

# the WATER COLUMN

*The Newsletter of Lake Stewards of Maine - Volunteer Lake Monitoring Program*

Vol. 24, No. 1

Celebrating the Work of Maine's Citizen Lake Stewards

Winter 2019

## Meet Maine's Lake Stewards!



## WHAT'S INSIDE:

President's Message . . . . .	2
Lakeside Notes ~ Building Communities . . . . .	3
Littorally Speaking ~ Call to Action . . . . .	4
Connecting the Drops to Sustain LSM's Programs . . .	6
Quality Counts ~ Equipment Hibernation . . . . .	8
Meet Maine's Lake Stewards! . . . . .	9
Thank You to Our Generous Donors! . . . . .	18
2019 Annual Conference Highlights . . . . .	21
Algal Blooms (Cyanobacteria) in Maine Lakes . . . . .	22
Maine Lake Ice-out Dates & Trends . . . . .	24
Under the Hand Lens ~ Chinese Mystery Snails . . .	26
Maine's Lake Ambassador Speaking Tour . . . . .	28
LSM Tech Support for Alum Treatment . . . . .	30
Toxic Algae Blooms in the News . . . . .	31
Passings . . . . .	32
Welcome, New Lake Stewards! . . . . .	34

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# President's Message

Barb Welch

President, LSM-VLMP Board of Directors

Winter Greetings,

Given my background as a manager of the Volunteer Lake Monitoring Program for a number of years (when it was part of the Department of Environmental Protection), I find the volunteer stories in this issue to be very inspiring and reassuring. The stories remind me of why I enjoyed the program so much. The monitors then, just as now, are so positive, energetic, and knowledgeable about their lakes! I enjoyed working with teachers, engineers, developers, stay-at-home moms, treatment plant operators, artists, and others. Everyone was friendly, welcoming, and helpful; from supplying boats for the spring trainings to pulling me out of a ditch, from popovers for a treat to lemonade on a hot day. All were concerned, interested to know more about their lake and lakes in general, and determined to protect *their* lake. Some asked hard questions that took effort to find answers, some pushed for

more monitoring or protection tools, many educated us about their lake, and lakes in general.

Over time, I have seen the culture around lakes change; for example, in the 70's, many lake association meetings were primarily social and the big event was a parade or sailboat race. Now many lake meetings are focused on lake and watershed awareness and protection. Monitors are often in the forefront of developing a culture of environmental stewardship for their lake. Trying to get people to change habits is hard, whether it is eating healthier or taking better care of our lakes. Social scientists tell us that community leaders are crucial to encouraging the spread of a new practice. Monitors are often those community leaders. Thank goodness, we have so many dedicated monitors leading the way. A very special thank you to all Maine citizen lake scientists!

Cheers! ☺

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(207) 783-7733 or [stewards@lakestewardsme.org](mailto:stewards@lakestewardsme.org).

# Lakeside Notes

## LSM Citizen Scientists:

### Building Communities of Lake Stewardship

This issue of The Water Column features a number of remarkable accounts of the work of certified LSM lake stewards – all on behalf of their lakes and surrounding communities. During the past few years, it has become increasingly evident to us that many, perhaps most, LSM citizen lake monitors go well above and beyond their good work as lake water quality monitors and invasive plant patrollers. They are typically connected to multiple lake and watershed stewardship initiatives in their lake communities, as well, often serving in leadership roles.

It's not unusual for individuals who have received comprehensive training at an LSM workshop to be considered a local lake expert in their lake community. And rightly so – considering the many hours that they have committed to training, and the many days that they spend on the

lake gathering data, year after year. A growing number of LSM citizen scientists have been continuously active for 5 years; 94 for over 10 years; 58 for at least 15 years; 36 for over two decades; 20 for more than a quarter century; 7 for at least 30 years; 7 for over 35 years, and 9 for four decades, or more!

Certified lake monitors are trained to know much more than how to take a Secchi disk reading or a phosphorus sample, or to identify an aquatic invader. They also know why the information that they gather is valuable, how to interpret the results, and when immediate action needs to be taken to gather additional information or to address a concern. Years of experience on the water enables them to recognize when something doesn't look right. They recognize threats, and they know what to do and who to call when one is detected.



By Scott Williams  
LSM Executive Director

A great deal of information is covered in the broad range of LSM's workshops that are available to the public. Once individuals are certified, they have access to lifetime technical support through LSM staff, and our broad network of advisors, partners and colleagues. All of this is provided to them at no charge, in exchange for their very generous donation of personal time.

Individuals who embrace a culture of lake stewardship rarely limit themselves to a single activity, as you will see in reading through their stories herein (*please see pages 9-17*). We encourage you to submit yours—we would love to share it! 🍷

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## Want to See Lake Stewardship in Maine Grow & Thrive? Consider Becoming an LSM Board Member

Are you enthusiastic about the work of LSM? Looking to support a good cause, for a way to give back to your community, or to help the lakes of Maine? The LSM Board of Directors welcomes you to apply for a position on our board, or one of our subcommittees.

The Board develops policy, oversees fiduciary matters, and works with an excellent staff. We help with the annual conference, fundraising, and outreach to the public, and some of us even volunteer in the field, working alongside LSM staff. We are particularly interested in bringing on new board members who have knowledge and experience in the areas of marketing, fundraising and program development. Some of the Directors are

monitors who bring that background as well as various experience and skills to the job; others are in the field of lake science or environmental conservation.

The Board of Directors meets 4-6 times annually at the LSM Center for Citizen Lake Science, in Auburn, Maine. Meetings typically take place on weekday mornings, and may last until early afternoon.

Please contact LSM Executive Director, Scott Williams, if you are interested in a position on the LSM Board, joining a subcommittee, or if you have questions.

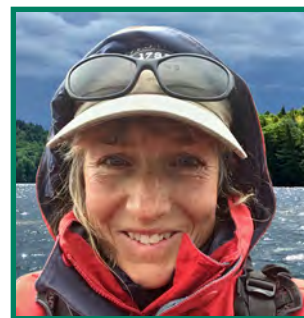
Following an initial discussion, candidates will be interviewed by a subcommittee of the Board, and the Board will act upon all applications. These are volunteer positions. 🍷



# Littorally Speaking

## Call to Action in Washington County

### *Responding to Maine's newest and northernmost invasive milfoil infestation*



by Roberta Hill  
LSM Invasive Species Program Director

Hi Roberta,

I received a plant sample from Brad Richard, a local State of Maine warden who has a camp on Big Lake. Keying it out is giving me variable water-milfoil:

- tightly packed whorls of leaves, under .5cm apart
- 9-12 leaflet pairs per leaf
- 4-6 leaves per whorl
- lance shaped bracts that are more than 2x as long as the flowers seem to be (flowers are gone at this point)
- bracts have some serration under a hand lens

So I'm going to send it along to you all for verification. Brad noticed the plant growing in front of his camp. His family has had the camp for years. He had never noticed this plant before.

I'll get the paperwork filled out and get this in the mail today.

Joe

The email from Joe Musante arrived on the second day of October—typically a time when plant identification inquiries are beginning to slow down around here. (Joe, a biologist with the Passamaquoddy Environmental Department, and LSM Regional Coordinator for the Passamaquoddy tribal lands, is a long-time LSM partner and friend.)



