Protecting the Lake Region

Despite the challenges, this season quickly became one of the most successful in the crew's history. In Sebago Cove alone, 20% of the area was brought under control. LEA 230 Main Street Bridgton, Maine 04009 (Change Service Requested)

See page 2

Winter 2017 Free **LIEA Lake News**

New Environmental Studies Program at LRHS! By Alyson Smith and Alanna Doughty

After several years of development, an environmental studies course has been expanded at Lake Region High School. The overall goal of the Natural Science with LEA Program is to extend environmental education learning opportunities for Lake Region students within their own environment and beyond, providing them the inspiration, education and experiences to understand and advocate for clean lakes as environmental stewards. In collaboration with LRHS science teacher, Joe Dorner, LEA is working to develop and implement an environmental education program that engages students in active learning about their local watersheds. This learning includes exploration of lakes, rivers, wetlands, and forested ecosystems - understanding how they all relate and how they are affected by pollution, climate and people. Additionally, a leadership component will be incorporated to train the high school students to help educate younger students during after-school programming, including a spring event for district elementary students, and potential summer programming. *Continued on Page 3*



LEA's New Preserve

In July of 2016, the David and Carol Hancock Charitable Trust gifted 325 acres of land on Highland Lake to the Lakes Environmental Association. Executive Director, Peter Lowell, called the land "a superb addition to LEA's conservation, education and recreation lands." This generous gift will assure protection of a significant portion of Highland Lake's watershed and will provide researchers with a rich variety of study sites for a wide range of work.

Dr. Rick Van de Poll, an ecosystem management consultant who spoke at LEA's annual meeting, noted that "the Hancock land on Highland Lake contains a regionally significant wetland complex that includes an extensive beaver marsh, lowland spruce-fir forest, vernal pools, a pocket swamp, and a nearly pristine sub-watershed above the lake. Wildlife species abound, especially beaver, mink, otter, and moose.

Continued on Page 4

Lakes Hold Their Own in 2016

The prolonged drought that engulfed the Lake Region was likely the driving force behind this past summer's better than average water quality. The lack of precipitation caused water levels to drop lower than we've seen in years and the absence of rain meant the usual nutrients and sediments that wash into our lakes stayed put in the watershed.

Our three most telling water quality assessments all showed 2016 was a good year. Secchi disk readings were deeper than average on almost 70% of the lakes in the area. Deeper Secchi readings mean you can see down further into the lake, which is definitely a good thing! This also means there is less algae in the lake. But we have a more direct way of measuring algae through chlorophyll concentrations. These were also lower on a whopping 80% of our lakes! Not surprisingly, phosphorus, the nutrient that feeds algae, was lower than average on 72% of the 40 lakes LEA tests. While it was dry, it was still unusual to have so many lakes showing better than average results. Over the winter, we will be looking at similar drought years to compare overall water quality. The last major drought in 1999 threw off water quality trends by spiking clarity (for the better) and lowering nutrient and algae concentrations in waters across the state.

We can't control the weather, but this dry spell shows the difference we can make by infiltrating our stormwater. Even in rural, primarily forested areas like ours, development along the lake shore and tributary streams causes excess sediment and nutrients to enter the water. This happens when roads, road shoulders, driveways, paths or man-made ditches erode during rain events. To prevent this from occurring, we all have to be diligent about how we maintain our own land and how towns conduct public works projects.

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The Maine Lake Science Center – Big News

By Alyson Smith and Peter Lowell

What does a science center need? Researchers – that's what! We are thrilled that our Maine Lake Science Center Research Director, who will facilitate





a host of research projects in the Lake Region and beyond, has been appointed. After a nation-wide search, LEA found Dr. Benjamin L. Peierls.

Dr. Peierls has been actively involved in aquatic ecosystem research for almost thirty years, including studies on lakes, large rivers, and estuaries. His focus has been on phytoplankton and microbial ecology and general water quality issues such as eutrophication (the process by which a body of water becomes enriched in dissolved nutrients like phosphorus that stimulate the growth of algae and depletion of dissolved oxygen). He is skilled in a range of chemical and biological techniques, field measurement instrumentation and long-term data management and analyses.

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LEA's Courtesy Boat Inspection Program – Big Numbers for 2016

LEA partnered with seven organizations this summer to help staff 14 boat launches around the Lake Region. Partners allow us to cover more sites by providing the financial and administrative support which is essential for the program. LEA would like to thank them for their tireless fundraising efforts which add an extra layer of protection for all of our lakes. They are the Hancock-Sand Ponds Association, Keoka Lake Association, Moose Pond Association, Peabody Pond Association, Sebago Pines Property Owners Trickey Pond Environmental Association. Protection Association, and the Woods Pond Water Quality Association.

The unusually dry weather had mixed impacts on our inspection numbers. The chart shows some launches had higher numbers than last year while some were lower. The Songo Lock was consistently busy but other launches were affected by heavy drought by the end of the season. A couple of launches were nearly unusable by the end of August which dropped their inspection numbers. This was a complaint heard from many boaters around the state. Despite the drought, the weather was remarkably good for boating and our inspection numbers skyrocketed by 144% to 12,494!

Incidents of invasive plant intercepts at our launches have dropped dramatically in recent years. Of the 871 plant fragments taken from boats and trailers last summer, only 18 were identified as invasive milfoil. Most of those were found at Sebago Cove which tallied 12 plants removed from boats and trailers. We found two invaders at the Sebago Lake State Park, three at the Songo Lock and one at Long Lake in Bridgton. Considering we had boats from a dozen different infested New England lakes traveling through the Lock, the number of invasive plants found is surprisingly low. Increased boater awareness and more inspections probably contributed significantly to the decrease in numbers of plants. Of course the hard work of LEA's Milfoil Control Team is a primary reason we have so few fragments at the Songo River and State Park sites.

LEA had trouble filling open CBI shifts at the end of the season. Every summer we lose valuable employees in mid to late August when students start school. To mitigate this situation for 2017, LEA is hoping to hire a larger pool of inspectors to help fill all shifts. Please see the job description on the next page if you are interested.

Probably the best news from last summer was an

increase in the inspection program at Sebago Cove. With the help of a DEP grant and the cooperation of the Sebago Pines Property Owners Association, LEA was able to have more paid inspector staff on Sebago Cove. That launch is a regional "hotspot" for intercepting plants. That honor used to belong to the Park and Lock sites. In 2016, we had some great Sebago Cove inspectors and willing boaters which led to the 12 confirmed "saves" out of 174 total inspections performed. Statistically 7% of the boats leaving the Cove were carrying invasive plants, each of which represents a potential infestation prevented at the next lake visited.



LEA's Milfoil Control Team Protects the Lake Region By Christian Oren

This past summer the Milfoil Control Team was busy protecting the gains made in Brandy Pond and the Songo River, and they expanded territory to include Sebago Lake. This broader focus will provide even better protection for all lakes in the region. On the "big lake", they cleaned marinas at Frye Island and Pickerel Cove in Windham, but the major concentration was on the heavily infested Sebago Cove in Naples. This responsibility more than doubled our territory and posed new challenges for the Team. Sebago Cove was unfamiliar to the crew, and its infestations are spread over many acres of water. To properly tackle this problem, we hired crew members and acquired new equipment, including two new boats.

