the compensation. He enjoys being a part of the greater community, where he's developed a fair and trusting relationship regarding environmental issues. "LEA fills a void in the community in the form of ecological monitoring, preventive conservation, outdoor education, landowner interaction, and municipal services," says Colin. "There are few organizations like LEA that do all of these, and as a proactive organization, we provide a big part of the lake puzzle that's missing. I feel lucky working with an organization with such a strong staff, involved board, and connected community. I'm fortunate to have arrived at this place at this time."

What should we expect on January 1, 2018, when Colin officially takes on the role of executive director? "I want to get comfortable," he says, "making sure the machine functions under my leadership. That's how I've always worked. I tell new lakefront property owners the same thing before they make changes in the landscape, "See how you like it, how you use the land."

He sees the first year in his new role as a time to learn the ropes and set the system up so he can manage his workload. While he knows LEA has ventured down many lake-related avenues in its 47-year history, he's learned to expect the unexpected. He plans to keep a strong staff well compensated for their efforts and availability. And he believes that all staff members should gain a better understanding of each other's job so they can step up to implement programs when necessary. To that end, he also foresees an exchange of ideas and programming within the staff.

As for the Maine Lakes Science Center, Colin is excited about the opportunities it will provide for lake research. "It's a pleasure to work with Ben, who has vast knowledge of scientific principles and limnology," says Colin. "Ben has varied experiences in roles different from mine, and he's someone I can turn to and work with on organizational questions. It's a challenge to make sure we integrate the science center into LEA's programs. It's still in its infancy, but is such a great facility for training and education. I want to embrace it to make it work."

The past eighteen years have provided a good training ground for Colin to use going forth and he truly appreciates the guidance Peter has provided.

"I've learned so much from him. A lot of my style comes from Peter's style," says Colin, "because he's showed me how he's done something and I've observed him in action. A couple of years down the road, things he did or said I'd suddenly notice myself doing because it makes sense. For me, he's always been a good and reasonable boss. It's nice to work with someone who never gets noticeably upset. I've seen him get frustrated, but he maintains his composure even in trying circumstances. I admire that and I try to do the same. It's hard to step back for a second and breathe, but that's what Peter does and people around appreciate it when you can approach a conflict with a level head. He has maintained his composure under tough circumstances. I hope I can do the same."

"Peter has been a leader and tireless lake advocate," says Colin. And I know that executive director Colin Holme will be the same—just in his own way.

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# The Secret that Anisoptera Shared

By Alanna Doughty

“That was my favorite part of the Holt Pond field trip last year!” a fifth grader exclaims as I mention the word “macroinvertebrate”. As fourth graders, students explored the Holt Pond boardwalk, the floating sphagnum mat and red maple swamp, and had a too-short visit to the bank of the Muddy River to collect aquatic insects. “Yeah, it’s my favorite part too,” I share, “but what I didn’t tell you is that different macroinvertebrates react to pollution differently, so depending on which insects we find, we can actually determine the health of the water!”

Thus, in the fifth grade, we begin a year-long aquatic macroinvertebrate study.

Aquatic Benthic Macroinvertebrates (BMIs) are insects that live in the water, or insects that spend part of their life in the water - like mosquitoes, mayflies, and dragonflies (Anisoptera). Collecting BMIs with students has a number of upsides.

- One: It’s super cool.
- Two: The “ick factor” is always a bonus.
- Three: They are easy to sample and relatively easy to identify with some practice.
- Four: (my favorite part) It is a completely legitimate investigation that scientists actually do to monitor water quality.

Sampling macroinvertebrates and determining the variety and number or diversity and density of species provides an informative, long-term view of the health of the water. These species cannot easily escape pollution and they spend a large part of their life cycle in the same part of the stream clinging to the bottom substrate. The macroinvertebrate community of a stream reflects the water’s physical and chemical conditions over time, whereas collecting pH only measures the pH at that very moment.

Students at the Stevens Brook Elementary school investigate three sites along the Stevens Brook to see if there is a change in water quality as the stream flows through Bridgton. A homeschool group collects data farther down the stream, near Long Lake. At Songo Locks Elementary, fifth graders explore the Crooked River, one of the most important spawning habitats for landlocked salmon in Maine, and students at Sebago Elementary School will explore the Northwest River prior to it widening into Sebago Lake. At all three rivers, students collect and identify the macroinvertebrates and then carefully release them back into the stream. They will also determine a



3-E2 Stonefly from the Brook

full bio assessment of the site, including water quality chemistry, and a shoreline evaluation. In addition to spending time outside (always welcome), students will work on their scientific writing as they support their findings with written and photo evidence, GPS coordinates, sketches, and field notes. They will visit sites in the fall and again in the spring to repeat the study, and various classes will provide replication in our investigation. After field work, students upload findings, photos, and sketches to the Vital Signs database - a Maine-based field investigation website powered by the Gulf of Maine Research Institute. Vital Signs connects our students to other students, scientists and citizen scientists across the State. When I asked students if they were up to the challenge, I saw some more wide eyes, but heard lots of “YES!”



Kids Searching for Macroinvertebrates

With the help of a mini-grant from the Gulf of Maine Research Institute, and support from the Onion Foundation and our members, we embark on our field work, clad in shiny new hip waders, along with equipment to test the dissolved oxygen, temperature, pH, and turbidity of the water body. Students will be able to connect the “moment-in-time” water parameter tests with their bio assessment findings to see if they match up, and we will compare our findings from different streams and connect that back to the surrounding watershed.

Through the winter months, we will study life cycles, adaptations, and food webs of the organisms in the aquatic ecosystem and prepare to embark on our second field study in the spring. As part of their learning, students at Stevens Brook will look into stenciling in-town storm drains to share their knowledge with the public that they drain straight into the Stevens Brook. We plan to continue our field studies yearly, and expand our investigations to include long-term temperature and flow data collection. One class has already decided if they find a new species they shall name it “Smithaea”, after their teacher, Ms. Smith. Kids are so awesome!!

A big thank you to the Gulf of Maine Research Institute, the Onion Foundation, our members, and the teachers at the schools who are embarking on this adventure with us!

Vital Signs has an option to join their community as a citizen scientist. Check out [vitalsigns.gmri.org](http://vitalsigns.gmri.org) for more information.

## Reflection on a Summer at LEA

Jacob Moulton, LEA intern

The dictionary defines phenomenal as something very remarkable or extraordinary... something that stands out as an exceptional experience, or occurrence. If I were to define the word phenomenal I would define it as the Lakes Environmental Association.

In the beginning of the summer, I was taking courses and planning on working at whatever job I could manage in the Orono area. Fortunately, my plans changed when I gave LEA a call and spoke to Peter. To be honest, I hadn’t done much research into the association before I called. I was simply looking over a list of places that might offer internships. I actually had an interview lined up for the following week with GNC in Bangor. But I chose to give LEA a call, and after one conversation with Peter, knew it was where I wanted to be.

Once I had moved down to Bridgton, my co-workers, Ben and Alyson at the science center shared a working and living space with me, which ultimately led me to view them as friends, instead of my bosses on the Bathymetry Project. I felt welcomed into the water testing program by Amanda, and by my fellow interns Kayla and Isabella. And I felt that I could voice any concerns or questions I had to Colin or Peter without a second thought. The community I’ve experienced here is clearly one that cares, and whether it’s Mary or Alanna teaching a group of curious individuals, or Jenny attempting to answer some abstract question from a visitor, It’s clear that the people around Bridgton care about their environment and support LEA. The experiences I’ve gained here, the people I’ve met, and the fun I’ve had is something I won’t forget.



Jake getting ready to take a phosphorus grab.



# Remarkable Support

LEA has been extraordinarily lucky in many ways. For example, the perfect people seem to apply for our rare job openings. Pondicherry Park, the Maine Lake Science Center site, the Highland Lake Preserve and the Holt Pond Preserve all grew from fortunate happenstance. This good fortune is exemplified by the support we have received from an Anonymous Family Foundation and from exceptional LEA members.

It is said that you make your own luck, and LEA has always prided itself on innovation, dedication, and the productive use of resources. Maybe those are the elements that attract the supporters we are so lucky to have. Regardless of their motivation, LEA would be a far different organization without their caring and generosity.

Stop by the Science Center to see the lovely watercolors of one of our staunch supporters, Madeline Wikler. These are for sale, with proceeds benefitting LEA.



## The Maine Lake Science Center – A Happening Place *by Alyson Smith*

The Maine Lake Science Center’s third year in operation began in June. Educational programs, researcher conferences, researcher stayovers, interpretive forest trail construction, civic group meetings, training sessions, dignitary visits, and even a few rentals are among the variety of uses. The Center has been widely complimented and is functioning extremely well. Below is a summary of some of the happenings at the Science Center within the past year.

At our January Lake Science Retreat, the formation of the Maine Lake Research and Protection Collaborative came together as an action plan for lake protection bringing together agencies, organizations, and researchers from throughout the state and New England. The Collaborative contains distinct tasks in the categories of lake science, communications, education, economics, and policy. With funding assistance from the Anonymous Family Foundation, the Elmina Sewall Foundation, the Davis Conservation Foundation, a Patagonia Environmental grant, the Betterment Fund, and numerous individual donors, the work of the Collaborative has been proceeding in full-force this year.