Emergent stems with whorls of finely-serrated, blade-shaped bracts are diagnostic for invasive variable water-milfoil.

As I read Joe's message, my heart began to sink. I tried to remain optimistic—some native milfoils would key out similarly, but the mention of 'bracts with serration' was definitely unsettling. I asked Joe if he could take a photo of the flower-spike before packing up the plant, and within less than an hour, the photo arrived in my inbox. I

opened the file and as soon as my eyes hit the image on the screen, I knew exactly what I was looking at. The serrated blade-shaped bracts arranged in whorls along the emergent stem were unmistakable: this was, without doubt, variable water-milfoil (*Myriophyllum heterophyllum*).

One week later, I was on my way to Big Lake with John McPhedran, Denise Blanchette and Doug Sutor from Maine Department of Environmental Protection (DEP). Our goal was to meet up with Joe and Brad at Passamaquoddy Environmental Department headquarters in Princeton, and then to travel, by truck then boat, to Clifford Bay at the southeast end of Big Lake, where Brad had first observed the patch of milfoil.

Big Lake is the second-largest lake in Washington County and, covering 10,444 acres, it is also one of the largest lakes in Maine. The lake is located in and around the town of Grand Lake Stream, near the border with New Brunswick, Canada, and is part of a sprawling and much larger—roughly 17,000 acre—system (basically constituting the west branch of the Saint Croix River), known for its remote, wilderness beauty and extraordinary fishing.

Though depths of up to 70-feet do occur in the waterbody, the mean depth of Big Lake is only 12 feet. This means that the littoral zone (parts of the lake that are shallow and sun-filled enough to support the growth of rooted aquatic plants) extends far out from shore along much of the lake's 70-plus-miles of shoreline. In addition to the vast shallows, the lake is rich in tributaries, coves and islands, (28 islands to be exact!), all of which further increases the potential for invasive plants to move about unseen, while steadily gaining ground.

The boats slowed as we approached the small island along the southern shore of Clifford Bay, where Brad's family camp is located. No sooner were the scopes in that water, than we began to see the snake-like plumes of milfoil—at first spotty, soon everywhere. Motor off, we paddled gingerly around the perimeter of the densest patch, sadly, way larger than any of us had expected—roughly the size of a couple of football fields. Some of the plants had recently flowered. And though the once-emergent flower stalks were now flopped over in senescence and the plants themselves eager to break into fragments at the lightest touch, the tall bottle-brush-like stems were still defiantly erect, vibrant, formidable, menacing.

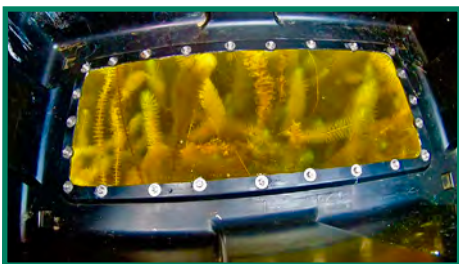
The patch was clearly well-established, but could this possibly be the pioneer colony?



Approaching Brittany Island in Clifford Bay where Brad first noticed the suspicious plants.

Is it possible Brad had serendipitously come upon the site of the initial introduction? With this tiny thread of hope, our minds leapt forward—well if this is the pioneer colony, there might still be time this year to control and contain it. The only way to know for sure if the milfoil was contained to this area, was to widen the scope of our survey.

Splitting up into two units to maximize direct observation, the boats proceeded in opposite directions around the bay. The sky was cloudy but bright, the winds light, and the water clarity good; we were able to cover most of the perimeter of Clifford Bay and some of the shallower off-shore areas. Our findings were not good. Much of the nearshore perimeter was dotted with individual and clustered milfoil plants. The plants were not only abundant and widespread, but also vexingly mixed in among the natives. We also found several additional large patches including one that encompassed the greater part of one large cove. Here, senescing flower stems were everywhere. In a nutshell, our findings revealed that the invasive milfoil was not, as we had all so keenly hoped, contained to the area near Brad's camp. Rather, the infestation was quite extensive throughout Clifford Bay, indicating that the invader has been present in Big Lake for a number of years.



The tall bottle-bush-like stems of variable water-milfoil were still defiantly erect, vibrant, formidable, menacing.

Which begs the next question. . . if variable water-milfoil is well established here in Clifford Bay, where else in the Big Lake might it occur? This is the question that LSM has been called upon to help answer. It will be our job to assist with a comprehensive survey of Big Lake and its associated flowage, beginning early next season. We will be working in the coming months, with the DEP and area partners, to organize and support as large a team of experienced volunteer surveyors as we

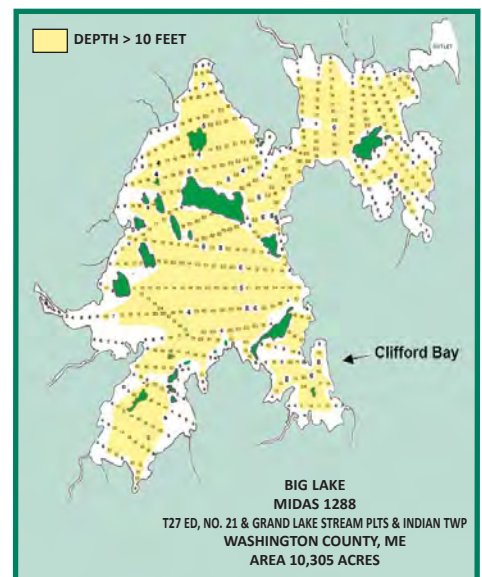
can muster. Our goal will be to complete the entire level-3 survey of Big Lake and associated flowage in 2020. This will require the careful scouring of roughly 100 miles of shoreline, plus a systematic search of vast shallow offshore expanses, zigzagging along an uncountable multitude of transects—the survey of Big Lake will be no easy feat.

Adding to the greater challenge of preventing the spread of this infestation to other area lakes, is the fact that Big Lake occurs in a part of the state where invasive aquatic species prevention and early detection programs are sparse to non-existent. On the prevention side, 91% of all lake groups with active Courtesy Boat Inspection (CBI) programs occur within Maine's 11 southernmost counties. Only 2 CBI programs occur in Washington County, 0.03% of the state's total. The statewide statistics for active Invasive Plant Patrol (IPP) programs is similar. Ninety-one percent of Maine's certified Invasive Plant Patrollers survey lakes in one of the eleven southern counties, and this, not surprisingly, is where over 95% of recent IPP surveys have taken place. As of 2019, less than 0.1% of statewide IPP activity has occurred in Washington County.

There are understandable reasons for the disparity. Most of Maine's known invasive aquatic plant infestations also occur in the south. Knowing aquatic invaders are nearby has a way of generating concern and inspiring action; believing one's local lakes may somehow be immune to such scourges tends to inhibit these motivating impulses. There are also simply more people in the southern counties, a larger pool from which enthusiastic lake stewards may leap into action. And of course, the lakeshores of more southerly lakes are more densely populated and more threatened by development, which has led over time to the growth of organized and engaged lake associations. Northern Maine is less accessible, with less economic opportunity; this often means fewer resources to devote to conservation programs.