Despite the challenges, this season quickly became one of the most successful in the crew's history. In Sebago Cove alone, 20% of the area was brought under control. After a recent tour, John McPhedran of the Maine Department of Environmental Protection, said "The systematic approach by LEA's crew should result in a native plant habitat in their wake." One major problem remains in Sebago: funding. With the increase in territory comes an increasing budget, but donations from Sebago Cove and Sebago Lake are not covering costs. And, this year we had to become OSHA compliant. The cost of training, equipment and staff to accomplish this added over \$15,000 to the funds we needed to raise. More donations are required to continue mitigation efforts at the current pace in 2017.

Despite moving into Sebago Lake, the Milfoil Control Team needed to spend time on the Songo River and Brandy Pond. These areas require constant maintenance to prevent the milfoil from taking over again. Monthly surveys revealed renegade plants re-growing or coming upstream from Sebago. This work required significantly less effort in 2016, which allowed the crew to spend more time in Sebago.

The Milfoil Control Team is always on the lookout for new infestations. Invasive species are much like a disease: they are easier to treat if you catch them early. This year we were fortunate to be able to conduct surveys for invasive species in surrounding waterbodies. We did а comprehensive search of the southern shore of Long Lake - always at risk from the amount of boat traffic from the Songo River and Sebago Lake. A resident of southern Long Lake pulled sizeable strands of milfoil off his beach near the causeway, heightening our concern.

We also conducted a few targeted surveys sponsored by lake associations on Moose Pond, Peabody Pond, and McWain Pond. Fortunately, all areas were free of invasives. If you are interested in a survey of your lake, contact your lake association or LEA.



Invasive species like milfoil pose a serious risk to delicate aquatic ecosystems, and they negatively impact our enjoyment of these resources and our substantial property investment. LEA's Milfoil Control Team is hard at work protecting these resources, and repairing the damage done to those areas already infested. The numerous lakes and hundreds of square miles of water within the Lake Region pose a serious challenge, but year after year the Milfoil Control Team proves itself capable of the task.

significant reduction in invasive milfoil throughout the cove in coming years, leaving



Page 2 Like us on Facebook and follow us on Instagram (@lakesenvironmental)!

Courtesy Boat Inspector Job Opening

We are seeking individuals with a strong work ethic 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.

Praise for LEA education

"Students look forward to going outside to learn about science with our marvelous LEA leader! She has been an inspiration to all of us and has fostered our love of nature. Students have learned to be respectful of nature, to notice details of their environment and take care of it. Students have adopted trees which they are observing during the different seasons. Tree journals show pictures of the trees including details about bark and needles, maps to the trees, life cycles, and evidence of animals. This has been a wonderful educational opportunity." (Kathy Harmon, SAD#61 elementary school teacher) "Our LEA educator comes with a wealth of knowledge about the outdoors, recognizing treasures in nature that others, including me, would bypass. She has instilled a curiosity in my students that goes beyond the surface. Their respect, enjoyment, and concern for their natural environment grows each time we take a trail walk. I am pretty certain I have learned just as much as my students since our LEA partnership began." (Chris Bennett, SAD #61 kindergarten teacher)

"LEA inspires me to take my students outside more often. When class is outside, student engagement and retention are through the roof!" (Jessie Toohey, SAD#61 high school teacher)

New Environmental Studies Program at LRHS!

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LEA educator, Alanna Doughty, and Joe Dorner co-teach the ecology-based course targeting 10th-12th graders, meeting every other day for 70 minutes and going on field trips. In September, students traveled to Lisbon to tour an organic working aquaponics farm (an efficient and sustainable form of agriculture in which plants and fish work together for their mutual benefit), tying in understanding of sustainable agriculture, water conservation, and working farms. Students returned to design their own hydroponics projects in the classroom and are collecting data each class on plant growth and maturation and will use their vegetables in a recipe to share with the class.

Students ventured outdoors with Shane Duigan, Maine District Forester, to learn about native trees around the school and researched and built their own plant presses with the technology teacher, Mr. Hilton. They are working on identifying, pressing and mounting 15-20 native tree species and exploring effects of climate change and invasive species on native trees. Students use field guides and field notebooks to collect data, ask questions and make connections. As they finish their herbarium collections they will learn about how forested ecosystems affect water, as opposed to urban or rural areas, and why forests are so important in watersheds.

LEA's researcher, Amanda Pratt, is teaching an algae lab in which students will identify various algae types and make connections to water quality. Students will conduct informal and formal water tests using macroinvertebrate stream bugs to determine water quality, plan for a springtime elementary grade water and ecosystem field day at the high school, and enter teams in the Maine Envirothon and SeaPerch competitions.

LEA hopes to facilitate positive change by implementing the course. By learning about local ecosystems and building relationships within the region with groups like the water district and town planning boards, students will acquire tools to be future environmental stewards in their communities. The Lake Region community depends on the health of its natural resources and youth educated in science, technology, engineering, arts and math (STEAM) will be its leaders of tomorrow.

Note: This program has been funded, in part, by a grant from the TD Charitable Foundation. You can increase your financial support for LEA through TD Bank's Affinity program (see box in this newsletter for more details).



Students Study Macroinvertibrates (stream bugs)

Highland Lake – LEA's Testing Ground

For several years, Highland Lake has been the focus of new research and technologies. While many LEA lakes have also received extra attention, those of you on other lakes may still be wondering when your turn will come. To go beyond the basic water quality monitoring on any lake, extra support from landowners, lake associations or foundations is necessary. The routine testing LEA performs on forty lakes is significantly more intensive than 95% of Maine lakes outside our service area receive. But it is costly and we do not have the funds in our operating budget to expand that work. Folks on Highland Lake have contributed to provide for a wash station, and sophisticated watershed hydrology analysis. An anonymous family foundation and landowners on Highland raised funds to deploy a GLEON buoy with an on-board weather station.





The Lake Region has lost an icon and a remarkably interesting and dynamic community member. Sonny Berman was one of a kind – an accomplished attorney and civic leader. One of Sonny's passions was Long Lake and this led him to a leadership role in the establishment of LEA. He was the last surviving founder of the Association. He was a volunteer water tester for many years and was one of our staunchest and most loyal supporters. It's especially hard to imagine the causeway without Sonny patrolling the waterfront and keeping an eye on his beloved lake. We are thankful to his wife Pat for the loving care that sustained Sonny for so long.

The following resolution was adopted by the LEA Board of Directors: Whereas C. Martin "Sonny" Berman was instrumental in the formation of the Lakes Environmental Association, and Whereas Sonny served diligently as a founding Director of the Association, and Whereas Sonny remained an enthusiastic and generous supporter of the Association over the decades, now Therefore we, the Directors and Staff of the Association do honor and recognize his lifelong dedication to the Lake Region and its lakes.