The recreational and educational Pinehaven Trail was blazed and officially opened on science center property this past spring. The creation of the trail was accomplished with the help of a diverse group of volunteers, including a Boy Scout troop, local Rotarians and local high school students. Two scouts collaborated on their separate Eagle Scout projects to build boardwalks and establish the half-mile trailway. Thanks to the generosity of the Lambert/Maxwell family and the work of local students, the trail will soon include interpretive signage and fun activities for kids of all ages. Development of educational materials and study plots on the property are also underway. A forest study plot, which will be observed throughout the seasons, was created as part of a Forest Inventory Growth workshop conducted with Project Learning Tree. Local citizens and visitors can be seen walking the trail, which connects to abutting Pondicherry Park, on a daily basis!

We are also excited about the growing list of civic groups, agencies, and educational groups using our facility. For example, we now partner frequently with Maine Audubon to host programs like Growing Up Wild, Flying Wild, Forestry for Maine Birds, and the Wild Seed Project. We even host nature painting classes!

LEA has been fortunate to have many volunteers helping in various capacities this year: students from Stevens Brook Elementary School and KeyBank employees worked on the Center grounds for springtime clean-up, Boy Scouts built boardwalks, and Lake Region High School students constructed trail marker signs. A citizen science bathymetry project (see separate article) was partially funded with a grant from the Maine Community Foundation and implemented by summer intern, Jake Moulton, along with 18 volunteers on 9 lakes (Woods Pond, Long Lake, Moose Pond, Keyes Pond, Bear Pond, Adams Pond, Peabody Pond, Crystal Lake, and Keoka Lake) that included more than 65 volunteer hours of driving (and rowing!) boats back and forth to collect data with a depth finder.



We’re more used to acquiring data than things in the science world, but we needed to do the latter this past summer to outfit the Phil Chute Memorial Education and Research Lab. Support for the lab came from individual donors with particular help from John and Jolie Mitchell and from the Nine Wicket and Kendal and Anna Ham Foundations. With the purchase of significant lab and field testing equipment, Dr. Peierls has been collecting lake samples for future methods testing, comparing data from sondes to traditional testing methods, and developing and using a novel, flow-through platform for sonde measurements. The educational amphitheater and Heffernan Native Garden got a facelift with granite slabs for

seating donated by the Town of Bridgton from the Moose Pond Causeway and the addition of more native ornamental species during a planting workshop conducted by Lucia Terry and LEA educator, Alanna Doughty. We are honored to have a piece of Bridgton history in our front yard, and our recent workshops enabled us to share environmentally-friendly garden techniques with community members.

Supporting the well-being of people, healthy land and water, and building resilient communities are inseparable from the perspective of natural resource protection in Maine. The impact of climate change and water quality degradation could be catastrophic for Maine’s resources, citizens, and municipalities. New science, technology, education, standards, and proactive planning are needed, especially on the local level. LEA has been dedicated to supporting this work since 1970. It’s rewarding to be appreciated regularly by LEA members for our work in protecting our lakes. In turn, we truly appreciate all that the community contributes to LEA and our new Maine Lake Science Center.

Lakes with temperature sensors:	
Waterbody	Description
Back Pond	string of sensors
Hancock Pond	string of sensors
Island Pond	string of sensors
Keoka Lake	string of sensors
Keyes Pond	string of sensors
Long Lake	2 strings of sensors
McWain Pond	string of sensors
Moose Pond	3 strings of sensors
Peabody Pond	string of sensors
Sand Pond	string of sensors
Trickey Pond	string of sensors
Woods Pond	string of sensors



# Milfoil in Long Lake

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Surveys were also organized to determine the extent that milfoil had spread in Long Lake. LEA and volunteers, in collaboration with the Volunteer Lake Monitoring Program, have surveyed nearly three quarters of the lake, and only one other location was identified as containing milfoil. There were a few plants at Salmon Point Campground in Bridgton, in the early stages of infestation. These plants were easily eradicated by the Milfoil Control Team because they were small, and had not yet developed into a large patch.

LEA and the Lake Region community have learned a valuable lesson from the discovery: we must do even more to protect our lakes. Despite all our efforts, an invasive plant was able to reach a new waterbody and grow there for years without being detected. LEA manages the state-sponsored Courtesy Boat Inspection program, and inspectors are posted at public boat launches all across the state to check boats before and after they launch into a new waterway. However, we believe this new infestation in Long Lake was introduced from a privately owned boat launch. There are dozens of these sites in the area; too numerous to staff with boat inspectors.

After jointly meeting with the Towns of Bridgton, Harrison, and Naples, LEA has identified private boat launches, marinas, and campgrounds that are



at risk of becoming infested with invasive species. We are in the process of implementing a program to increase education at these sites and start annual inspections of their waterfront. This program will help prevent new infestations, and more quickly identify invasive species before they become established. Prevention and early detection are key to stopping invasive species and are important because control is difficult and expensive. For example, the work in Salmon Point to remove a few plants cost a couple of hundred dollars. Compare that to the ongoing control effort in Mast Cove which cost over \$12,000.

Thanks to a robust and timely response to the milfoil in Long Lake, we have avoided a massive infestation. Control work has removed the vast

majority of plants from Mast Cove, so the threat of spreading fragments around the lake is minimal. The Milfoil Control Team will return to the Cove next summer to remove the barriers, and remove any re-growth that may appear. The area will be continually monitored for years to prevent milfoil from re-establishing in this prime habitat. Complete eradication of a patch this large and dense is difficult, but the Control Team has high hopes for the area going forward. Hopefully this milfoil scare will continue to spur community involvement, and an annual inspection program will become established with continued, strong municipal support. It seems the lake is safe for now, but it will just be a matter of time until this type of event happens again if we don't increase inspections and awareness.

## Science Center Lab: A New Benchmark *By Ben Peierls*

Laboratory: a facility that provides controlled conditions in which scientific or technological research, experiments, and measurement may be performed (source: Wikipedia).

I imagine if I asked readers for their visions of a laboratory, I might get descriptions of rooms filled with beakers and test tubes, and maybe some scary smoke emerging from a flask heating over a Bunsen burner on the counter. While some spaces may look like that, there is not one-size-fits-all model for laboratories, especially those specific for limnology (the study of lakes and other inland waters). Last spring and summer, we created a safe and updated laboratory working space in the Maine Lake Science Center (MLSC) so we can conduct more innovative lake research and attract outside research and researchers to our service area.

When I first arrived at LEA, the MLSC had about 575 square feet of space in what used to be a garage, designated for an environmental laboratory. Other than a large sink and a 15-foot-long laminate work surface on top of cabinets and drawers, the finished space was an open canvas for my own laboratory design and plans.

The first thing was to replace the countertop with a proper lab work surface (with support from the Ham Foundation). I found a manufactured quartz

product that was durable and resistant to chemicals, water, and heat. As a side bonus, 15% of the surface material was made of recycled glass. During the process, we moved the cabinets out from the wall to accommodate a larger countertop, significantly increasing usable bench area. We also more than doubled our work surface area and increased storage capacity with the acquisition of two adjustable height, mobile tables and two mobile lab units with cabinets (thanks to the Anonymous Family Foundation). All have chemical resistant tops and the wheels mean we have great flexibility in how to arrange the space.

With support from many generous donations and foundation grants, we have populated the new bench space with several high-tech instruments. We have a refrigerated centrifuge (Anonymous Family Foundation) that can clarify or concentrate samples by spinning over 4,000 revolutions per minute. An extremely sensitive digital balance lets us weigh samples and chemicals to sub-milligram levels (a milligram is about two millionths of a pound). The stars of the bench are a fluorometer (Nine Wicket Foundation 2016) and a spectrophotometer (Nine Wicket Foundation 2017), both of which operate using properties of light interacting with samples (fluorescence and absorbance, respectively). Both will be used to measure chlorophyll (a proxy for algae), nutrients

(like phosphorus and nitrogen), organic matter, and analyses yet to be determined.

Some equipment is not on the bench, including a fume hood (Ham Foundation), a critically important and big addition to the lab space. This piece of equipment works like a giant air filter and allows us to work with volatile chemicals without exposure to hazardous vapors. A new refrigerator/freezer combination provides plenty of sample and chemical storage space. We also have a water purification system (Anonymous Family Foundation) that uses reverse osmosis and deionization to produce extremely pure water critical for many of the new analyses. This wall-mounted system also provides water suitable for glassware rinsing.

Rounding out this first phase of the lab's development, we also purchased glassware and several small lab items necessary for the basic research. There are a few items still on our wish list, which will be the focus of future grant proposals and other fundraising efforts. We are "open for business" and putting the new lab space to good use doing the "research, experiments, and measurement" that help us understand and protect the water quality of Maine's lakes. The new lab has been named in honor of LEA's founder: The Phil Chute Educational and Research Laboratory,





# Magical Transformation

By Alyson Smith

We’ve come a long way since 2013, when some LEA Board Members wanted to tear down the Flint camp and start over to build the LEA Maine Lake Science Center. The building was so aged and outdated that it was difficult to see its potential. Fortunately, due to the vision of many local craftspeople, the camp was not only saved, but was resurrected to become the special place it is today. Although on its face the MLSC is simply a log cabin with an attached ell, it has been transformed into a building that many visitors see as magical. The interior radiates a warm and welcoming beacon with its simplicity, space utilization, and beauty. The woodland setting enhances the interior with views, wildlife, and trails.