And while all these factors add considerably to the challenge of responding swiftly and effectively to Maine's newest infestation, they also suggest some possible unique opportunities for moving forward:

- This new infestation in a remote, previously uninfested part of the state has



All areas in white on the map are littoral, capable of supporting rooted aquatic plants. The islands are shown in green; yellow indicates depths exceeding 10 feet. Depth analysis courtesy of Ross Wescott.

been a wake-up call for all of us. With that awakening comes new statewide energy and focus.

- By snuffing out in one fell swoop the notion that Maine's more-northerly lakes are somehow immune to the aquatic invaders, we have broken through a barrier. We now have a better chance than ever to put programs and partnerships in place and to build local resilience in this more remote but widely-cherished part of the state.
- Not enough people to do the CBI and IPP work? Maybe this is an excellent opportunity to try out some brand-new ideas for educating and engaging boaters in best prevention practices, and for attracting early detectors from previously untapped groups of conservation-minded people.

And we have much working in our favor. First, Maine now has two decades of experience with invasive aquatic plant prevention, early detection, rapid response and management, and especially with this particular invader. Thanks to the persistent efforts of the lake communities who have been on the front line of the effort to control variable water-milfoil in Maine, much of the trial and error is now behind us.

Communities facing new infestations are also now supported by steadily-strengthening legislation, funds made

*Littorally Speaking . . . continued on page 29*

# Connecting the Drops...

## Cultivating Relationships and Building Community to Sustain the Work of LSM's Programs

*LD 959\*, State Funding for Lake Stewards of Maine and Maine Lakes Society*

Earlier this year Lake Stewards of Maine (LSM) "connected the drops" with Maine Lakes Society (MLS) on a bill that will benefit LSM's Citizen Lake Science programs and MLS's LakeSmart program. Staff and Board members from both LSM and MLS, along with many of our volunteer constituents, collaborated in the presentation of information submitted to the Natural Resource Committee of the Maine Legislature. This opportunity allowed for the only two statewide lake-focused nonprofits to clearly define their programs to legislators, and to explain how both organizations work collaboratively for the protection of Maine's lakes.

On July 2, 2019, LD 959 was enacted and will guarantee \$75,000 in funding for 2

years to Lake Stewards of Maine (MLS will receive equal funding). While this funding appears to be a significant boost to LSM's budget, it is actually filling a gap created several years ago when LSM lost funding from the USEPA's 319 Nonpoint Source Management Program. LD 959 will help stabilize some of the annual funding uncertainty that LSM experiences from year to year. State funding will be used to expand our outreach to underserved regions of the state, assist in the investigation and assessment of newly discovered invasive aquatic plants, support our citizen lake science monitoring programs and provide funding security that will allow us to expand our staff.

There was a tremendous amount of support



by Alison Cooney  
LSM Development Coordinator

surrounding this bill with written and in-person testimony, as well as calls and emails to legislators, from individuals (lake monitors, invasive plant patrollers and more), lake and regional associations, conservation NGOs and state agencies. **THANK YOU** to everyone who contributed to the passage of this bill, especially the Legislators who sponsored the bill: **Presented by Representative Keschl of Belgrade; Co-Sponsored by Representatives Gattine of Westbrook, Jorgensen of Portland, Martin of Eagle Lake, Millett of Waterford, Wadsworth of Hiram.** ☺

*\*Maine Joint Environmental Training Coordinating Committee (JETCC) also received funding through LD 959.*

## Planning for the Future

If you have never visited LSM's Center for Citizen Lake Science building, you might be surprised to learn that our office is actually a house. Woodbury and Barbara Brackett built the house in 1946 and lived in the Cape-style home for over 50 years. Upon Mrs. Brackett's passing, she bequeathed her home and property to the Auburn Water District in honor of Woodbury who had passed a few years prior. The restrictions on the planned gift was that the house be used for conservation, protection of water quality and environmental education. Lake Stewards of Maine's mission fit these requirements. In 2010, the Brackett's home became the Center for Citizen Lake Science when

**"Own your joy so that you can be happier and bring more energy to the world. That ripple effect works on a quantum level. It brings about changes in the world."**  
~ Gabrielle Bernstein

LSM purchased the building from the Auburn Water District. The house still holds its original charm, including the cheery bird and strawberry wallpaper, the kitchen cabinets and old push-button stove top, and a unique bubble light fixture. The home/office is a delightful place to work and LSM staff are grateful to the Brackett's for creating a welcoming space that we can extend to our Lake Steward visitors.

Bequeathing one's home for conservation purposes is an exceptionally gracious and unexpected gift, and not one that many would choose to do. However, there are other options for planned giving. *If you are considering leaving a gift to a charity in your will, we would be honored if you chose Lake Stewards of Maine as a beneficiary in your estate planning.* Many LSM lake stewards have a deep connection with a Maine lake and have committed years (some, decades) to citizen lake science on behalf of our clear, clean lakes. Their volunteer efforts are worthy of investing in keeping Maine's lakes beautiful for generations to come. ☺

# Maine Lakes Need Monitors!

While LSM currently has trained lake monitors on several hundred of them, many are not being monitored for water quality or surveyed for invasive species. It would be too costly to hire professionals to monitor every lake in the state. However, training lake residents or frequent visitors to a specific lake to become citizen lake scientists is a very efficient and cost effective way to gather vital information about the health of a lake.



Help LSM connect to lake associations, friends, family, and other people you know who care about Maine lakes, and wish to become volunteer citizen lake scientists. All LSM workshops are free, and they come with many fringe benefits to both our certified lake monitors and their lake communities! To determine if a particular lake already has certified\*\* monitors, please visit LSM's lake resource website, [LakesOfMaine.org](http://LakesOfMaine.org). Search for your lake of interest, go to the lake page and click on monitoring.

Collecting annual water quality data provides a history of a lake's health, using key indicators, which include water clarity (transparency), temperature and dissolved oxygen, total phosphorus, and baseline water chemistry. Having a record of these indicators allows for comparisons to be made from year to year and over time. It can also be a red flag when significant changes with any of these indicators are being observed. Red flags lead to further investigations.

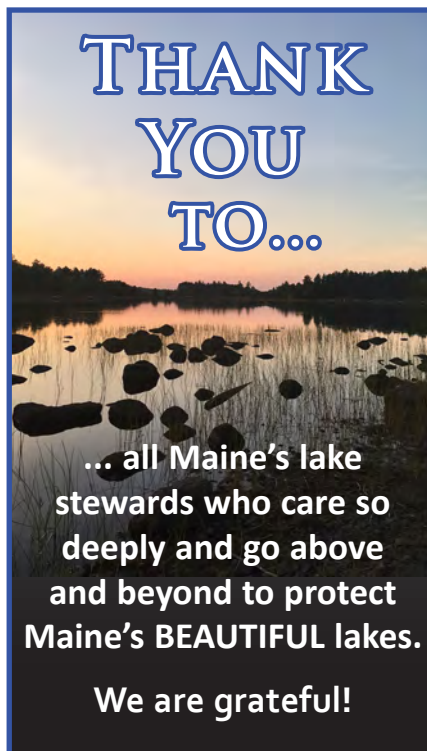
Invasive aquatic species can wreak havoc in a lake ecosystem. It is important to



train as many eyes as possible to conduct organized screening surveys for these threats. Invasive plant patrollers learn how to identify native aquatic plants, as well as, the most common invasive aquatic plants found in Maine. They are also trained to participate in comprehensive lake-wide surveys, playing key roles in the prevention and early detection of invasive aquatic species. 🌱