LEA's long-term plan is to continually expand full testing and research to all of our lakes. Work on Highland Lake has provided a great template for accomplishing this. LEA established lake advisory committees on Highland Lake, Bear Pond and Crystal Lake in 2016 to facilitate and support added programs. Committees will be established on more lakes that do not have their own associations in 2017. Lake associations on the Five Kezars, Hancock-Sand Ponds, Island Pond, Keoka Lake, Keyes Pond, McWain Pond, Moose Pond, Peabody Pond, Trickey Pond and Woods Pond have been instrumental in expanding testing on their lakes over the past few years. More data will be needed to fully understand each lake's tipping point in order to provide adequate long-term protection, so expanded testing must be emphasized and supported.

LEA Gifts for the Holidays

Be sure to visit our headquarters on Main Street to check out the LEA merchandise. We have t-shirts, hooded sweatshirts, coffee mugs, shopping bags and a new line of hats. These items make great holiday gifts to the lake lovers in your life. Show your support for LEA and take care of your gift shopping all at once! Visa and Master Card are accepted.

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Water is most dense at 4 C or 39 F

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Exceptional hard mast areas are supplying bear, turkey, and deer with much of their winter fat reserve needs. The critical marsh and shrub habitat currently supports regionally rare breeding birds such as American bittern, black duck, and Canada warbler. Water quality remediation and flood storage functions are among the highest values of this property immediately above one of the most fragile lakes in the region." Dr. Van de Poll worked for LEA on the Holt Pond Ecosystem Study in 2002, so his perspective is particularly valuable as someone who knows LEA and its conservation lands well.

The gift will enhance the work of LEA's Maine Lake Science Center in its efforts to define water quality threats and study how watershed land uses affect lake health. LEA hopes to use the land as a sustainable forestry demonstration site and will engage Van de Poll to conduct an extensive ecosystem analysis before establishing trails or amenities.



Northern End of the Lake

LEA's New Preserve Spring dedication for Adam Perron Trail

Adam Perron spent many summers working on the various trail projects for LEA. His work in Pondicherry Park and on the Stevens Brook Trail was wonderful, but the place closest to his heart was Holt Pond. There, trails wind through extensive riparian corridors and boardwalks snake over unique wetland ecosystems normally nearly impossible to access. The Holt Pond trails were also ones Adam frequented as a visitor. Right next to the Preserve is where his wife, Elizabeth, grew up and where they lived as a young couple in a house built by her father. Adam knew these trails well and his gratitude for the Preserve was evident in the work he did to maintain them.

In appreciation of Adam's tenure at LEA, commitment to the community and his affinity for the unspoiled beauty of Holt Pond, LEA is naming the most popular portion of the trail system around the pond in memory and honor of him. Following a morning of cleaning up the trail segment that runs from Chaplin's Mill Road to the Holt Pond board

The Phil Chute **Teaching Laboratory**

When Phil Chute founded LEA in 1970, he recognized that "a clean and safe environment would require our concern for as long as we live". Forty-seven years later, those words ring loud and clear. We're dangerously close to significant environmental and economic damage. The unusual thing about Phil Chute was that as a land developer and businessman, he realized our waters were in danger and made the effort to do something about it.

In recognition of Phil's instrumental role in creating LEA and recruiting Peter Lowell as Executive Director, the teaching laboratory at the Maine Lake Science Center is being named in his memory. Contributions to honor this remarkable man can be sent to the Phil Chute Fund at LEA. In this way, his legacy of caring and taking action lives on.

Stevens Brook Trail Revitalized

With help from Bridgton's Gilroy Family Foundation, the Stevens Brook Trail has received a much-needed facelift. The trail was established by LEA in 1977 when raw sewage from over 120 sources was flowing in Stevens Brook and everyone had turned their backs on the natural beauty of the waterway. LEA assisted the Town of Bridgton in creating a sewer system that same year. Landowners were asked for permission to create the trail and there was universal support. LEA itself owns a parcel near the Smith Mill. The brook drains Highland Lake and becomes a legally-defined river where Willett Brook merges near the Community Center. In Maine, a river is defined as draining 25 square miles of land or more.



walk, a dedication and naming ceremony will be held to honor Adam and keep his memory alive. The ceremony will be in mid June with the exact date to be announced. If you are interested in helping out or attending, please contact Colin Holme at colin@leamaine.org or call LEA at (207) 647-8580.



Wielding a chainsaw, Adam Perron was with interns Daniel Bishop and Roo Atchinson on the Stevens Brook Trail. Photo by Jesse L. Cottingham

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Board of Directors

Orrin Shane - President Roy Lambert - Vice President Lori Thomae – Secretary

Ryan Curtis, who donated most of his summer in 2015 to restoring the Holt Pond trail system, led the effort on Stevens Brook. Hikers can now fully enjoy the nearly two mile trek between Highland Lake and Long Lake with its numerous mill sites and natural beauty. The trail crosses the Pondicherry Park trail right at the Bob Dunning Bridge and is reached via the spiral stairway. LEA Milfoil Control Team members joined Ryan one day to help realign a heavy section of boardwalk and relocate a snapping turtle who was living under the walkway. Ryan has done more to improve LEA's trails than is imaginable. We thank him and salute his dedication.

Julie McQueen - Treasurer

Steve Collins • Brian Cushing David Ehrman • Matt Frank Henry Hudson III • Dan Richards Drew Sanborn • Tom Stockwell Karla Swanson-Murphy • John Willson Leigh Hayes • Anne Wold Anne Butter • Peter Whitchurch

Honorary Directors

Ray Caplan, Tom Rosen Hubert Caplan, Stan Cohen

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Most Maine soils are naturally high in phosphorus

Lakes Hold Their Own in 2016

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It often costs more up front to do it right, but this expense is recouped by reduced maintenance costs. Ignoring regular maintenance is a fast track to expensive fixes for our basic infrastructure and causes unintentional but totally preventable harm to our lakes.

This summer was dry and our lakes benefited, but we cannot expect this same trend every year. Locally, we have seen an increase in big storms from our monitoring at the National Atmospheric Deposition acid rain site that LEA operates in Bridgton. The 2014 National Climate Assessment solidified these findings by showing that there has been a 71% increase in the amount of precipitation falling in very heavy events in New England. While all areas in the continental United States showed increases in these big storms, the northeast has been hit the hardest. Knowing this, hopefully we can all take action to make sure our waters stay clean and clear every year to protect the values that lakes provide to our citizens and economy.

2016 clarity, phosphorus and chlorophyll concentrations in LEA lakes



33% Change (%) This National Climate Assessment map shows percent increases in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events) from 1958 to 2012 for each region of the United

A Short Lesson on Algae By Amanda Pratt

States. These trends are larger than natural variations for the Northeast, Midwest, Puerto Rico, Southwest, Great Plains and Alaska.

Say the word "algae" and most people have a

negative reaction: they conjure up images of slimy rocks, smelly, pea-soup colored water, and closed beaches. While all of these scenarios can be the result of excess algae growth, the real cause of algae blooms is often human impact. When you realize how important algae are to life on earth, and how beautiful and varied they are in all their shapes and designs, I hope you will gain a new appreciation for them.