Thanks to individual donors and foundations, and the generous financial support of LEA members and numerous local business and community members who donated time, equipment, and services, the property was purchased and renovated to be an energy-efficient, multifunctional facility in harmony with its surroundings. Some support came in the form of naming opportunities:

- The Kendal C. and Anna Ham Charitable Foundation Conference Room
- The Phil Chute Memorial Educational and Research Laboratory
- The Pinehaven Trail (forest interpretive trail) – by Roy Lambert and Mary Maxwell.



- Native Plant Gardens – by Jack and Deborah Heffernan
- Granite slab seating donated by Town of Bridgton (from the Moose Pond Causeway)
- Researcher Housing Complex – by Tom and Dee Stegman

- Science Center Boardwalk Trail – by Richard and Lauren Packard

Naming opportunities are still available at the Center. Please contact Peter Lowell at 207-647-3318 or [peter@leamaine.org](mailto:peter@leamaine.org) if you are interested in sponsoring part of this amazing facility.

# Getting to the Bottom of Mapping Lake Depths

By Ben Peierls

How deep is your lake? Do you know where the deep hole is? If you know these answers, you have likely used a depth map. The Maine Department of Inland Fisheries and Wildlife (IF&W) offers depth maps online for most large lakes and ponds around the state, but many of those originate from almost 80-year-old data. Now, with support from the Maine Community Foundation, LEA is using new technology and community volunteers to help improve those maps and provide much better lake shape and volume estimates that are an important part of understanding lake water quality.



In the summer of 1938, staff from the Maine Department of Inland Fisheries and Game and the Zoology Department of the University of Maine set out to conduct a biological survey of lakes and ponds in the Sebago Lake and Saco River watersheds. This was part of a larger statewide survey effort. The scientists collected data to guide fisheries management and, in the process, created depth maps of many lakes in our area that are still in use to this day. The team used weighted hand line soundings to record depths at locations estimated from visible landmarks. They then transferred those readings by hand to lake outlines traced from USGS topographic maps.

Now, there is an easier and better way. The newest generation of fish finders with built-in GPS receivers have the ability to combine accurate location information with water depth readings. Every second, the echo sounders measure depth using sound waves bounced off the lake bottom and save the results and the GPS coordinates to memory. That data provides the foundation for detailed depth maps, often called bathymetric or hydrographic charts. In addition to producing updated depth maps, combining this new data with water temperature, oxygen, and clarity data yields:

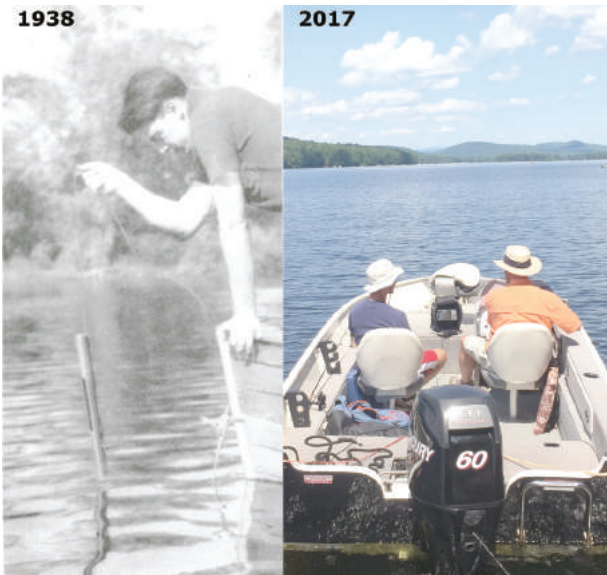
- Volume of lake water below specific dissolved oxygen thresholds;
- Area of lake bottom exposed to low-oxygen water;
- Mass of phosphorus released to lake water from sediments;
- Estimates of suitable fish habitat based on temperature and oxygen preferences;
- Estimates of plant habitat and optimal survey locations based on depth of available light.

In the summer of 2017, LEA intern Jake Moulton worked with over a dozen volunteers to collect high-resolution depth data on several lakes in our service area using a portable echo sounder. Altogether, this amazing crew visited nine lakes, with mapping complete on all but two. Each lake required many hours of surveying and yielded thousands of data points. For example, the IF&W map has 50 readings on Keoka Lake, while LEA’s survey generated over 100 times that number of data points.

For now, we are working on the software-based techniques necessary for the creation of maps and lake volume and sediment area estimates. The lakes completed last summer are Adams Pond, Bear Pond, Crystal Lake, Keoka Lake, Keyes Pond, Peabody Pond, and Woods Pond. Highland Lake was mapped back in 1999 by the Portland Water District. We intend to continue surveys in

the coming year, including the remaining areas of Long Lake and Moose Pond that will be finished next summer. Look for updates in future newsletters.

Jake Moulton and David Thomae depth mapping on Moose Pond



Depth Mapping Then and Now





## Phosphorus Controls Installed on Moose Pond and Long Lake

By Colin Holme

One of the best ways to keep our lakes clean and clear for the future is to look to the past. Properties and roads constructed decades ago rarely took water quality considerations into account. Thus, older development can account for a disproportionate amount the phosphorus entering a lake. While this is a problem, it is also an opportunity for corrective action.

Last summer, LEA worked with landowners in the Long Lake and Moose Pond watersheds to greatly reduce perennial erosion and stormwater issues at two locations near the water.

On Long Lake, a private, steeply-sloped fire lane stretching from route 117 to the water had been washing out for years. The small and narrow road is the access for several seasonal camps and one year-round resident. The upper portion of the road was old pavement and in dire need of reshaping. The bottom end was gravel and washed out severely during heavy rains.

LEA met with a representative from the road association in 2016, and drew up plans to greatly mitigate the problem. To help implement the plan, LEA offered a financial incentive through the stormwater compensation program. These funds are collected by the state on new development projects and are managed by LEA, under the oversight of the Maine Department of Environmental Protection.

In July, the group followed through with LEA’s plans and reshaped and paved a portion of the road system, dug out ditching, and installed several paved waterbars and turnouts. After several torrential rainstorms, they did further enhancements by adding one more waterbar and enlarging one that was just installed. Residents at a follow-up site visit were amazed at how well the system was working.

Another site worked on was the East Area parking lot at Shawnee Peak. Erosion at the bottom of this lot was first documented during the Moose Pond Watershed survey back in 2011. Because of the slope of the land, the size of the parking lot and the heavy winter traffic, finding a fix was no easy task. After several visits to the site with experienced local contractors and Shawnee Peak’s owner, we developed a solid plan to address the issues. A combination of reshaping and paving with the addition of waterbars, several turnouts, two sediments basins, and a new culvert was the final solution which held up well to the barrage of rainstorms that followed construction.

Both projects could not have been done without significant monetary commitment by the owners, additional financial support from the stormwater compensation fund, and thoughtful and open-minded discussion with owners and contactors.

# The Maine Lake Science Center Campaign

The campaign to create, staff and operate the Maine Lake Science Center through 2020 began early in 2014. Now, thanks to a generous pledge to match all MLSC donations into next year, the goal of \$1,450,000 is within reach, and we are turning our attention to the long-term sustainability of this remarkable facility. Over 230 families, individuals, businesses, and foundations have already contributed to make the Center possible. Within the first three years, the building was completed and fully staffed. In 2017, the Phil Chute Educational and Research Laboratory was established and the Pinehaven Forest interpretive trail was completed. Native plant gardens and a final paint job enhanced the exterior and grounds. In the last year, several long-time LEA supporters

banded together to help LEA develop a sustainability plan for the Center. That committee has since met several times and is working with an advisor and LEA staff and board members to help refine a business plan and provide input to the research agenda. The goal is to complete the Campaign in 2018 so we can turn our full attention to operations and sustainability. If you wish to make a contribution, which will be matched dollar for dollar through June 30th, 2018, you can mail a check or credit card information to LEA, specifying “MLSC Campaign.” It’s amazing to realize what your generosity has created, and it’s exciting to see how significantly the Center has advanced lake protection in Maine!

## The Value of Membership

Your LEA membership has more value than the dollar amount you give. Think of it as an investment into your own community, lake or property. As a member, you join us in our 47-year quest to keep the lakes as pristine as they ever were. Some of the programs LEA spends your membership dollars on are comprehensive water testing on 40 lakes, policy monitoring, technical assistance to landowners, and milfoil control and prevention. We employ educators who work with the local school systems to provide watershed education that gets kids outside to connect with nature. One of LEA's biggest value-adds is our public education program, which takes many forms and offers a wide range of information and local field trips, each of which connects our members to the area and to the importance of watershed protection. Some of our education events are members only, and all give members first dibs on sign ups. Do you have specific questions about your property? As a member, we will send out a technician to help you correct costly erosion issues.

When you consider all you are getting for your LEA dollars it is truly amazing. Know that you have a powerful team in your corner protecting the clean, healthy lakes of this region. Please renew your membership or join today.