**\*\* Other than the Maine Department of Environmental Protection (DEP), Lake Stewards of Maine is the only organization that *certifies* water quality monitors and invasive aquatic species patrollers. *Certified* means that an individual has attended a training that follows the Maine Lake Assessment, Quality Assurance Program Plan. This training protocol ensures that the lake data being collected by certified monitors is scientifically credible.**

- LSM's 1,200 certified citizen lake scientists who volunteer countless hours of their valuable time collecting lake data, year after year
- State of Maine, especially the Department of Environmental Protection, for continuing to provide financial and technical resources that support the work of LSM Stewards, and quality assurance oversight of Maine's lake data
- Foundations, businesses and individual donors who generously provide the financial resources needed to meet public demand for LSM's stewardship initiatives, while moving us closer to our ultimate goal: vibrant citizen-powered stewardship on every lake in Maine!
- To our contractual partners: Clark Marine (training boat storage and maintenance); James Cradock (IT Consultant/Web Development/Programming); Steve Grubb (Near Real Time Lake Data manager); Kyocera Intelligence (IT technical services); Larna Poulin (Accountant); Peter Vaux ([LakesofMaine.org](http://LakesofMaine.org) visionary and site manager)

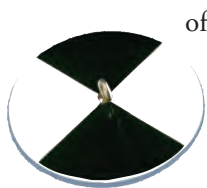


- State and federal agencies, municipalities, educational and research institutions, Maine Indian tribes and non-profits who partner with us on various projects and initiatives, and share common goals
- Volunteer project leaders: Herbarium Crew- Pixie Williams, Dennis Roberge, Marsha Letourneau, Keith Williams; Lake Association Outreach- Matt Scott; Videography- Steve Underwood
- Uber IPPers, IPP & WQ regional coordinators and IPP Lake Leaders for all your extra time and efforts
- Lake and regional organizations who support the important work of Lake Stewards of Maine and who partner with us through our programs
- LSM's Board of Directors for their guidance and governance, Subcommittee members for overseeing, planning and helping to achieve our Mission; LSM Advisory Board members for their technical support 🌱

# QUALITY COUNTS!

## 'Tis the Season for Monitoring Equipment Hibernation

You know the drill! Winter is upon us – time to prepare. Get out the shovels, clean up the yard, put on the snow tires...all those mundane tasks that help us get through until spring. As a citizen scientist, it is important that your list includes putting monitoring equipment into hibernation. Your equipment is valuable and you should 'store it in a cool dry place' (to quote a Travelling Wilburys' tune). Clean out your view scope and secure a plastic bag over the end with an elastic band to exclude spiders. Check your Secchi disk: black quadrants should be black, white quadrants should be white. You can get a new sticker from LSM to place on the surface if need be, or you can use a Sharpie and/or white nail polish to touch it up. Also check the tape measure for tears. Tears often occur within a foot



of the disk. Repair small tears by wrapping a few inches of duct tape around the tape. If a tear extends

more than halfway through, arrange to get a new one through LSM.



them so the ends don't short out and cause a fire by wrapping them with an elastic band then placing them in a plastic baggie. Even new batteries can leak acid and destroy electronics. Follow the manufacturer's instructions for storing the probe. For probes that contain electrolyte, be sure to remove the membrane/cap, rinse the probe with distilled water, then allow to air dry. It is best to place the probe and protective cage into a baggie for storage so that come spring, it is obvious that the probe needs to be prepared for the next sampling season.

Be sure to remove batteries from your dissolved oxygen meter. Use them up in a flashlight or toy, or, secure



by Linda Bacon  
LSM Quality Assurance Officer; Aquatic Biologist,  
Maine Department of Environmental Protection

Rinse core tubes and grab samplers with distilled water and let dry before storing.

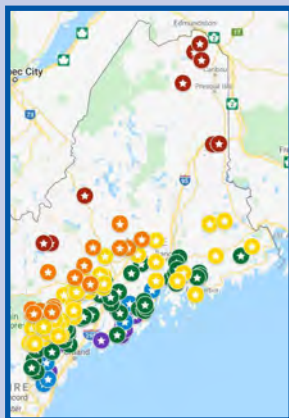
And please, keep watching for the spring notice to send your readied meters into LSM or DEP for their complementary annual QA check! ☘

*Kudos to the citizen scientists at Cross Lake and Georges Pond for an incredibly intensive monitoring season in 2019! Your careful attention to details has resulted in the best annual dataset ever obtained on your respective lakes!*

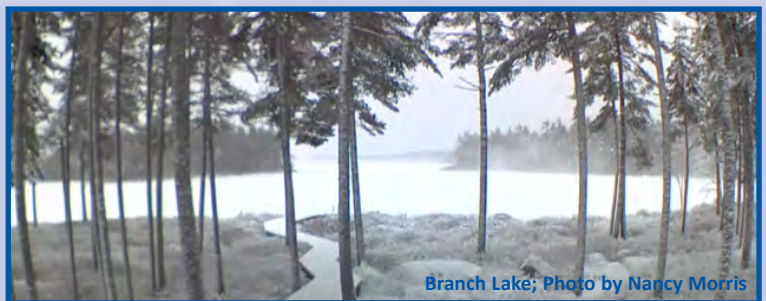


## Please Remember to Document and Report Your Lake's Ice Cover!

Once winter begins to set in, please remember to document your lake's ice cover. LSM acts as a state repository for **ice-in** and **ice-out** records, some stretching as far back as the mid-1800's. Lake ice cover data, when paired with water quality



data, may improve our understanding of the relationship between the



Branch Lake; Photo by Nancy Morris

duration of ice cover and water quality. For more information on determining ice-in/out, please visit our website at <https://www.lakestewardsofmaine.org/programs/other-programs/ice-in-ice-out/>. You may report ice-in/out dates to LSM via e-mail, directly to [Christine@LakeStewardsME.org](mailto:Christine@LakeStewardsME.org), or by phone at 207-783-7733. We actively update the map of reported ice-in/out dates on our website at <https://www.lakestewardsofmaine.org/near-real-time-lake-data/> as part of the Near Real-Time Lake Data initiative. All ice-in/out submissions should include your name, the lake's name and related town, and the date of ice-in/out, in order to be added to the statewide map on the LSM website. ☘

# Meet Maine's Lake Stewards!

*Without spark plugs, internal combustion engines simply do not work. Sparks flying from these little energy producers are essential for getting things started and keeping things moving. So it is with lake communities, where the task of providing the essential 'spark' for lake stewardship initiatives generally falls—at least at first—upon just one or two motivated individuals. LSM is fortunate indeed to be a veritable magnet for such individuals. Better yet, there seems to be no end to the ways in*