All lakes (in fact, all waters) contain algae. Cyanobacteria, the algae often to blame for water quality problems in lakes with high nutrient levels, are descended from the first complex cells. These early photosynthetic bacteria are responsible for creating our oxygenated atmosphere over a billion years ago. Algae (mainly in our oceans) also produce about 70% of the atmosphere's oxygen every year (although trees usually get the credit!).

The group of organisms called "algae" are very diverse, and not all algae are closely related. The one

No matter their origin, algae are the foundation of the aquatic food web, filling the same role that plants do in terrestrial habitats. Without algae there would be no fish or indeed much other life in our lakes, rivers, and oceans. Algae use sunlight and nutrients present in the water (most notably nitrogen and phosphorus) to grow. They are eaten by tiny zooplankton (microscopic animals) that are eaten by small fish, which in turn are eaten by larger fish. Therefore, algae are essential to a well-functioning lake ecosystem.

Knowing the amount of algae in a lake is essential to understanding and managing it. Most lake managers, including LEA, use chlorophyll-a (the green pigment common in all algae) as a way to measure algae concentrations. While this provides a convenient and comparable number with which to monitor algae populations, it leaves out a lot of useful information like diversity of species.

This is why LEA began its algae monitoring program in 2015. This program is an effort to count and identify algae from area lakes once a month from May to September. Monthly sampling allows us to see seasonal changes and patterns in algae populations. Identifying and counting the algae to

genus level (one step above species) allows us to pinpoint the most common types and get an idea of the distribution of algae in each lake.

This sort of information can be used to determine general lake water quality status, climate, seasonal flux, nutrient availability, and can be an early warning sign of water quality problems. For an element that has such a huge impact on lake water quality, algae are often neglected, only becoming important when a bloom occurs. One reason for this is the time and knowledge it takes to assess algae populations. Samples can take two to three hours each to be analyzed under a microscope, and the analyst needs to have a good understanding of algae taxonomy (identification).

With funding from an anonymous family foundation, the LEA membership annual appeal and local lake associations, LEA was able to expand Staff Researcher hours to accommodate algae analysis. After a couple of years of self-teaching, I went to Michigan in July of 2016 to attend a week-long algae taxonomy and ecology course at PhycoTech, Inc. with algae expert Ann St. Amand. The Norcross Foundation, The Kendal C. and Anna Ham Charitable Foundation and an anonymous family foundation provided funds for microscopes, settling chambers, and other essential equipment.



common trait they share is their ability to perform photosynthesis, the process of using sunlight and carbon dioxide to produce oxygen. Most algae are considered to be plants by scientists, with groups such as Charophyta even sharing a common ancestor with terrestrial plants. The cyanobacteria, as previously mentioned, are genetically more closely related to bacteria than plants.





The results of our algae studies show that our lake algae populations are consistent with Northern latitude, low-to-moderate nutrient systems. There are several common algae types, however they often occur at very different concentrations from lake to lake. These differences occur for a variety of reasons. A greater understanding of the causes and consequences of the differences is a key goal of LEA's algae monitoring program. Sudden changes in normal algae dynamics can be a sign of pending water quality problems and something we will be watching for with this new program.

LEA's education programs are based on experiential, hands-on learning Page 5

Amazing Buoy Technology Now On Long Lake

New Long Lake Buoy – LEA began fundraising in earnest for a GLEON (Global Lake Ecology Observation Network) remote sensing buoy to be installed in the north end of Long Lake after receiving a generous donation in memory of former board member Joe Wikler. A month later, the project got another boost when an anonymous family foundation contributed almost half the total cost of this expensive but cutting-edge piece of equipment. After these two major donations got the ball rolling, we decided to design and order the device immediately to get it in the water before the 2016 season ended.

Within a month we received the buoy, and after doing some in-house customization, it was launched just north of Bluff Point on August 19th. This new buoy is outfitted with temperature and oxygen sensors every other meter from the surface down to 30 feet. Ideally we would like to have three more of these sensors to see live oxygen and temperature stratification through the entire water column. This configuration would be similar to the Highland Lake buoy which has been extremely useful in understanding that lake's structure as it changes over the seasons and responds to individual weather events. Perhaps the most interesting part of the Long Lake buoy is its three chlorophyll sensors located at different depths in the upper, sunlit waters of the lake. This monitoring method was encouraged by lake scientists to allow us, for the first time, to look at algae concentrations in three dimensions. Until now, our chlorophyll data has all come from taking



Temperature, Oxygen and Chlorophyll sensors on the new Long Lake buoy

composite samples in the warm upper waters. Sampling this way is cost-effective but the state lab takes a month or more to give results and only one reading comes back. There is no way to determine where in the water column the peak algae population is occurring. The three chlorophyll sensors on the Long buoy will give us this information continually and virtually instantaneously. Algae population information is a key to understanding a lake's condition.

The Long Lake buoy campaign started out very strong, but additional funding has not come in with the same gusto we saw on Highland Lake. As we improve on the buoy's instrumentation and more people become aware of the benefits it will provide for enhancing our understanding of Long Lake, we hope new donations will allow LEA to fully outfit and maintain the buoy. If you are interested in helping, call LEA or send a check made out to LEA with "Long Lake Buoy" in the memo section. The goal is to raise \$15,000 by spring.

After its third year of deployment and with a new on-board weather station, the Highland Lake Buoy again provided needed insights into lake ecology. Temperature and oxygen sensors in a chain from the top of the lake to the bottom are coupled with a chlorophyll sensor just below the surface to show the effects of temperature stratification and mixing on algae concentrations. This configuration also gives a detailed picture of oxygen conditions throughout the open water season, which plays an important role in the ecology of the lake and nutrient cycling. Thanks to buoy technology, we were also able to see a unique event this past spring. After an extended period of strong winds in early June, the lake's stratification broke down. This allowed oxygen to be replenished by wind mixing in the deep waters, averting a long stratification period which would have caused severe oxygen depletion in the bottom half of the lake. Prior to this event, Highland was already showing signs of oxygen depletion due to an early stratification caused by a record breaking ice-out in mid March. This same event also pushed warmer surface waters to the bottom and thus elevated deep water temperatures. As the summer progressed, the bottom waters cooled off again indicating a significant source of cold water is coming in from seeps or springs.

Because of their complexity, size and set-up demands, deploying and maintaining these two buoys is challenging and sometimes difficult. Luckily LEA has had help from Great Northern Docks who designed and donated a custom built buoy maintenance boat for us. This pontoon based platform with a utility crane has become an invaluable resource for the LEA Buoy Team. We have also been lucky to receive deployment help from Seth Merriam at Great Northern Docks and Bill Masterson on Highland Lake.

If we are to fully understand lake tipping points, the rich data provided by buoys is essential since lakes nearing dangerous thresholds can exhibit sudden and dramatic changes. Observations from LEA's two automated buoys can give insights applicable to many waterbodies in the area and over time we hope to outfit more lakes with real-time monitoring systems.