*“We have been in AWE and are HUGE fans of all that LEA has done and continues to do for our precious lakes environment. Both our children have benefited from their educational camps, and in fact, our son wrote his junior high school year biology project on the effects of milfoil in Maine! The LEA helped our neighborhood clean and repair our water culverts through their college internship work crew program. We are so pleased to continue to support the LEA and all the great work they do.”*

– Long-time member from Harrison

*“You are a very unique and resourceful organization to the lakes region in Maine, and a critical resource in our efforts to preserve and maintain the quality of our lakes. I truly hope that the planned Lakes Science Center proceeds quickly, easily and with all the support you can imagine, for that would be a great reflection of the magnitude of what you are doing, and the vision to bring into being a different relationship between humanity and the natural world.”*

– Casco resident

*“LEA is much more than an organization*

YTD Members on Service Area Lakes			
Waterbody	Shorefront Lots	9/30/17*	%
Adams Pond	15	2	13%
Back Pond	34	6	18%
Bear Pond	37	12	32%
Beaver Pond	13	3	23%
Bog Pond	13	1	8%
Brandy Pond	205	53	26%
Cold Rain Pond	3	1	33%
Crooked River	752	10	1%
Crystal Lake	129	25	19%
Duck Pond	9	0	0%
Foster Pond	44	13	30%
Granger Pond	31	5	16%
Hancock Pond	169	23	14%
Highland Lake	431	133	31%
Holt Pond	3	0	0%
Island Pond	27	4	15%
Jewett Pond	22	1	5%
Keoka Lake	96	25	26%
Keyes Pond	46	13	28%
Kezar Pond	48	3	6%
Little Moose Pond	18	3	17%
Little Pond	6	1	17%
Long Lake	1102	309	28%
Long Pond	49	1	2%
McWain Pond	109	15	14%
Middle Pond/Mud Pond	39	5	13%
Moose Pond	602	96	16%
Otter Pond	10	0	0%
Papoose Pond	40	3	8%
Peabody Pond	99	23	23%
Perley/Pickerel/Lily	6	0	0%
Pleasant Pond	8	0	0%
Sand Pond	83	22	27%
Sebago Lake	1710	164	10%
Songo River	45	9	20%
Stearns Pond	66	15	23%
Trickey Pond	112	16	14%
Woods Pond	109	32	29%
Total	6340	1047	17%

\*Total current members include everyone who joined or renewed in the previous 365 days.

*attempting to preserve our lakes, which have provided our family and countless others with spirit and beauty and joy for generations. LEA represents a collective human conscience, an attempt by us as human beings to care for, respect and nurture our planet, a home which we share with life in many forms. LEA embodies our responsibility to tell the truth about the impact we have on the environment, and to take timely and effective action in response. I am confident in the integrity of those who manage this organization, and support wholeheartedly its work.”*

– Long-time supporter from Naples



# Local Students Research Forestry

By Mary Jewett

Plenty of research has been done on the importance of keeping our forested watersheds...forested. There are many ways forests benefit water quality, primarily through enhanced infiltration rates, erosion control and keeping large amounts of phosphorus from washing into the water.

Through LEA's extensive education programs, we strive to educate local students about the natural resources in the Lake Region and why clean lakes are vital to communities. In an effort to develop more forestry knowledge, we have teamed up with the Maine Forest Service and Project Learning Tree (PLT) to bring a new program to our schools. The FIG (Forest Inventory Growth) project was developed by professional foresters, University of Maine professors, and high school science teachers

as a way to study Maine forests. Students across the state use standardized methods for measuring trees and reporting their data to a communal database. Anyone with an account can visit the site and look at data from about 40 sites around the state. Last spring, LEA hosted a workshop with PLT and district forester, Shane Duigan, for teachers interested in the program. At the workshop, a permanent FIG plot was set up at the Maine Lake Science Center.

Last fall, LEA set up two one-tenth acre circular plots at Lake Region Middle School and two more at Lake Region High School. At the middle school, three teams (consisting of about 250 students) all identified and measured the same plots. This led to a serious discussion about accuracy and the importance of double-checking our work. Over a

period of three weeks, students honed their skills until all the measurements were compatible so we had a data set to upload to the site.

The other day, a student asked me "why are we doing this?" I told her that there are many jobs that require someone to take precise measurements and follow specific protocols. Many times in school the kids are given assignments that don't apply to the outside world. By exposing kids to this program, (one supported and used by many other schools and professional foresters), students learn that what they are doing is being taken seriously. These same trees will be measured each year until we can start to see changes and patterns in the forest.

Forests are the key to clean lakes because they comprise most of the land use in every watershed. If sound forestry is practiced, we can be sure of clean waters. Students in this program can learn about forest science and develop valuable work skills at the same time. Plus, they get to be outdoors!



LRMS Students Jaxson Libby and Cadence



Leigh Hayes and Teachers Measuring Tree Height

## Our New Preserve



The Highland Lake Preserve Wetland

LEA's new Highland Lake Preserve is about to join our other land holdings at Holt Pond and the Maine Lake Science Center as another magical place for fun and learning. This 325-acre gift from the Carol and David Hancock Charitable Trust offers students and visitors remarkable learning and enjoyment opportunities in its woodlands, wetlands, streams and frontage on Highland Lake. We are taking care to develop the land in a way that protects its sensitive habitats and ecosystems, in much the same way we did at Holt Pond.

Ecosystems researcher, Dr. Rick Van de Poll, will be surveying and documenting every facet of the terrain and its plant and animal inhabitants over the next 12 months. Following that, recommendations will be made for trails and amenities like access roads and parking areas. A major emphasis will be on establishing a sustainable forestry demonstration site to teach about and support forest practices that will make it economically viable for watershed landowners to keep their land undeveloped. Forests constitute the vast majority of all watershed land uses. Sound forestry may be the single biggest contributor to good water quality in Maine.

In establishing the Highland Lake Preserve, LEA has created new partnerships with industry groups like the Maine Forest Products Council, state agencies like the Maine Forest Service, conservation groups such as Maine Audubon, and educational organizations like school districts and Project Learning Tree.

## New LEA Board members

At the August annual meeting LEA welcomed four new board members to help guide our organization into the future. Businessman Frank Howell, comes to the board with the experience of running several local companies. Frank invented and patented numerous critical devices for the U.S. military, and is the owner of the Magic Lantern Movie Theater. He has been inducted into the Maine Ski Hall of Fame and has been a long-time supporter of LEA and local trails, including the Stevens Brook Trail and Pondicherry Park.

Phyllis Ginzler comes to LEA while serving her second term in the Maine House of Representatives, serving Bridgton, Denmark and Harrison. Last year she introduced a bill on behalf of LEA to help get additional revenue for milfoil control work in the state. Phyllis has an MBA in finance and spent over 20 years in the computer industry in regional, national and international sales management. She has served on the boards of Bridgton Hospital and Bridgton Community Center and has been the president of the Bridgton Hospital Guild.

Well known Bridgton Books owner Justin Ward is no stranger to LEA. He has been roped into numerous fundraisers, including playing fiddle at LEA's mid-winter Deep Freeze bluegrass concert and dance. In addition to serving as the "go-to-guy" for all of LEA's literary needs, he is an outdoor enthusiast, plays in several local sports leagues, and has served on the Landmark Human Resources Board of Directors.

Lydia Landesberg is originally from New York and starting coming to the area when her children went to camps Pinecliffe on Crystal Lake and Wigwam on Bear Pond. Since permanently moving to the area, she has been a strong advocate for her home lake, Bear Pond. This past summer she hosted an LEA meet-and-greet for Bear Pond residents and helped LEA acquire depth data for the entire pond.



# Stormwater Mapping Protects Road Systems and Lakes by Colin Holme

Simply put, road problems turn into lake problems. The roadways we rely on every day for transportation come with an environmental footprint. The extent of that footprint depends on many factors such as where, when, and how they were built, the maintenance they receive, their traffic load and of course, the weather.

This past summer, thanks to support from the Horizon Foundation, LEA took a new approach to watershed surveying. Horizon was particularly interested in assessing the impact of climate change on stormwater infrastructure. When road surfaces, shoulders and ditches fail, they cause significant pollution and repair costs. Inventorying erosion is nothing new to LEA. We have been involved in about a dozen watershed surveys over the years. These projects provide excellent information but they are somewhat cumbersome because they require a group of volunteers, a camera, a GPS and many paper forms. The new method LEA is pioneering only requires one or two surveyors and a smartphone. The best part is that data entry, compilation and analysis is all automated. Using phone mapping software, we sent our summer intern, Kayla Gray, out to document erosion problems along Bridgton’s public roads.

No matter what survey method you use, the surveyor still needs to know what to look for. Before heading out, Kayla had to learn the tools of the trade. She attended a traditional watershed survey at Hogan and Whitney Ponds in Oxford, read past watershed survey reports and familiarized herself with the Maine Gravel Road Maintenance Manual.

To acquire data, Kayla used an application called Survey123 – a product of mapping software giant, ESRI. She also created a customized form using questions from a traditional, paper-based survey. In the field, she filled out the information for each site on her phone. Photos and a GPS point were created by Survey 123 which linked and mapped all site data. Surveying involved walking road segments with a partner. Staff worked in pairs and wore reflective traffic vests for safety.

Although roads can impact the surrounding environment in many different ways, our primary concern has to do with phosphorus - the nutrient that controls algae growth in lakes. In rural Maine, it is easy to see the impact of big storms on lakes, ponds, and streams. Heavy rains can turn pristine streams brown with sediment, and all that material eventually is deposited in the lake or pond at the bottom of the watershed.