*which LSM 'spark plugs' may apply their passion, creativity, know-how and energy to the task of protecting the health of their local lakes. Some are organizing watershed surveys; some are building and leading local plant patrol teams; some are inventing new and improved monitoring gear. But once in motion, all 'spark plug' stories seem to share a similar trajectory: seemingly-small initial efforts gather momentum, igniting more and more sparks within the community;*

*involving more and more people. Soon the forward movement takes on energy of its own, eventually leading to significant, lasting change and a more engaged, capable and resilient lake community overall. In this special section of the Water Column we are proud to share stories of some of Maine's energetic lake stewards, sparking change in their communities and beyond, playing an essential role in the work of protecting Maine's extraordinary lakes for all who love them, now and in the future. LSM is extremely honored to support and celebrate the work of all Maine Lake Stewards! 🌱*

## Long-time Watchic Lake Watchers

Contributed by Eileen & David Burnell, LSM Certified 29 Years; Watchic Lake, Standish

My husband David and I are a team. We have been volunteer monitors on Watchic Lake in Standish for almost 30 years (though we did need to take a hiatus when David's work necessitated a move to NH). Shortly after we returned to Maine full-time, I noticed metaphyton growing in the lake to a degree which I had never seen before in Watchic. The ice cover had melted early that year, and I sensed something changing in our lake. David and I decided to become re-certified, first for Secchi disk and scope, later for dissolved oxygen and temperature monitoring.

Coming back to this work after a decade-plus hiatus, we had to re-acclimate to changes in our lake association. The monitoring work that David and I had done on Watchic Lake was not well-known among several of the newer Board members, and while we were away, the lake association had



Monitoring team, David & Eileen Burnell, with their helper Minni.

chosen alternative methods of gathering lake data. One thing I have learned in my sixty-five years is that change is inevitable; so the question now was, 'what is the best way for us to coordinate efforts with the lake association?' David and I had no question that we were going to keep following the programs and protocols established and maintained by the oldest volunteer lake monitoring program in the nation, LSM. We also knew the value of keeping a high-quality 25-year-long data set going. Our new approach would be to complement the lake association's new monitoring strategy with our LSM-certified data, which we now present to the lake association annually through a Board liaison.

Our long-term dedication to this work has provided us (and Watchic Lake) with many benefits! Our experience, and increasing understanding of limnology (how lakes work) has given us the ability to notice changes and new phenomena that we might not have seen as clearly before. And LSM is always there to help us learn more. For example, I have seen small green cotton-candy-like masses in Watchic for as long as I can remember. But three years ago, the masses were much larger and more abundant. Property owners and lake association members were quite alarmed and concerned. Thanks to LSM, we confirmed that the green masses were common metaphyton. They also shared their easy method for monitoring and mapping the changes in metaphyton growth over time. This year we submitted three metaphyton reports with maps and photos for the first time (and yes, it was easy!). With climate change affecting our lakes, this kind of observational information is increasingly important! 🌱

## Safeguarding A Wonderful Resource: Sokokis Lake

Contributed by Roy Bagley, LSM Certified 10 Years; Sokokis Lake (Holland Pond), Limerick

On September 5, 1952 my parents bought a camp on Sokokis Lake and told me it was a birthday present! Over the years, from my 6th birthday on, every summer I was involved in many activities to improve the quality of the lake, including personally removing and replacing boards on the dam to regulate the lake level and reduce shoreline erosion from ice and high water levels in the spring. And then I grew up!

Today, I am President of the Lake Association, an LSM Certified Invasive Plant Patroller, and I have also managed the CBI program for the past 10 years, basically doing all I can to protect the lake from invasive aquatic plants. I also converted to



Invasive Plant Patrol workshop on Sokokis Lake.

a safer and easier method of opening and closing the dam with a chain-fall system, established an acceptable level of the lake (approved by membership and the town to control erosion), and just received DEP approval to install a new hydraulic system to better control the water level.

Most importantly, we have created a caring, involved membership that demonstrates respect to all uses of our wonderful resource, SOKOKIS LAKE. 🌱

## Square Pond Snail Snatchers- A Successful Community Effort

Contributed by Rob Caron, LSM Certified 14 Years; Square Pond, Acton

The Square Pond Snail Snatchers is a grassroots organization dedicated to the removal of invasive Chinese Mystery Snails from Square Pond. While in reality, we'll never be able to completely eradicate them, we want to at least keep them at bay so that they don't completely invade our shorelines. Here is the story of the Square Pond Snail Snatchers.



Several members of the very productive Square Pond Snail Snatchers dive team.

While the exact date of the Chinese Mystery Snails (CMS) discovery on Square Pond is hazy, we know it was around 2011. No one really knew much about CMS. However, our resident water and plant life expert, LSM certified lake monitor Marsha Letourneau, had some knowledge and started to educate the Square Pond Improvement Association (SPIA) about what she knew and that they were invasive. With more research, we started to learn about other lakes that have CMS and the problems they created. Some lakes reported not being able to walk in their swim area without crunching on snails. We also heard about snail die off where the smell on the lake was horrid.

In 2013, with this information in hand, it was clear that we needed to do something. A small group of divers got together and started to dive for snails. Once we observed how many there were, SPIA started hiring paid divers to eradicate snails.

After we did some exploratory dives to try to figure out how large the territory was, we then had a good idea of how much ground we had to cover. Snails were primarily along the west shore of Square

Pond, in approximately a 500-yard area, and were seen in up to 25' of depth.

As we learned more about CMS, we found out how quickly they can reproduce. According to several CMS postings online, they can have up to 100 offspring per litter. It was obvious that we were fighting a rapidly-reproducing invader. We also learned that they can seal up their opening and float, then open up and sink somewhere else. For a few years we thought this was a myth, as we didn't find them anywhere else on the lake. In the last couple of years they have shown up randomly in other areas. We found them in small numbers, indicating a single snail may have started there. It may have hitchhiked on a boat, or the floating "pioneer snails" idea may be true.

Below is a timeline of what we have removed from Square Pond so far. We have tested several one pound samples and calculated that there are about 40 snails per pound. This is the basis for estimating the numbers, since we only weigh the catches and don't count each snail, for obvious reasons.

Year	Square Pond Divers (in LBs)	Paid Divers (in LBs)	Total (in LBs)
2013	400	1200	1600
2014	280	1020	1300
2015	110	720	830
2016	210	830	1040
2017	355	1475	1830
2018	325	101	426
2019	875	246	1121
TOTAL CMS Extraction			8,147

At 40 snails per pound, this is about 326,000 snails! All were picked out of the lake by hand, one at a time. As you can see, the numbers for the paid divers declined and the Square Pond Volunteer Divers have increased over the years. The costs for paid divers was draining our Square Pond Improvement Association (SPIA) funds at about \$5,000 per year. Our recurring costs now for our Square Pond dive team is about \$1,700 per year.

The number of volunteer Square Pond divers (which



One afternoon's efforts yielded several five-gallon buckets full of Chinese Mystery Snails.

includes snorkelers) continues to increase! In 2019, we purchased a surface breather. This is a battery powered compressor that sits in a boat and has two hoses with regulators attached. People don't need to be dive certified, and several people have used this equipment to extract snails. This gives us more bodies in the water and a higher yield.