Temperature buoys - This year, Peabody Pond joined the ranks of lakes with full arrays of temperature sensors throughout their water columns. These relatively inexpensive, but extremely useful sensors are now used in eleven lakes in LEA's service area. These buoys document seasonal stratification and mixing events and provide a lake temperature "fingerprint" for the year. Readings are taken by each sensor every 15 minutes and are stored internally. This type of long-duration and intensive data is needed to accurately assess long-term deep water oxygen trends and help diagnose the cause of algae growth or blooms. The funds to purchase the sensor string came directly from Peabody Pond Association members who have been long and active supporters of LEA.



Lakes with 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	strings of sensors
Sand Pond	string of sensors
Trickey Pond	string of sensors
Woods Pond	string of sensors



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8% of Maine lakes are oligotrophic (low in nutrients and productivity)

The Maine Lake Science Center – Big News By Alyson Smith and Peter Lowell

Continued from page 1

experience with His networking and communicating science to academic researchers, state agency staff, and a range of students and educators was particularly important to LEA's recruiting team. According to Peierls, he "always thought an ideal career would be to run a field research institution and facilitate ecosystem research." With his Ph.D. in Marine Sciences from the University of North Carolina at Chapel Hill, he was most recently a Research Associate, postdoctoral research at the continuing University's Institute of Marine Sciences.

According to Peter Lowell, LEA Executive Director, "The appointment of Dr. Peierls will significantly advance lake and freshwater research in Maine and will expedite the steps that need to be taken in order to protect them." LEA President, Orrin Shane, noted that "Ben brings to LEA expertise in lake science and experience in directing research in a major aquatic research center. His skills and experience nicely complement LEA's premier lake monitoring program. He will provide leadership for our research program to understand lake tipping points and to help develop a robust Lake Vulnerability Index to identify Maine's most fragile lakes."

Ben had the following comments on his new role: "I look forward to helping guide research development at the MLSC and making the Center a significant player in lake science, protection, and sustainability in the region and state. The first project I will tackle is the improvement of laboratory facilities. This is a critical need that will allow staff and visiting researchers to conduct a range of biological and chemical analyses on site. This will include the development of a laboratory safety plan and acquisition of safety equipment. Another project is to enhance the number and type of field measurements of lake conditions, for instance water color and indicators of algal bloom biomass and species. Support for some of these enhancements is included in a proposal made to the National Science Foundation. Part of what drives laboratory development will depend on research needs. My other primary goal, therefore, will be to work with the MLSC Lake Science Advisory Board and regional researchers to identify and prioritize the scientific research questions most critical to the health and protection of lakes. Some information is available from past researcher retreats at the Center and another retreat is planned for early 2017.

I always thought my ideal job would be to run a biological field station, since I love to do research in aquatic sciences, and I thoroughly enjoy interacting with other scientists and students to learn about and facilitate their own scientific endeavors. Now, with my new role as Research Director, I will be able to help make the MLSC an important resource for LEA and for academic, state, and citizen researchers working to understand and safeguard some of Maine's most important natural resources."

The Maine Lake Science Center Tipping Points Campaign

In 2013, LEA committed itself to establishing the first facility in New England specifically devoted to lake studies. This decision was preceded by several years of research on the state of the art in lake science and included visits to lake groups around the country. A Lake Science Advisory Board was assembled to direct research priorities in several disciplines that had a bearing on lake protection: limnology (the study of lakes), economics, policy and best management practices and the social sciences.

The Maine Lake Science Center Campaign was begun with strategic help from Bill Stockwell, a fundraiser, long-time LEA member and resident of Keoka Lake. The Campaign was entitled "The Tipping Point Campaign" because the chief purpose for the Center is to identify lakes on the edge of dramatic decline in time to prevent ecological and economic tragedy.

The Tipping Point Campaign seeks to raise \$1,300,000 to purchase and complete the Center itself and to operate and staff it through 2020. A Lake Science Center Sustainability Board has been created to oversee financial stability after the Campaign ends. A lead gift from an anonymous family foundation allowed us to purchase the 18-acre campus abutting Pondicherry Park and begin construction well ahead of schedule.

LEA's original goal was to have the Center up and running for its 50th Anniversary in 2020, but with the hiring of a Research Director and construction completed, that has now happened years ahead of schedule. This is particularly good news for Maine lakes. There is an increasing sense among scientists that time is running out for many of the state's most fragile lakes and our understanding of tipping points and initiatives to better protect all lakes need immediate attention.

You can help put the Maine Lake Science Center on solid financial footing and give our lakes the resources they need to avert disaster. Foundation and donor support brought us to the \$1,000,000 mark in 2016. Another \$300,000 must be raised to complete the Campaign. LEA asks you to consider a generous gift that can be paid over as many as four years. Visit our web site at www.mainelakes.org, email us at lakes@leamaine.org or call 207-647-8580 for information or to make a gift. To date, grants have been received from the following foundations and several more requests are under consideration: An Anonymous Family Foundation, The Betterment Fund, Davis Conservation Foundation, Fields Pond Foundation, Kendall and Anna Ham Foundation, Jack and Deborah Daw Heffernan Family Foundation, Stephen and Tabitha King Foundation, Carl M. Lindberg Family Foundation, Margaret Burnham Charitable Trust, Morton Kelly Charitable Trust, Nine Wicket Foundation, Norcross Wildlife Foundation, Patagonia Foundation, Strauss Foundation, TD Bank Charitable Foundation.



The Tipping Point Strategy – Protecting the Future of Maine's Lakes

LEA's work over 45 years led us to conclude that Maine lakes are degrading because of continued watershed development and decline is being accelerated by climate change. Research on "tipping points", best management practices for stormwater control and remediation of problem sites must be addressed in a timely manner to avert significant damage to the freshwater resources and the economic base of Maine towns. We define "tipping point" as the point at which a lake experiences frequent algae blooms. Lakes that have reached this threshold typically exhibit severe oxygen depletion and loss of high-value fisheries.

The Tipping Point Strategy is an action plan with specific, defined tasks that should be accomplished in order to gather the scientific and economic impact

information needed to support policy and behavior change. Other categories of work include research on how to encourage knowledge-to-action and develop specific policy recommendations like shoreland zoning improvements. The Strategy includes more than 36 specific tasks and as many partners from conservation groups, state agencies, businesses and academic institutions.

All Maine lakes and other waters will benefit from a broad-based and comprehensive approach to identifying tipping points and assuring that science-based policies are implemented before further damage is done. There is a robust and multi-disciplinary community of academic researchers, state and federal agency staff and non-government organizations that are being brought together in a working partnership as a powerful force for change. LEA, through the Maine Lake Science Center, is advancing the Strategy by partnering with the leaders of Maine's regional lake associations, known as the Lake Leaders. The plan has been submitted to several foundations for funding consideration. This is the main thrust of the work for LEA and the Maine Lake Science Center going forward, and it is a race against time.

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As lake water clarity decreases so do property values

Are you Lake Smart?

Have you ever wondered how your land affects the lake? Are you helping to keep the lake clean and clear for your children? Are there aspects of your property that could be changed to make your footprint on the landscape less intensive? Do you think you are doing all the right things but are not really sure? Maybe it is time for a LakeSmart evaluation!