Where does all that sediment come from? A lot



results from erosion that occurs downslope from impervious surfaces. Whether paved or gravel, roads are functionally impervious. Almost all of the rain that falls on them washes away. By contrast, in a forest, the majority of rainwater is absorbed and infiltrated directly into the ground. Depending on the slope and crown of the road, stormwater can travel down the surface before eventually heading to the shoulder and ditch. If this happens, the water speeds up and accumulates, causing shoulder and ditch erosion to add material and attached nutrients to our waters.

Roads have another attribute that makes them unique from other land uses. Their ditch systems, which are necessary for drainage, catch and concentrate all the small tributary streams and surface water flows they intercept. They become large conveyance systems for stormwater. Unfortunately, their banks are regularly disturbed from shoulder erosion, plowing, stray vehicles and, more recently, the occurrence of frequent large storm events.

The idea for this project came initially from a meeting with Bridgton Public Works Director, Jim Kidder. It is his job to monitor the condition of all town roads and to maintain them. Jim was looking for a low cost way to monitor and document road conditions and attributes. LEA suggested using an intern to travel and inventory Bridgton’s roads.

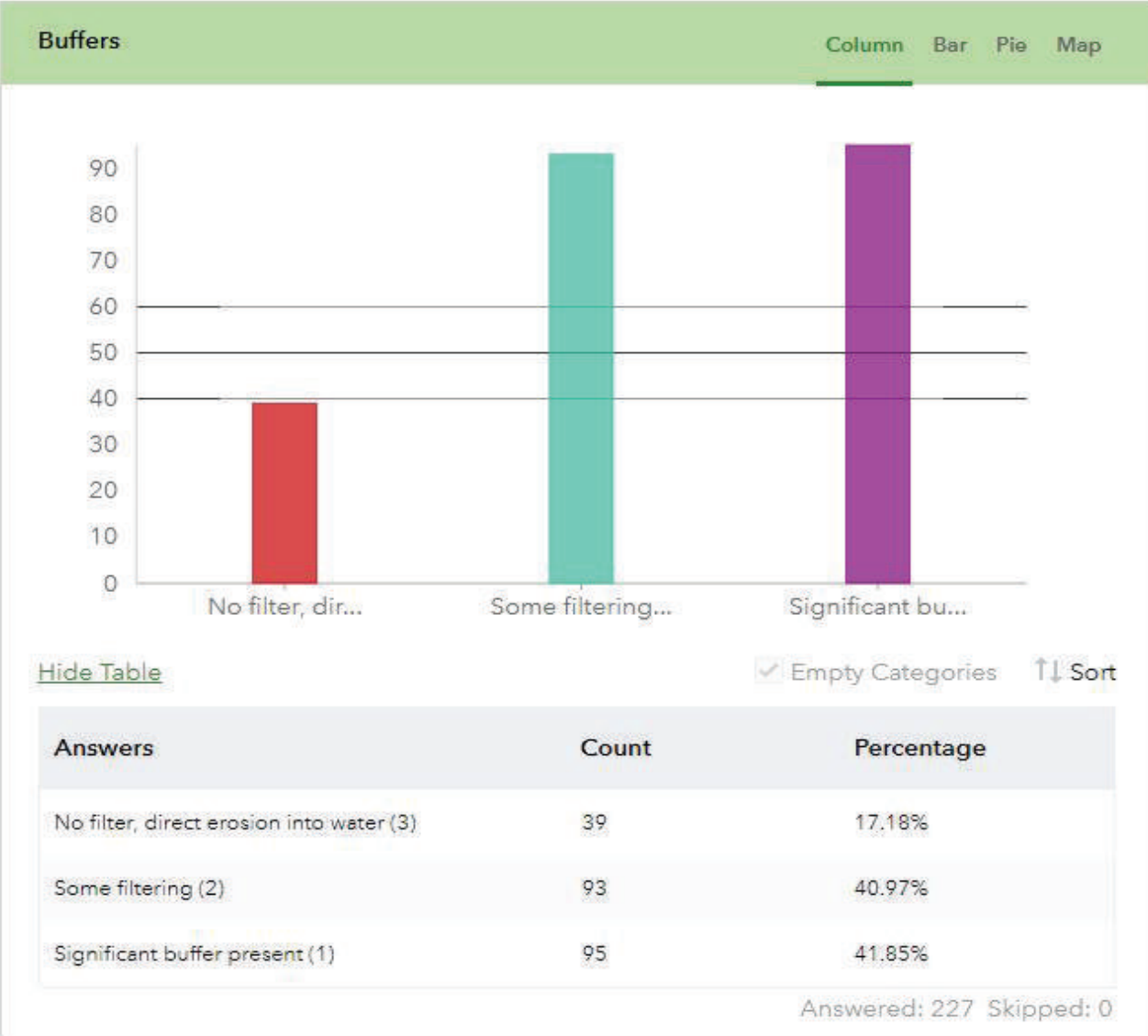
Working with the Public Works Director from the onset of the project was helpful in fleshing out how the final product could be used and what type of additions to the inventory would make the survey more useful. One of the things we noticed in working in Bridgton is just how quickly conditions change. The tremendous rains associated with the July tornadoes had some amazingly damaging effects on all surrounding infrastructure. Public roads were hard hit, giving us a chance to check some of our earlier field work. What was most interesting and encouraging was how quickly sites were continually being addressed and fixed by Bridgton’s road crew. With over 80 miles of road to maintain, that is no small feat. This is good news for Bridgton residents (and lake lovers), but



surrounding towns with smaller crews or no highway department face even greater challenges.

LEA intends to continue surveying to add to and update the project’s initial 227 erosion sites, most of which were road shoulder and culvert issues. Unfortunately, these systems are often sandy and easily erodible. Culverts are another common issue when they back up or clog during storms, forcing stormwater to overtop the road and cause substantial washouts. This happened in several locations this summer during the torrential July storm. One finding from the survey was that the vast majority of culverts were 12 inches in diameter or less. These small pipes can clog easily and may be undersized for today’s storms. The majority of culverts with issues were also metal, indicating they are older than the plastic ones now more commonly used. Another interesting finding was that sediment and stormwater from 82% of the sites surveyed passed through some level of natural buffering before entering a waterbody. This pre-treatment probably significantly reduced water quality impact and infrastructure damage.

This new method of surveying has huge potential in the environmental and public works fields. The functionality of a live, searchable map and an accessible database make the product very user-friendly. Automatically updated analysis of all survey elements was a great added bonus. LEA will be developing a detailed handbook on the whole project so other towns can replicate the process. The handbook should be available by next summer.