In the last 6 years, we have had dive equipment donated and have purchased some, as well. Some of us have our own dive equipment and SPIA owns some to loan out. SPIA pays for filling tanks, and the general maintenance for the tanks. All of this is at a cost, but has been approved by SPIA members, as they all deem this as necessary to protect our lake.

We also have volunteers for surface support. People come in kayaks, pontoon boats and even a peddle boat to hover over divers in the water and protect them from boat traffic. These people also help with the after-dive work of dealing with equipment and snails. The movement to join the Square Pond Snail Snatchers is growing in popularity. We even give everyone a cool T-shirt if they participate. To date, we have had more than 50 volunteers helping.

We strongly believe that we can continue to maintain a strong group of volunteers to keep the growth of CMS at bay. We know we won't ever completely get rid of CMS, but will hopefully keep them from invading our shores. SPIA also has an established team of invasive plant patrollers. ☺



SPSS volunteer holding the catch of the day.

## What A Wonderful World!

Contributed by John Schooley, LSM  
Certified 31 Years; Watson Pond, Rome

I moved to Maine in 1982. I had a job as a Physician Assistant in Belgrade Lakes. With a Thoreauvian and 'Back to the Land' mind set, I found a rustic camp on Watson Pond, roughly the same size as Walden Pond. I first saw it in blazing fall colors. I also saw my first loons. And, I had heard there were no motorboats allowed. Heaven on Earth.

By 1988, I was aware of the many threats to water quality from land use, associated with increased development directly affecting the region. I got involved with some of the local conservation efforts. We formed a land trust, made an ambitious application to the first *Land For Maine's Future* fund, and, I started the volunteer monitoring of Watson Pond.



John Schooley pictured with friend visiting 'from away', Pat Simpson.

Watson Pond water quality remained very stable with Secchi disk readings averaging 6 meters. Other parameters have also been stable. The biweekly canoe paddles have always been a pleasure, and often an adventure.

Over these thirty-plus years, I've been privileged to watch the natural heritage of the area become more and more protected. Our land trust was successful in preserving much of the undeveloped shoreline of the pond and grew into a vibrant regional conservation organization for the Belgrade Lakes area. We protected the wonderful hiking trail of French's Mountain with a great view of the Belgrade Lakes, and eventually created the Kennebec Highlands through the *Land for Maine's Future Fund*, with over 6,000 acres of forest, including 5 undeveloped ponds, hiking trails, and fantastic view-scapes. This includes all the undeveloped shoreline of Watson Pond, and most of its watershed.

More recently, with the steady encroachment of invasive plants, especially milfoils, I've kept an informal eye out, paddling and snorkeling around the pond several times throughout the summer. This year I finally got myself certified as an LSM Invasive Plant Patroller. I've enjoyed learning to identify the native species in the pond, as well as looking out for the unwanted ones.



Eastern watersnake sunning itself on a preferred rock. Inset: Watson Pond in Autumn.

I'm more connected to the life of the pond than ever!

While snorkeling this summer, I had a loon zoom past me underwater, and I stared down a snapping turtle at about 18 inches! I've gotten to know eastern watersnakes' favorite sunning rock. I've monitored the beaver grazing of the rush patches, and gotten to know a few big bass and their favorite haunts.

I now look forward to every swim! I can only hope I never find what I'm looking for!

So, with the disappearance of each Secchi disk and each snorkel around this little pond, "I say to myself, 'What a wonderful world!'" 🍁

## A Muse with a Secchi Disk

Contributed by Tom Hamilton, LSM Certified  
22 Years; Lake Anasagunticook, Hartford

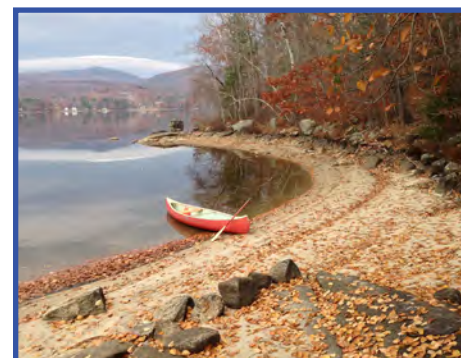
The lake is alive; it moves, changes, is home to a myriad of living things:



Tom Hamilton

plants, algae, bacteria, insects, crustaceans, fish, snakes, birds, annelids, amphibians, and humans. All are part of the lake. They live in, on, or with the lake.

They change with the lake. The wind pushes the waves that sigh upon the beach, and splashing on the rocks. With time, even they change. Creatures live and die; plants and algae grow and die. Detritus accumulates. The bottom rises. Marshes migrate and expand as the lake ages. The lake is alive. As seasons change, the lake changes. As nutrients mix, oxygen dissolves and the lake refreshes. Every year, every season changes the lake; what seems constant quietly changes. Humans are pulled to the lake; they take from the lake; they change the lake. They find sport and maybe peace. They recreate, but cannot re-create.



Canoe on the shores of Lake Anasagunticook.

We can't own the lake; we are part of the lake that we love. For our children and all who will come after us, we protect the lake. 🍁

## Friends of Cross Lake

Contributed by Cheryl & Kirk St. Peter, LSM Certified 1 Year; Cross Lake, T17 R05 WELS

The Friends of Cross Lake (FOCL) was started in 2018 by LSM certified water quality monitors, Kirk and Cheryl St. Peter, who are spearheading efforts to restore Cross Lake's impaired water quality. FOCL currently has 155 members who have joined us since August 2018, as well as many partners in our efforts.

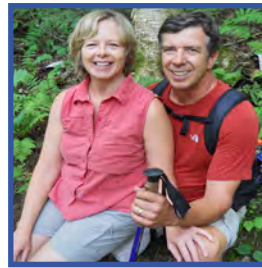
### Water Quality Monitoring & Other Activities:

In June, 2018, Kirk and Cheryl attended the Lake Stewards of Maine (LSM) lake monitor training and watershed survey training workshops, and began monitoring the lake after a gap of 9 years from previous monitoring efforts. In June, 2019, they also attended the LSM Dissolved Oxygen & Temperature (DO/T) training workshop and the Maine Department of Environmental Protection (DEP) provisionally trained 10 additional volunteers at Cross Lake, all of whom will be fully LSM certified in 2020. Biweekly Secchi disk transparency readings are being taken in 2019 and 2020 by FOCL and University of Maine at Fort Kent (UMFK) volunteers at 12

stations around the lake, with DO/T readings, as well as chlorophyll and total phosphorus samples, also taken at 2 stations. With FOCL and UMFK help, EPA completed a bathymetric map of the lake in July, wetland and stream samples were collected by DEP and FOCL in Dickey Pond, and Dickey & Daigle Brooks this summer (the two main tributaries), a gravel road workshop with State Soil Scientist, Dave Rocque, was held on August 2, and a LakeSmart program was started on August 17-18. To date, 12 camp lot evaluations have been completed.

### 2019 Watershed Survey:

FOCL received a \$1,000 grant from LSM to conduct a survey of the watershed (see group photo below). We engaged many volunteers and partners. The Land Use Planning Commission (LUPC) made all the survey maps; 90 total! The Fort Kent Natural Resources Conservation Service (NRCS) staff with help from UMFK students and drones completed the agricultural land survey, looking for soil erosion sites on farmland in the watershed.