LakeSmart is a free non-regulatory program in which waterfront landowners ask for a property assessment of how their land is affecting the lake and downstream water quality. The evaluation includes a thorough review of the developed portions of the property, the quality and extent of vegetation, stormwater patterns and wastewater disposal. The appraisal is done by a team of trained volunteers and a final written report is reviewed by LEA staff and provided to the property owner.

The process is designed to fully involve the landowner in the evaluation so the experience is both instructive and educational. The purpose, of course, is to make each property more lake-friendly by promoting best practices for eliminating runoff into the lake.

If a property is particularly lake-friendly, it qualifies for a LakeSmart Award. Two signs are provided to confirm the owner is "living lightly on the land for the sake of the lake." Display of these signs on the shore and at the end of a driveway publicizes the program and encourages lake-friendly practices for others.

LakeSmart was originally developed at the Maine Department of Environmental Protection with input from LEA and was based partially on our Clean Lake Check-Up Program. After it was defunded several years ago, the Maine Lakes Society took on the program to ensure its continuation on a statewide scale. Because of its popularity, particularly on lakes with active associations, LEA teamed up with the Society to expand the program. In our area, a team of LakeSmart volunteers actively promotes LakeSmart on Highland Lake and Woods Pond. They also evaluate properties on other area lakes by request. In the first year with LEA, the volunteers completed 20 property assessments and 15 families or individuals received awards.

LEA is very excited about this new program and the potential it has to reach out to lakefront property owners. If you are interested in LakeSmart or having your property evaluated, please email LEA's Colin Holme at colin@leamaine.org.

Water Testing Interns Wanted!

Every summer, LEA hires two or three motivated, responsible students to join our team as water testing interns. Ideal candidates are anywhere from high school seniors to recent college graduates with a demonstrated interest in environmental science or a related field. We have been lucky enough to have many of our interns return for several summers.

A typical day consists of water testing on the area's beautiful lakes in the morning and lab work and data entry in the afternoon. Interns are trained in sample collection and lab analyses, which include clarity measurements, recording oxygen and temperature data and using a core tube to collect water samples which are analyzed for pH, color, conductivity, alkalinity, chlorophyll, algae, and phosphorus. They also assist with LEA's advanced testing program by collecting plankton, taking electronic chlorophyll readings with a fluorometer and helping with buoy maintenance. Interns may also find themselves doing trail work, garden maintenance, taking lake photo inventory pictures, or providing assistance to LEA staff on a variety of other projects. Interns work under LEA's Staff Researcher and Assistant Director. Important qualities we look for are self-reliance, attention to detail, independence, maturity, and dedication. Previous experience with outdoor work, lakes, boating, and canoeing is a plus. A basic understanding of scientific principles is required and enrollment in a science-related degree program is an advantage. A driver's license and reliable vehicle are needed. We compensate for mileage.

Student interns work 40 hours per week Monday -Friday, although a part-time schedule may be negotiated. The positions are paid and run from May to September, but we can accommodate school schedules within reason. Internships count toward college requirements in some schools. If you or someone you know might be interested, email Colin Holme at colin@leamaine.org with any questions. You should email a resume and letter of interest giving a little background about yourself. Hiring decisions are made in late winter or early spring.



Mainelakes.org Gets a Facelift

This spring LEA embarked on a total website redesign. It had been several years since the site's last facelift and it was time for an overhaul to incorporate recent changes in our organization and to increase the overall compatibility of the site. With a whole new look, the updated site has a simplified interface so users can more easily focus on important messages or events. The front page is now less "crowded" but all content from the old site is still available, as well as updated information. Regular viewers will notice there is a new section dedicated to the Maine Lake Science Center, and we are now streaming live data from the Highland Lake buoy. Another goal of the update was to make the site mobile phone friendly so content can be easily viewed on the go. Online contributors will also notice that the donation process is has been simplified and streamlined. LEA used Webfix Studios of Portland for the upgrade.

Check us out at the new www.mainelakes.org and let us know what you think!

Show your LEA Colors

Show your friends and neighbors you are an LEA supporter! When you give at the Lake Sponsor level (\$100) in 2016, you will receive a snazzy sign that can be attached to your dock or home. Help us encourage LEA membership by displaying your sign! Investing in LEA as a member is investing in the water quality of your lake. Your dues provide water testing, milfoil control and environmental education as we work to keep Maine's lakes pristine for future generations. In 2015, we added advanced testing, algae monitoring, and won the milfoil battle in the Songo River. Thank you to all members for funding all we have accomplished! If your annual membership has lapsed, please consider renewing.

Also, be sure to visit our headquarters on Main Street to check out our new LEA merchandise. We have t-shirts, hooded sweatshirts, coffee mugs, and a new line of hats for summer 2016. If you are a summer resident or are just visiting, take home a reminder of "the way life should be" as you support your favorite lake. LEA items also make a great gift for the lake lover. Visa and Master Card are accepted.



New LEA Member Dock Sign

Page 8 Aluminum treatments to control phosphorus cost \$600-1000 per acre

Why Build Community Partnerships?

By Alanna Doughty

Sometimes we like to pretend that things are not connected, that our actions might not have an effect on others or the natural world. The reality of course, is that we are all connected. Even the lichen knows this. Lichen exists due to a lovely symbiotic relationship between fungus and algae: working together to survive through dry spells, making food from the sun, and providing plant structure. The species of fungus and algae found in lichen could not survive on their own. Both partners contribute to the mutual survival, and benefit from the partnership. This is known as mutualism, contributing to lichen being an ancient species and enabling them to survive in extremely harsh environments like at the poles. If we all worked a little harder to be like lichen, things would be very different on this planet! Instead, humans tend to form other types of connections. There are three types of symbiotic relationships in the natural world: commensalism, competition and parasitism. Commensalism represents a partnership where one organism benefits and the other is not harmed, while parasitism we recognize as one organism

benefitting while another negatively is affected. Competition is a little different; the relationship is highlighted when organisms compete for the same resources like food, water, shelter, or even a mate. Following the idea that all boats will rise with the tide, LEA for mutualism strives in relationships with partners and the community. So, to be like lichen, we are working to foster connections with our neighbors where we mutually benefit. In fact, when we build multiple positive relationships our whole community starts to benefit.

Like lichen, our relationships are growing slowly, and the results are rich. There have been multiple projects with Loon Echo Land Trust where we worked collaboratively to preserve land and provide opportunities for people to access the outdoors: the Holt Pond Preserve and Sebago Headwaters Project, and Pondicherry Park in downtown Bridgton. These amazing spaces would not be protected if it was not for both LEA and LELT, and that is something amazing in itself. We also work together to co-lead programs. Jon Evans of Loon Echo says, "Participants in our collaborative programs are offered perspectives of land and watershed conservation, and how it affects animal habitat and water quality in our lakes and streams."