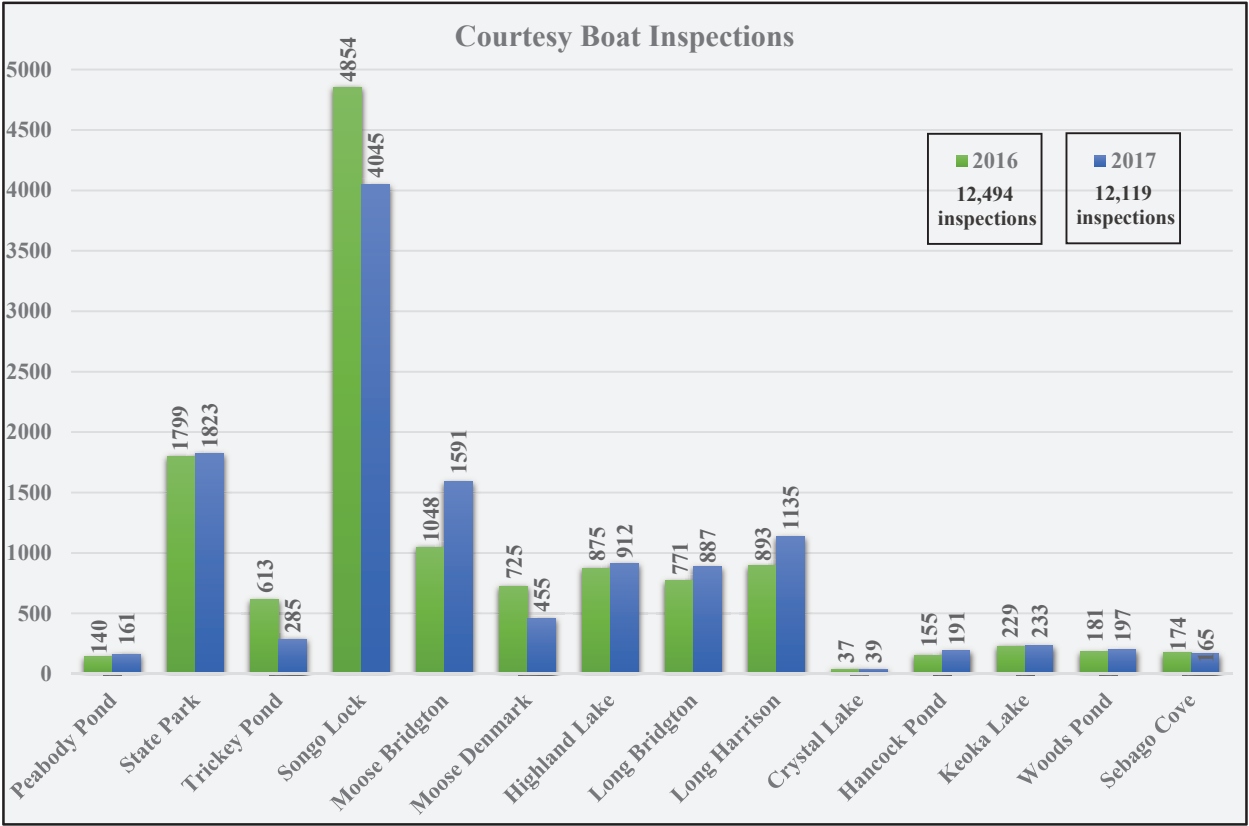




# Highlights from the Boat Inspection Season

Thanks to town, state and public support, LEA was able to hire a great team of Courtesy Boat Inspectors in 2017. This year, we institutionalized several new policies to acquire more data on boating conditions and launch use and continued to work with new and seasoned inspectors to ensure watercraft are thoroughly checked. LEA is constantly trying to improve the program to ensure boater interaction with inspectors is positive and awareness and cooperation about invasives grow. Strangely, despite a beautiful summer, our inspection numbers were lower than last year. However, the CBI season was still extremely valuable and productive. We found several fragments of variable leaf milfoil at the Sebago State Park landing but nothing on trailers or boats. We had one “save” at the Songo Lock where milfoil was found on a prop. The boater was very grateful to us for finding it. At the launch on Sebago Cove, six fragments of milfoil were removed during 165 inspections. That amounts to about 4% of the total inspections conducted. While that number seems small, if we still had that level of infestation at the State Park it would translate to about 90 fragments. Every year our plant control crew returns to survey and hand pull plants at the State Park launch area. We continue to do this work to avoid reverting back to when that area was badly infested.

Toward the end of the season, veteran inspector, Becky Smith, was speaking with an angler at the Bridgton launch on Long Lake and he mentioned an infestation of milfoil he had seen just down the lake from the launch. Armed with these details, LEA staff members went to local campgrounds south of the launch and discovered several serious infestations (see Milfoil in Long Lake article ). Becky’s thorough inspections and prompt notification to LEA serve as a reminder that if you are attentive and see a suspicious plant, you should report it immediately.



## What’s Happening in the Education World at LEA?

Did you ever wonder why we offer fewer events in the fall? Our educators are back in the classroom working with students from Lake Region and Harrison schools. We work with teachers to develop lessons and units that fit with the Next Generation Science Standards the State of Maine has adopted, and we work to get kids outside and connected with the natural world. We teach them about lakes and wetlands, about where they live, about Maine animals and adaptations, about what’s happening with our climate, and lots more. LEA

has two educators who reach over 1,000 students each year from kindergarten to high school. This shifts our public education focus to the back burner as we gain our footing each new school year.

Not to fear! We will hold events throughout the winter! The best ways to find out about what’s going on are through your email, by visiting our website ([mainelakes.org](http://mainelakes.org)), or by checking out our Facebook page. Don’t worry about being bombarded with notices in your inbox. We usually

only reach out twice a month. If you have an idea of something we should offer, I always love to hear from you: [alanna@leamaine.org](mailto:alanna@leamaine.org).

*“Every year, we always have great educators from LEA. This year was no exception. The program you run offers such a special opportunity for science to come alive for our local kids. I can’t thank you and your educators enough for all you guys do to enhance our science education.”*

- Teacher, Stevens Brook Elementary School, Bridgton





# LakeSmart and Clean Lake Check Up *Christian Oren*

This past summer was the second year of implementing a new initiative called LakeSmart to protect water quality in this area. If you have heard about this program and wonder what LakeSmart is, or how it differs from LEA's Clean Lake Check Up, here is the answer.

The *Clean Lake Check Up* (CLCU) program has been an integral part of LEA for over twenty five years. The program provides technical assistance to shorefront landowners through property consultations with LEA staff. Staff combine environmental knowledge and permitting expertise to create recommendations for the landowner that will improve water quality. Most suggestions alleviate erosion, but staff also provide expertise on land usage such as adding or removing vegetation, zoning ordinance interpretation, or altering the landscape and structures. LEA also works with municipalities and developers to ensure new projects are conducted with best practices to protect water quality.

LakeSmart is a relatively new program managed

on a statewide level by the Maine Lakes Society. It was originally modeled after LEA's *Clean Lake Check Up*; with the same intention of improving water quality. However, over time, it has evolved to have its own unique signature and improving landowner knowledge about waterfront activities and land uses have become central to the evaluation. LakeSmart uses public recognition of good land practices as an incentive for landowners to participate. Unlike the CLCU, it uses volunteers in place of staff to visit properties. LakeSmart volunteers evaluate driveways, structures, septic systems, land usage and buffers with a rubric that scores the impact of the overall property to the adjacent waterbody. If runoff and septic systems are well managed, they are declared "LakeSmart" and the landowners receive an award sign to display. If the property has aspects that may be impacting water quality, then volunteers make recommendations on how to make things better, giving the landowner an incentive to improve and eventually become "LakeSmart".

These two programs are very similar, and they both protect Maine lakes. *Clean Lake Check Ups*

are a more specific program that usually addresses more complex issues. For example, a member might call because their beach is eroding. LEA staff will make recommendations to alleviate erosion, install native plants, or go over any required permits. LakeSmart is a broader program that looks at the entire property, and can make general recommendations to lessen any potential impact on the water. LakeSmart is free to anyone, while *Clean Lake Check Ups* are free to LEA members, and start at \$50 to non-members. One of the advantages of LakeSmart is that it is prepackaged and marketable. It can be easily adopted anywhere in the state and takes little financial commitment because it is led by volunteers. Unfortunately, LakeSmart is only available on certain lakes that have dedicated volunteers. In LEA's service area those include: Woods Pond, Moose Pond, Highland Lake, Keyes Pond, Long Lake, Sand Pond, and Long Pond. Hopefully this range will expand as the program grows and more people become involved. If you would like to get either type of evaluation or would like to become involved in this region's LakeSmart program, please call LEA at 647-8580.

## 15 Families and 2 Youth Camps Receive LakeSmart Awards

The Lakes Environmental Association is pleased to announce the 2017 recipients of LakeSmart Awards in the Lake Region. LEA thanks each of these individuals and owners for helping to ensure that the beautiful lakes and ponds of this area stay pristine for generations to come.

### Woods Pond:

Dates and Lauren Fryberger, Daniel and Lura Lentz, Joe Sczurko, The Frances R. Stern Family Trust, Heather and Jim Raftice, Jill and George Haines, Camp Kingswood (JCCs of Greater Boston and Eric Bloomberg), Camp Wildwood (Louis Kail, Ted Friedman and Glen "Bear" Zaidman)

### Highland Lake:

Ron Forman, Peter and June Folger, Robert and Sunny Feeley, Peter and Paula Lowell, Bill and Jean Preis

**Moose Pond:** Mark and Suzanne Patterson

**Long Lake:** Tom and Cynthia Jones



**Keyes Pond:** The Shane and Knight Families

**Peabody Pond:** Mercier-Doody Trust and Robert Mercier

**Long Pond:** Philip and Susan Cullen

LakeSmart is a voluntary, educational and non-regulatory program that helps lakeshore owners improve the lake-friendliness of their property. On request, a no cost evaluation of the property is made by trained volunteers. Volunteers identify lake-friendly practices present like buffer vegetation along the waterfront and driveway water diversion and make suggestions for other conservation practices. Following each evaluation, a written report is provided. Reports contain recommendations and are reviewed by LEA staff.

Properties which are particularly lake-friendly receive the LakeSmart Award, with signs for display at the shore and at the driveway. For more information about the program, contact Colin Holme at LEA (647-8580 or colin@leamaine.org).

## Interns, Volunteers, and CBIs Wanted

It's that time of year again! LEA is seeking applications for a number of summer internship/seasonal positions for 2018. We plan to hire three water testing interns, two full-time and one part-time. We are also looking for Courtesy Boat Inspectors (CBIs).

### WATER TESTING INTERNS:

Our water testing season runs from May through September. Interns will spend about half their time in the field, canoeing and boating on the 40+ lakes in our service area collecting water quality data. This data includes secchi disk clarity readings, integrated core samples, and temperature and oxygen profiles. Interns will also collect samples and data for numerous ongoing research projects. The other half of the time, interns will be running samples in our lab, entering data, and helping other staff with various projects as needed. Interns report to LEA's Staff Researcher.

The ideal candidate will be a college student or mature high school student with a demonstrated interest in environmental science or a related field. A basic understanding of scientific principles is

required and enrollment in a science-related degree program is an advantage. Previous experience with outdoor work, lakes, boating, and canoeing is also recommended. A driver's license and access to a reliable vehicle are necessary for these positions. LEA provides mileage reimbursement.

Two full-time positions are available (40 hours per week, Monday-Friday, 8 am – 4:30 pm) and one part time position (16-20 hours per week, negotiable hours but ideally Tuesday and Wednesday, 8 am – 4:30 pm). These positions may be used for college credit where applicable. Preference will be given to candidates who can work for the majority of the May-September season, although we understand that school schedules often prevent interns from working for the whole summer.