LSM certified lake monitors Cheryl and Kirk St. Peter are spearheading efforts to restore the water quality of Cross Lake.

On June 8th, 30 FOCL volunteers with 4 technical leaders started the survey of developed land around the lake and on the public roads, also looking for soil erosion. The Maine Forest Service and a FOCL Forester volunteer surveyed the forestland. All this data will be compiled in a report available in the next several months.

### USDA National Water Quality Initiative (NWQI) Project:

Cross Lake's watershed was chosen as a USDA NWQI project, providing additional annual funding (\$250,000±) and technical assistance to our watershed farmers for years to come!

### Watershed Based Plan:

With our partner, the County of Aroostook, FOCL received the highest score on a competitive grant to develop a Watershed Based Plan (WBP). With the grant, cash and in-kind contributions, the WBP will use survey and monitoring data, with analysis and modeling, to describe actions needed to restore Cross Lake to meet state water quality standards in the next 10 years!

### Algal Bloom:

Unfortunately, Cross Lake also experienced a lake-wide blue-green algal (cyanobacteria) bloom that lasted over a month, starting on September 10, 2019, which has reinforced FOCL members' and our partners' determination to restore Cross Lake's water quality! 🌱



## Lovell Area Education & Outreach

Contributed by Diane Caracciolo, Lovell Invasive Plant Prevention Committee; Kezar Lake, Lovell



2019 Invasive Plant Patrol workshop on Kezar Lake.

The Lovell Invasive Plant Prevention Committee (LIPPC) is a town of Lovell committee, charged with the mission of detection, prevention and eradication of invasive aquatic plants in the Kezar Lake Watershed. Over the years, we have realized that education and awareness is one of the best ways to prevent the spread of invasives. *With the support of Lake Stewards of Maine (LSM), we have developed a strong outreach in our community.* The accompanying photos capture some of the many ways we spread the word about invasive aquatic species. *We are extremely*



LIPPC parade float at Lovell Old Home Days.

*grateful to LSM for their guidance and support in our mission to keep invasives out of our watershed!* 🌱

## Four Days in 2019

Contributed by Bunny Wescott, LSM Certified 12 Years and Sibyl French, LSM Certified 12 Years; IPP Team Leaders; Panther Pond, Raymond

“When you come to a fork in the road, take it.” ~Yogi Berra

We took the road more traveled by, and it made no difference as the two forks rejoined again in a matter of a few miles. Certified LSM IPP and Board Member, Sibyl French and I, in a Subaru Outback filled with emergency items: tent, food, cooler, sleeping bags, come-along, two spare tires, water, trenching tool, and hatchet were followed by fellow IPPer, Dennis Roberge, in his new pickup, equally equipped. (Dennis holds the statewide records for most waterbodies surveyed for aquatic invaders [128], as well as most surveys reported [334]. He is also a major contributor to LSM's *Pixie Williams Herbarium*.) We were each carrying our standard gear: kayaks, canoe, paddle, PFD's, scopes, rakes, resealable plastic bags, plant ID books, and hand lenses. Our mission? To survey and botanize on some never-before-surveyed lakes in Maine's deep north

woods—pristine, remote waters which we would access by way of a complex web of gravel logging roads, gaining deeper and deeper entry through a series of logging company checkpoints.

Over shale, mud, ruts, and bark debris we traveled to meet up with our PhD-sporting IPP counterparts, Mark Whiting and Keith Williams, who organized the effort. Our accommodations were log cabins with gas lights and stoves, set snugly around a sportsmen's lodge with central outhouses and hot showers. From Loon Lodge on Round Pond we were able to access other remote lakes and streams, and over the next four days we spent many happy hours collecting and examining the local aquatic flora. *Our collective inventory accounted for over 50 native plant species (with no non-natives of concern) and many other 'incidental' wonders as well, including a bald eagle, a moose, several herons, meteors, and rock mounds made by fish.*



Intrepid IPPers surveying remote Maine lakes.

Why did we go?

- Curiosity: How are northern lakes similar to (and different from) our more southerly lakes?
- A chance to learn from those with more expertise
- To broaden our perspective, and to become more skilled at this work, so we may be a better resource for LSM and for our Panther Pond IPP team—the PPippers
- To branch out and go beyond, joining on to a mini-adventure with a purpose and focus
- The thrill of the open road and the chance to be immersed in sights, sounds, smells, and touches not yet accessible on Google Earth 🌐

## Jumping in With Four Feet!

Contributed by Wendy Porter, LSM Certified 3 Years; Shagg Pond, Woodstock

Community Lakes Association has been battling invasive variable water-milfoil in Shagg Pond and Lake Christopher for over a decade. Four years ago, Donnie and Wendy Porter decided to get involved in the local effort to control and prevent the spread of aquatic invaders in their community, and began attending a variety of LSM training seminars, as well as networking events such as the Maine Milfoil Summit.

It was not long before the Porters found suitable outlets for their passion and resolve. Donnie is now CLA's Invasive



Wendy Porter giving instructions to a volunteer during an Invasive Plant Patrol Plant Paddle on Twitchell Pond in 2019.

Species Coordinator, coordinating the removal of 15,000 gallons of variable milfoil from CLA waters, and the deployment of 299 benthic mats, with 3.4 miles of rebar attached to keep them in place. (He recently expanded his efforts beyond his local waters, going to work for New England Milfoil in

2019, where he removed over 10,000 gallons of invasive plants from Maine waters.) Meanwhile, Wendy has taken on the role of CLA Board Education Chair, conducting Invasive Plant Paddles on ponds throughout the Greenwood/Woodstock area and coordinating CLA's local IPP team. In addition to her IPP leadership, Wendy also volunteers as the regional coordinator for the Maine Audubon Annual Loon count; she is responsible for 53 lakes and ponds in western Maine.

If you are interested in getting involved with Community Lakes Association programs please contact [commmlakesassoc@gmail.com](mailto:commmlakesassoc@gmail.com). 🌐

**SAVE THE DATE! 2020 LSM ANNUAL LAKE MONITORING CONFERENCE WILL BE HELD ON SATURDAY, JULY 25TH**

## My Years with LSM/VLMP

Contributed by Richard Offinger, LSM  
Certified 42 Years; Cathance Lake, Cooper

Many years ago, I noticed a newspaper article saying that the Maine DEP\* was looking for citizen volunteers who would be interested in collecting data related to water clarity in Maine's lakes. That interested me, so I quickly responded to offer my services, and so began my longtime association with the program. I believe that was back in 1973, as I remember my daughter Carrie, who was born in November of 1972, being in a playpen at our cottage on Cathance Lake when a fellow from the DEP arrived to train me. Although I did take a couple of years off later on to tour Virginia with a musical group I was playing with, I eagerly jumped back into monitoring Cathance Lake upon my return to Maine in 1977.