These partnerships greatly benefit our local community, our greater community, and our future communities. Close to home we are working with the Bridgton Historical Society to offer guided walks through Pondicherry Park or along the Stevens Brook trail to discuss the rich history of Bridgton and the beautiful flora and fauna. We are working with the Bridgton Public Library to offer a citizen science program for area youth utilizing the downtown parks



A Brilliant Day of Nature Journaling at Baldpate Preserve with Artist Wendy Newcomb

to collect data. We continue to build our connections with area school districts and spend more time in the classrooms and after-school programs with our students. We are working with local lake associations, towns and the Department of Environmental Protection to provide more advanced water quality testing, direct communication about water quality results, increased courtesy boat inspections, and invasive plant control. We partner with the Maine Lake Society to build support for legislative issues and the LakeSmart program, and with the soil and water conservation districts to develop watershed protection plans. To the south, Portland Water District has recognized the work LEA is doing to protect the headwaters of Sebago Lake and has provided funding, staff and technical expertise to better understand regional land use trends.

Lichen is not special only because of the remarkable mutual relationship between algae and fungus. It is also important as the first colonizer of bare rock. Once lichen establishes itself, it helps break down rock, and provides an invitation for other vegetation like mosses to grow. As moss grows and dies over many life cycles, it develops soil, inviting more plants to grow. Without lichen, post-glacier bedrock would still be bare. Mutual partnerships take time to grow and build, but as they become established, they invite more mutual growth and our communities, natural and otherwise, become all the stronger.

A Quick Lesson on Lakes

Lake science is fascinating because of the number of variables that can influence conditions. "Limnology" is a "young" science so new discoveries and theories are common.

Winter is a slow time for lakes because ice cover cuts off sunlight and wind and most of the inhabitants are enjoying a sluggish lifestyle. If ice was not lighter than water, lakes would freeze from the bottom up and lake creatures would be in serious trouble.

Spring brings ice melt, warming of surface waters, winds, and a complete mixing – a kind of rebirth. As summer arrives, lakes deeper than 30 feet or so will gradually separate or stratify into a warm, top layer and a cold, bottom layer. Most important data is developed during late **summer** when lakes experience their worst conditions. Stratified lakes show problems prominently in the isolated bottom waters below the thermal barrier (thermocline) that prevents them from mixing with the warmer surface waters. The upper, warm waters are constantly wind mixed which replenishes oxygen. If the thermal barrier did not exist, we would have no cold waters to support trout and salmon, but the isolation of cold waters keeps them from replenishing their oxygen.

phosphorus and more algae grow. Since algae are plants, they can only live in the upper, sunlit waters. As their populations increase, water clarity diminishes. There are dozens of species native to our waters, each with its own unusual shape, color and arrangement. They are short-lived and die after a few weeks, left to drift by gravity to the bottom waters where they are decomposed by bacteria. This process consumes oxygen.

Phosphorus comes from the land and determines water quality. Phosphorus is a natural element found in soils. Erosion and sedimentation deliver soils to the lake. Clay particles are richest in phosphorus because of a chemical attraction and they have a lot of surface area as compared to their size and weight. Through a microscope they look like paper plates. Unfortunately, clay particles are carried easily by stormwater runoff. The heavier and less phosphorus-rich soils like sand and gravel tend to settle out more quickly. More phosphorus means more algae. More algae mean more decomposition. More decomposition means less oxygen. This is the link between what goes on in the watershed and what happens in the lake.



recycling" can add large amounts of phosphorus to the lake to stimulate more algal growth.

Following summer stratification, cool **fall** winds chill the warm upper waters until the temperature differential weakens. Then stratification breaks down and the "fall turnover" occurs - a full mixing of the lake waters, preparing the way for winter.

The critical element for understanding lake health is phosphorus. Lake algae populations are limited by phosphorus concentrations in the water. Add Excessive decomposition can use up the oxygen in the bottom waters, causing a complex chemical reaction which releases sediment-bound phosphorus into the water column. This "internal phosphorus Weather is a major factor for water quality. Lack of rain is good for a lake since runoff is needed to carry the loose soil particles with their attached phosphorus to the lake. The size, duration and spacing of rains and the type of snow cover and snow melt also greatly influence the phosphorus deliveries. It's difficult to compute these variables, but we do our best to factor them in. Every season is unique in its conditions but the same enemy threatens every lake and the more we all know, the better equipped we are to protect them.

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Water quality of the Crooked River improves as you go north

Grist Mill Brook Violation Stabilized

Last spring, LEA was alerted to major construction along Grist Mill Brook which flows from Foster Pond to Holt Pond in South Bridgton. What resulted provides a good model for correcting serious land use violations. LEA documented the problems and requested that the DEP and Town of Bridgton take action. Several months later, conditions were greatly improved after both agencies pursued the case. It will take several years for the land to heal and vegetation to re-establish itself, but the site survived a 5-6 inch rainfall in October of 2016 without apparent harm to the brook. If you suspect a violation is occurring, please call your town's Code Enforcement Officer, but feel welcome to call LEA if he or she is not available.









LakeSmart Tip: Waterbars

Driveway runoff can be a big source of phosphorus to the lake. One inexpensive way to help control stormwater on driveways is waterbars. There are several different types and each has its own advantages and disadvantages.

Gravel Waterbars are very simple to construct and maintain. They are essentially just a speed-bump made of gravel. Water hits the elevated gravel ridge and is diverted off the road. Making this type of waterbar wider requires more gravel, but it then feels less like a bump in the road and will last longer. These waterbars work well on gravel driveways and can be plowed over in the winter. Construction and maintenance can be done simply with a shovel and a hand tamper. However, they do get worn down over time, particularly if they are plowed over, usually requiring rehabilitation once or twice a year.

Rubber Razors are simple to maintain (just clean out behind them periodically) and they work great but they cannot be plowed over. Rubber razors are usually a piece of 3/8 inch rubber sandwiched between two pieces of pressure treated 2x4s or 2x6s. The lumber is buried in the driveway and the rubber that sticks up can be driven over. These are very effective



diversion on non-plowed roads. LEA has a supply of rubber for these waterbars.

Open-top culverts are the classic waterbar made of two vertical and parallel, pressure treated 2x6s, with a pressure treated 2x4 in between to form a trough. The trough or "box" is buried flush with the driveway surface and runs the width of it. To keep the open top portion of the box from collapsing from side pressure, bolts or spacers are placed at the top. These are fairly easy to construct but need to be regularly cleaned out to function properly. Great care must be taken if they are to be plowed over.

When installing any waterbar, there are a couple things to consider. The waterbar should be constructed at a particular angle to the road. The Maine Gravel Road Maintenance Manual recommends a 30° downslope angle (as compared to a perpendicular line across the road). The waterbar must also extend fully beyond the driveway surface to make sure its runoff does not find its way back onto the travel way. If the road is crowned (high in the center), then you may need to use two half-length bars, extending to the ditch from each side of the crown. Email LEA's Colin Holme at colin@leamaine.org for more information. LEA can provide construction fact sheets and can set up a LakeSmart evaluation for you!



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A large tree can uptake 100 gallons of water a day

The Maine Lake Science Center

The Maine Lake Science Center was established by the Lakes Environmental Association to initiate and support a new generation of lake protection. Without a collaborative and scientifically based effort to provide better water quality standards, Maine lakes face a very uncertain future.