Interested? Please email Amanda Pratt at amanda@leamaine.org and include a resume and cover letter. Hiring decisions are typically made by March and positions are filled quickly, so apply early!

### COURTESY BOAT INSPECTORS:

We are seeking individuals with strong work ethic



2017 Intern Kayla Gray and Volunteer Chloe Wendler on Moose Pond

and communication skills to act as the first defense against the spread of invasive aquatic plants like milfoil. You must be comfortable approaching boaters and able to perform a complete inspection, including crouching down to look under boats. Hours range from 15-40 hours per week. Priority will be given to individuals who are able to work weekends and holidays. For more information or to apply email mary@leamaine.org or visit our website.



# Paddle Battle!

Calm waters, abundant sunshine and an amazing location helped make the state's first inland paddleboard benefit race on July 1st a huge success. Forty-seven paddlers and their families came down to beautiful Tarry-A-While Resort on the east side of Highland Lake for racing, lots of raffle items and delicious food. Here is what a few of the participants had to say about the race: "Wonderful event!" "Venue was ideal!", "Well organized!" Donors and sponsors Sports Haus, Tarry-A-While, Sun Sports+, Henry's Concrete, Merrill Lynch, Shawnee Peak, Bridgton Books, Keds, Hayes True Value, Patagonia, and Portland Water District helped draw in contestants and make the benefit topnotch. If you missed it last summer, be sure to mark your calendars for next year's race on July 7th!

## "Summer Kids Days" Sneak Peek

We wanted to give you a little primer of what's in store for next summer at LEA and the Maine Lake Science Center. LEA is planning an outdoor day activity group that will meet regularly throughout the summer. The details still need hammering out, but we do know that this will offer your kids a window into the natural world: forests, lakes and wetlands, and lots of time to explore the woods around the Center. Interested in learning more? Please contact [alanna@leamaine.org](mailto:alanna@leamaine.org) with questions and suggestions, and look for an official announcement this winter. We are very excited about this new offering!



Maine Lakes Open Champions



The Home Stretch

## What Makes LEA Unique by Peter Lowell

Fundraisers always stress the importance of developing an "elevator speech" which is to be deployed if there is an opportunity to seek recognition from a potential supporter with very little time available. Describing LEA in an elevator speech is a real challenge because of the organization's many dimensions and long history, but the overarching theme is uniqueness.

Our uniqueness comes primarily from the fact that LEA covers all elements of lake protection extraordinarily well even with limited resources. When we visited groups at Lake Tahoe as part of our research for the Maine Lake Science Center Campaign, they were astonished at how much we accomplished with a relatively small staff and budget. Everything from school education to Milfoil programs, water testing, technical assistance to landowners and towns, research, policy, recreation, land preservation and advocacy are done well in the context of a holistic body of work.

Innovation is another hallmark. See the listing of "LEA's 40 Top Accomplishments, on page 16" for insight into the changes and projects that have resulted. Risk taking was an element of many of these. From early law suits against the state, towns and developers to making the decision to establish the Maine Lake Science Center, LEA has had the gumption and support to step into uncharted, even controversial territory.

Uniqueness has been enhanced by diverse and strong collaborations, especially in the past few years. All of this work has been possible thanks to a large, generous and loyal membership team which has stood behind us through bad financial times, challenges, and controversies. The LEA staff and Board of Directors is particularly grateful for our members who have empowered us to be unique, not wavering in their support.

# Tribute to Gerry Haviland

Gerry Haviland was a dynamo of energy, inspiration and action. He was a transformative force for any group or cause lucky enough to attract his interest. The Naples Public Library and the Lakes Environmental Association channeled Gerry's skills to create impressive new facilities. His determination and sacrifices in time and money were accompanied by a generous dose of humor and understanding. Gerry designed and presented Peter Lowell the "Feathered Whip Award" for his work on LEA's new headquarters building, but the truth is that he himself was the gentle, patient, skilled leader who volunteered his engineering

skills to make sure the project was a success. Gerry served as President of the Board of LEA from 1992-1996.

Behind Gerry was a far more powerful life force...Jane. It was clear to everyone who knew the Havilands that she was his co-conspirator and must have fueled, promoted and supported his ventures. Together, they were agents of change who left their communities with lasting legacies. The LEA family was lucky to have known Gerry and Jane as wonderful human beings and tenacious supporters of all they believed in. Gerry passed away in the fall of 2017, pre-deceased by Jane.

## Ways to Keep in Touch With LEA

There are many ways for you to contact 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 teaching the wonders of our watersheds by liking us on Facebook and following us on Instagram (@lakesenvironmental).

Don't forget to check our [mainelakes.org](http://mainelakes.org) web site for the latest water testing results on your favorite lake. You will also find our latest 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 at 207-647-8580 if you have any questions or need any help.



## No-Cost Ways to Support LEA

If you are looking for a unique way to give to LEA? Stop at your local TD Bank and ask about the Infinity Program. Here's how it works: If you have an existing checking account

TD Bank will donate \$10 to LEA. For opening a new checking account TD Bank will donate \$50 to LEA. For a new or existing savings account TD Bank will donate a percentage of the average balance to LEA. This all happens at no cost to you! Simply give them the LEA code: AF307

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





# Driveway Sealants Pose Threat to Lakes

By Amanda Pratt

“PAH” is one of those dreaded 3-letter initialisms that the average person is vaguely aware of, but probably couldn’t easily define. Much like PCB, CFC, and BPA, it is an environmental concern. But what exactly is it?

The term “polycyclic aromatic hydrocarbon” (PAH) applies to a large number of organic molecules that are formed naturally during combustion or heating of carbon-based compounds. One well-known PAH is naphthalene, which is the active ingredient in moth balls that gives them their strong scent. PAHs aren’t plastics or synthetic chemicals created in a lab. However, they still pose a health risk to humans and wildlife and are therefore important to be aware of. This group of chemicals is ubiquitous within the environment and our lives. While they do have a short lifetime, especially in water (most evaporate or decompose readily), certain sources are persistent and can contribute PAHs over long periods of time.

PAHs are concerning because several of them are toxic, especially to sensitive aquatic life. Some are also known or suspected human carcinogens. They can be formed naturally by fungi, plants, and bacteria. However, most of the PAHs in the environment come from fossil fuels and their by-products.

One particular source of PAHs is much more potent than any other: coal tar. Coal tar is a thick sludge produced as a by-product of coal processing, and is a known human carcinogen. It is often used as the main ingredient in sealcoat, which is used on driveways and parking lots to protect and visually improve these surfaces. Asphalt-based alternatives to coal tar sealcoat are available and contain literally 1/1000th of the amount of toxic PAHs found in coal tar products. However, in the eastern U.S., coal tar based sealcoat is much more common.

A concentration of just 23 parts per million of PAHs is enough to cause harm to macroinvertebrates and other aquatic life. Coal tar based sealcoat often contains thousands of parts per million of PAHs, hundreds or even thousands of times more than

other common sources such as engine exhaust, used motor oil, or non-sealcoated pavement. The huge contribution of PAHs by coal tar based sealcoat was discovered only recently, by researchers in Austin, Texas in 2003.

PAHs from freshly laid coal tar sealcoat enter the environment when they are washed off by rainfall. This can introduce enough PAHs to the aquatic environment to damage or kill wildlife. In urban areas, where sealcoat is more commonly used, storm drains often lead from parking lots and roads directly into streams, where PAHs can accumulate in sediments. Sealcoated driveways around lakes are a potent source of PAHs, especially because they are often close to the water. Sunlight can also magnify the toxic effects of PAHs, so shallow streams and shallow areas around lakes (where light penetration is greatest, and where concentrations of PAHs are likely to be higher) are especially at risk.

While PAH levels from sealcoated pavement do decrease over time, the concentrations are so high to begin with that even weathered sealcoat gives off dangerously high PAH levels. Anyone who is familiar with sealcoating knows it wears off fairly quickly and usually has to be redone every few years. Weathering causes fine particles of sealcoat dust to be released, which can be scattered by the wind onto nearby soils and waters, or washed away by rain. Thus, sealcoated pavement becomes a persistent source of PAHs in the environment.

Studies by the USGS and others have found that between 50-90% of PAHs in urban streams, lakes, and stormwater ponds can be traced back to coal tar based sealcoat. Nationwide, PAH levels are increasing, and the USGS found that sealcoat use was a main contributor to increased PAH levels detected in several lakes. Urban PAH levels are much lower in the western U.S. compared to the rest of the country because the western states use predominantly asphalt-based sealcoat.

PAH concentrations in the sediments of streams that drain sealcoated parking lots, and even in the soils that surround these lots, have been so high in some



Paved Unsealed Parking Lot (left) and Shiny Sealcoated Pavement (right)

places that special hazardous waste disposal measures have been required. This is a concern in urban areas with stormwater control basins that need to be dredged regularly, since special disposal is very expensive. This problem, and increased awareness of the damage to aquatic life and human health hazards, have resulted in coal tar based sealcoat being banned in two states (Washington and Minnesota) and several counties and municipalities.

PAH levels have not been measured in the Lakes Region to our knowledge. We would expect levels to be relatively low because of the lack of significant urban development. However, we urge you to think twice before sealcoating your driveway, both for your health and the health of the environment. Consider using an alternative product, such as asphalt-based sealcoating. Avoid any products that list variations on “tar” or “coal tar” (e.g., “refined tar”) on the product’s MSDS form or on the container. And, be sure to question commercial applicators about alternatives.

## Citizen Science in the Lake Region

by Alyson Smith

Participation in citizen science projects is on the rise. Here are two ways to get in on the action:

- Ice phenology is the study of freezing and thawing cycles of lake and river ice. We are looking to expand our database of freeze and thaw dates for lakes in our service area. If your lake has not already frozen when you read this, please send us your “ice-in” date. The freeze date (ice-on or ice-in) is defined as the first date on which the water body was observed to be completely ice covered, and the breakup date (ice-off or ice-out) is the date of the last breakup observed before the spring open water phase. Ice-in occurs when the lake is completely or nearly completely covered with ice. We will consider “ice-out” to be when you can navigate unimpeded from one end of the water body to the other. There may still be ice in coves or along the shoreline in some areas, but when a person can traverse the entire water body without being stopped by ice floes, we consider the ice to be out.

Historical observations were made for different reasons such as religious, cultural, practical (the need for transportation over ice or open water), or out of curiosity. Today, scientists are recognizing the importance of knowing how long lakes are under ice cover. Please send your observations to Amanda

Pratt: [amanda@leamaine.org](mailto:amanda@leamaine.org). Include your name, the lake, town, and date of ice-in and/or ice-out.

- Help track cyanobacteria (blue green algae) blooms using your smartphone. [cyanos.org/bloomwatch](http://cyanos.org/bloomwatch)

Are you seeing a normally-clear lake that has suddenly turned the color of pea soup or a blue-green paint spill? It may be a bloom of cyanobacteria, which has the potential to produce toxins that affect humans, pets, and our ecosystems. Join citizen scientists from around the world to record the occurrence of these blooms locally! While few lakes in our area have had documented cyanobacteria blooms, they may be occurring in coves with restricted water flow and blooms can also be short lived. This new phone applications lets you catch and easily document these occurrences. Because it is a nationwide program, you can document these water quality issues anywhere you travel. This fall, LEA encouraged Environmental Protection Agency (EPA) staff to enhance the app by allowing users to document “control” lakes where there is no bloom occurring. This simple addition will greatly broaden the database and show the spatial extent of the applications use. Interested in finding out more? In the spring of 2018, LEA will be hosting an EPA workshop on different tools (including this application) for citizens to monitor algae on their home waterbody.



Please contact Alyson Smith: 207-647-3318 or [alyson@leamaine.org](mailto:alyson@leamaine.org), if you would like to find out more about this hands-on workshop.





# LEA's 40 Key Accomplishments

1. 1970\* - Water quality testing begins

2. 1972 - Phosphorus bans enacted in Bridgton and Naples

3. 1972\* - Holt Pond Preserve established

4. 1973 - LEA hires Peter Lowell as Executive Director

5. 1977\* - Bridgton Sewer System on line with LEA assistance

6. 1977\* - Stevens Brook Trail built

7. 1978\* - LEA trains volunteer lake testers

8. 1979-1981 - Law suits filed against two developments

9. 1980\* - LEA intervenes to strengthen DEP enforcement

10. 1982\* - Moose Pond Land Fund established to purchase public lands

11. 1986 - Department of Energy High Level Nuclear Waste Dump fight

12. 1987 - Long Lake Watershed Study completed for DEP

13. 1987\* - Salmon Point Park established with LEA leadership

14. 1988\* - Model Shoreland Zoning regulations adopted in several towns

15. 1988\* - Lake testing internships start

16. 1991\* - Clean Lake Check-Ups begin.

17. 1992\* - Watershed Education Program begins

18. 1993\* 6th Grade "Hey You" Cruises start on Songo River Queen

19. 1995 - 25th Anniversary Campaign funds endowment and lake center

20. 1996\* - Lake Center built in downtown Bridgton
21. 1997\* - Watershed restoration projects begin

22. 1999\* - Courtesy Boat Inspections pioneered by LEA

23. 1999\* - Phosphorus Hot Spots mapping developed

24. 2000\* - Maine Milfoil Summit established by LEA

25. 2001\* - Milfoil Bill enacted with strong LEA leadership

26. 2004\* - Brandy—Songo River—Sebago Lake Milfoil clean - up begins

27. 2005\* - GIS shoreland zoning maps provided for area towns

28. 2006\* - Pondicherry Park project initiated by LEA

29. 2009 - Maine Milfoil Initiative funded with Senator Susan Collin's help

30. 2010\* - Development Compliance Study begins in 3 towns

31. 2010\* - Maine Lake Leaders group established

32. 2011\* - Stormwater Compensation Fund watershed projects begin

33. 2011\* - Wash Stations constructed (eventually 5 lakes)

34. 2012\* - Advanced lake testing begins

35. 2014\* - GLEON remote-sensing buoy program starts

36. 2014\* - Maine Lake Science Center campaign

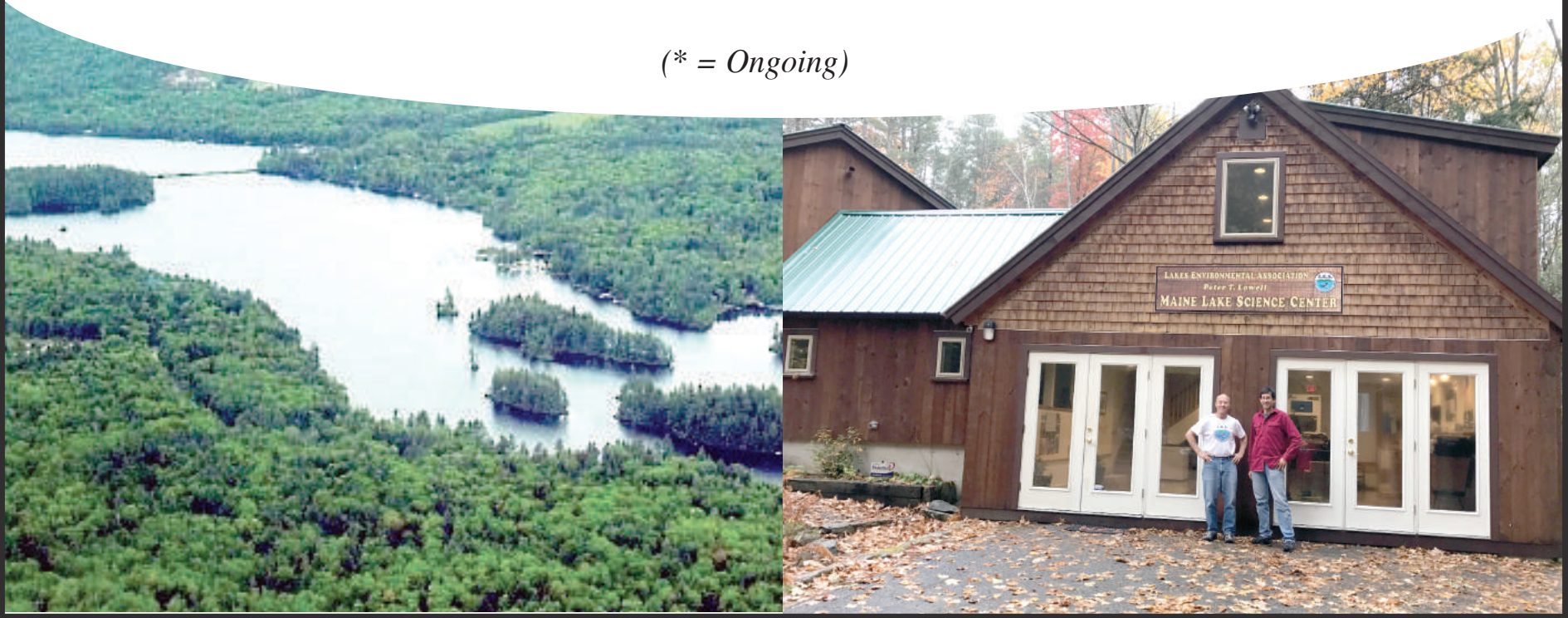
37. 2015\* - DEP/NADP acid rain and mercury station operated by LEA

38. 2016\* - Hancock Foundation donates Highland Lake Preserve

39. 2016\* - Sebago Lake Watershed Project

40. 2017 - Dr. Ben Peierls hired as Science Center Research Director

(\* = Ongoing)



## LEA Members Keep Us Going

*Are you an LEA member? Please join in the effort to protect our lakes*

Name: \_\_\_\_\_ Email: \_\_\_\_\_

Winter Address: \_\_\_\_\_

Summer Address: \_\_\_\_\_

☐ Check enclosed

☐ Charge my credit card \$ \_\_\_\_\_

☐ Visa

☐ Master Card

Exp. Date \_\_\_\_\_

Account #: \_\_\_\_\_

Gift Levels:

☐ \$1000 Benefactor

☐ \$500 Patron

☐ \$250 Sponsor

☐ \$100 Lake Steward

☐ \$75 Family

☐ \$50 Individual

☐ Any other amount \$ \_\_\_\_\_

I'd like to make an additional donation to the:

☐ Intern Fund \$ \_\_\_\_\_

☐ Milfoil Fund \$ \_\_\_\_\_

☐ Environmental Education Fund \$ \_\_\_\_\_

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](http://www.mainelakes.org)