Lake Resilience

LEA's review of the status of lake science in Maine convinced us of the need for an initiative to harness new testing techniques, equipment and research to prevent significant ecological and economic damage to Maine lakes. The Maine Lake Science Center campaign was begun in 2015 to construct, staff and operate the first facility in Maine dedicated to supporting lake research and resilience.

The mission of LEA's Maine Lake Science Center is "to foster and sustain initiatives that will assure the long-term resilience of freshwater systems and communities. The Center will use an interdisciplinary solutions-oriented science approach, known as sustainability science, to link science with decision maker and policy development needs at municipal, state, and federal scales."

The Maine Lake Science Center has worked to establish a formal network of social and biophysical researchers, state agency staff, lake advocates and municipal decision makers. The network is sharing resources and innovations to expand lake research, upgrade policy, develop educational opportunities and support community resiliency.

Consulting Executive Director, Dr. Bridie McGreavy, has a Ph.D. in Communication and a concentration in Sustainability Science from the University of Maine. Bridie is an Assistant Professor of Environmental Communication affiliated with the Senator George J. Mitchell Center for Sustainability Solutions at the University of Maine, Orono.



Research Director, Dr. Benjamin Peierls, has a Ph.D. in Marine Sciences from the University of North Carolina. Ben has been actively involved in aquatic ecosystem research, including studies on lakes, large rivers, and estuaries.

Center and Program Manager, Alyson







LEA's Maine Lake Science Center, located in the heart of Bridgton, is nestled on 18 acres of woodlands and wetlands, connected by trails and boardwalk to Pondicherry Park.

The purpose of the MLSC is to build collaborations and networking within the scientific community and provide researchers with facilities to attract them to western Maine for the purpose of studying and preserving Maine's lakes.

The Center also provides expanded opportunities for watershed education programs serving students, land use professionals, the business community, and the public, promoting knowledge to action to protect and preserve our natural resources.

A model of how to re-design to provide high energy-efficiency and good interior air quality, the Center contains a teaching laboratory, housing with three bedrooms, office spaces, and a 60-seat conference room.



Smith, left public education after 30 years to join the Maine Lake Science Center team. She has a Masters degree in Educational Administration from the University of Southern Maine.

To help staff, equip and operate the Maine Lake Science Center, please send donations to LEA at 230 Main Street in Bridgton, ME 04009. Please specify "MLSC Campaign". All donations are tax-deductible. The Maine Lake Science Center is available for use by non-profit organizations, civic groups, business groups, and the general public. It is located at 51 Willett Road in Bridgton. For information, call or email Center Manager, Alyson Smith. 207-647-3318 • alyson@leamaine.org www.mainelakes.org

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Maine has about 2,600 lakes larger than 10 acres

The Membership Mystery Thanks for Helping

Who would protect your lake if LEA did not exist? LEA has many crucial programs that are not addressed by anyone else: water testing on 40 lakes, representation before the legislature and town boards, informative public education events, LakeSmart, technical services to landowners, developers and municipalities, our Milfoil Control Team, Courtesy Boat Inspectors, education programs that serve over 1,000 students in nine grades each year, recreational and educational opportunities at the 700 acre Holt Pond Preserve and the Stevens Brook Trail and the new initiatives at the Maine Lake Science Center. No one else does what we do and we provide all kinds of help to others like initiating Pondicherry Park and providing towns with zoning and mapping services.

The scope of what the LEA staff does is amazing. So here is the mystery: Why aren't more shorefront land owners and citizens members? The average membership rate on our lakes is only 22%. When you consider that our staff is protecting the water quality which in turn protects property values, one would think the number would be much higher. Why is it not 40 % or even 60 %? There are also many lake dependent businesses that are not LEA members even though they need good water quality for their own survival.

This is a paradox that is unfortunately true. For 47 years it had been our mission "to preserve and, when necessary, restore the high water quality and the traditional character of Maine's lakes, watersheds, and related natural resources." Most

LEA programs rely on membership dollars, not state or federal funding. This year, our board of directors will be working to solve the membership mystery through such things as neighbor-to-neighbor campaigns and new membership events. Significant staff time and mailing and printing costs are required each year to fuel membership. You can make the job of keeping LEA alive easier by sending in your membership contribution and encouraging your friends, neighbors and relatives to join you. LEA is worth the investment.

TD Bank Help LEA

Thank you to everyone who has participated in the TD Bank Affinity Program. This year the bank sent us a check for \$2,538.96. Remember, there is no cost to you! TD Bank will donate money to LEA for each person who signs up for the program. Contact us for more information or for help signing up, go to the TD Bank near you. The LEA Affinity Program number is AF307. We appreciate your help TD Bank!

A New LEA Fun Event for 2017

Watch for LEA's fun event, coming this summer. LEA will hold its first large-scale fundraising event called the "Great Lake Adventure Day" The day will feature an adventure race, the Lake Regional Paddleboard Invitational Race, kayak races, swimming races, a cookout, live music and events for all ages, including pirate ship and torpedo rides. Watch newspapers, emails and the summer LEA News for more details.



Planned Giving to Help your Lake's Future

Remembering LEA in your gift planning assures a strong lake protection program. We all have a big emotional and economic investment in clean lakes, so it is essential that LEA remains on the cutting edge of lake science, education and advocacy to protect water quality for future generations. There are many ways to make a gift to LEA. We welcome gifts by check or credit card, by mail, phone, or online. If you wish to mail your gift, make your check payable to "Lakes Environmental Association" and send it to 230 Main Street, Bridgton, Maine 04009. LEA's Federal Charity ID Number is: 23-7120682. Here are some options for making a gift to LEA:

1) You can remember LEA through a simple provision in your estate. Whether giving through your will, living trust, life insurance policy or qualified retirement plan, you should make your designation for "Lakes Environmental Association, a charitable and environmental organization in Bridgton, Maine."

2) Stock and mutual fund donations are a welcome way to support LEA. Such donations are handled through our Vanguard account. If you are making a gift of mutual funds or securities through a financial institution, please contact LEA to help you through the process.

3) Give a gift that keeps on giving! Gift memberships are a great way to help your family and friends support clean lakes.

4) There is also an assortment of mutually beneficial arrangements that provide a variety of benefits, including lifetime income, capital gains tax savings, income tax deductibility, and state tax savings. These significant benefits enable many donors to leverage their support for LEA.

For information on planned giving to LEA, please email Peter Lowell: lakes@leamaine.org or Jenny O'Connor: jenny@leamaine.org or call 207-647-8580.

LEA Members Keep Us Going

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

Name:	Email:			You can join LEA with a contribution of any
Winter Address:				amount. Just mail this form and a donation to LEA, 230 Main Street,
Check enclosed	Charge my credit card \$ Card Exp. Date	Gift Levels: \$1000 Benefactor \$500 Patron \$250 Sponsor \$100 Lake Steward \$75 Family	I'd like to make an additional donation to the: Intern Fund \$ Milfoil Fund \$	Bridgton, ME 04009 You can also join or renew at:
Account #:		 \$50 Individual Any other amount 	Environmental Education Fund \$	www.mainelakes.org