Around 1990, the Maine DEP was experiencing extensive funding cuts, and asked if anyone currently in the Maine Volunteer Lake Monitoring Program (VLMP; now *Lake Stewards of Maine*) who had computer programming knowledge would be interested in developing a data entry program which could be used by volunteers who were trained to enter lake water quality data. This seemed like a natural extension of my involvement, as I had just graduated with an Associate of Science degree in Computer Science



Richard Offinger

from Andover College in Portland. Taking the then-current database files that DEP lake biologist Linda Bacon supplied me with, I developed a data entry program in the "C" programming language. The "Lakedata" program was first used by volunteer lake data entry coordinators at about the time that VLMP transitioned from the DEP to a nonprofit organization in the mid 1990's. The coordinators were trained to input data from data sheets submitted by VLMP

certified lake monitors. As time passed, I began hearing requests to develop a Windows based data entry program, and in 2007 I released the first such Lakedata program, which I developed using Borland Delphi Professional software. Each year since then, I have continued to update and enhance the Lakedata program as necessary to incorporate database changes.



Richard Offinger with trusty sidekick, Hachi.

Three years ago, I was diagnosed as having macular degeneration, cataracts,

and glaucoma, and also experienced a shoulder injury as the result of a hard fall. I began wondering how much longer I will be able to keep up my lake monitoring activities. Having explained this to a membership meeting of the Cathance Lake Association, and asking for a show of hands of those who might be interested in taking over my monitoring activities, I was quite surprised that not a single hand was raised. In thinking about this, though, it became apparent that because of Cathance Lake consistently being rated as having exceptional water quality and clarity, none of the membership is feeling concerned that an event could cause a sudden and continued decline. Luckily, I have found help from another Cathance summer resident, James Ihle, who has taken me out on his boat for monitoring sessions. Without his help, I could not have continued to monitor after suffering my shoulder injury, as I no longer had the ability to haul anchor from a depth of 100 feet at the deep basin. I do hope that a young adult will soon step up and make a long-term commitment to take over when I inevitably must step down.

In closing, I must say that my own long-term association with the LSM/VLMP, and the friendships that have evolved over this period of time as a direct result of my participation, have truly been a most rewarding experience. ☺

*\* Note: Prior to 1996, the VLMP (now LSM) was managed by the Maine DEP – Ed.*

## Recruiting the Next Generation

Contributed by Ross Swain, LSM Certified 25 Years, and Christine Swain, LSM Certified 9 Years; Ellis (Roxbury) Pond, Byron



Annabelle learning how to take a Secchi reading.

Last winter our niece, 7-year-old Annabelle Withey, told her mom that come summer, she wanted "to see what Aunt Steen & Uncle Ross do at their pond."

It took all summer for our schedules to agree, but in early September, Annabelle and her mom, Sondra Withey, were able to join Ross for a short boat ride to take a Secchi reading and a DO/Temp profile. It was Annabelle's first boat ride, unless you count a Storyland ride, and she was a little nervous. Once on the water, though, her curiosity got the better of her and she became thoroughly enthralled with the experience.

At the end of the trip, Annabelle left with her own data sheet to take back to



Ross Swain with his niece, Annabelle Withey, and her mother Sondra.

school for show-and-tell. She still talks about her adventure. ☺

## IPping In Style

Photos contributed by Lon Cameron & Tyler Kidder,  
Invasive Plant Patrollers on Wilson Pond in Wayne



Invasive Plant Patrollers Tyler Kidder and Lon Cameron conducting an invasive aquatic plant screening survey on Wilson Pond in Wayne from the comfort of their floating picnic table.

There is no one-type of watercraft best suited for conducting screening surveys. As long as your watercraft affords comfortable viewing, is easily maneuverable, with a relatively shallow draft and ample space to stow gear, you should be good to go. We are delighted to share Maine's latest, and perhaps most innovative, invasive aquatic plant survey craft.

Kudos to Lon, Tyler and Buoy!

~ the Editor ☘



Canine patroller Buoy, showing off his prized bucket scope.



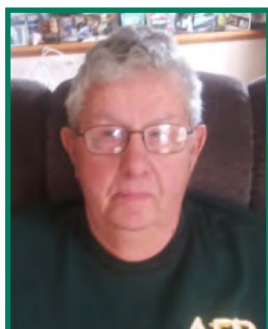
Lon created this unique viewing platform by constructing a picnic table (using pressure treated wood for the frame and cedar for the benches and tabletop) to fit over some repurposed dock floats. The rig, which sports a battery-powered trolling fishing motor, a beach umbrella and multiple cup holders, can hold about seven people or 900 pounds.

## Worthley Pond Stewardship

Contributed by Dave Clement, LSM  
Plant Patroller; Worthley Pond, Peru

My interest in having good water quality in our Maine lakes, ponds, streams, rivers, and wetlands started when studying forestry at the University of Maine, but really took on new life when we purchased our family camp at Worthley Pond in Peru. The year we bought in 1991, a group of owners were reorganizing and starting the local camp owners association. Their first goal was to work on ensuring the pond's water quality remained good. To do this, they started annual monitoring of the water quality through the Volunteer Lake Monitoring Program (VLMP; *now LSM*) Then we needed to start learning what project(s) would help maintain our very clear water, which was already above the average for Maine lakes.

We learned invasive plants could get into our pond, so we started a Courtesy Boat Inspection (CBI) program. We now employ both paid staff and volunteers to inspect boats at two launch sites on the pond. We also started learning how to become early detectors. Several of us signed up for LSM's Invasive Plant Patrol (IPP) 101 to learn how to survey our pond for suspicious plants. (I have actually taken



Dave Clement

the course a couple of times now.) With the trainings, the LSM plant keys, and practice on the water, we have steadily gained confidence in our ability to spot invasive plants, if and when they should arrive. When in doubt about a plant identification, we head to LSM headquarters in Auburn to get verification.

In 2007, as I was finishing a two-year stint as President of the Worthley Pond Association, I was introduced to the LakeSmart program, an effort to teach shore lot owners how to improve their land, so little or no runoff containing contaminants, such as phosphorus that promotes the growth of algae, enter the pond.

In 2007 we started a LakeSmart Program at Worthley Pond, with close to 30 landowners signing up. This program has grown to include 150 properties around the lake, and over 50 owners certified as LakeSmart. In 2018 we received the Gold Pond

Award from Maine Lake Lakes Society for having over 15% of our shore lot properties certified.

In 2016 we did a Citizen Watershed Survey, coordinated by LSM and Maine DEP staff, to locate areas of work that needed to be done to protect Worthley Pond's water quality. To date, over 90% of properties cited by this study that needed improvement have been corrected or are being addressed.

Today our pond's water quality is stable or improving, which we know thanks to our LSM Certified Lake Monitor, Bruce Paster, who takes regular Secchi disk (water clarity) readings throughout the summer. Our three conservation programs: Invasive Plant Patrol, Courtesy Boat Inspection (CBI), and LakeSmart continue to protect the lake. The backbone of these programs is the education and the commitment of our association members who Monitor, Inspect, Patrol, and are Smart managers of their own properties. Thanks to Lake Stewards of Maine for offering the educational courses and technical support that help the Worthley Pond Association raise its Water Quality to higher standards. ☘

## Toothaker Pond Turnaround!

Contributed by Adrienne Rollo, LSM  
Certified 18 Years; Toothaker Pond, Phillips

My name is Adrienne Rollo, and I have been an LSM certified lake steward on Toothaker Pond in Phillips since 2001. The pond was pea green with algae at that time, and I wanted to learn what had caused it and how could we clean it up. I contacted the Maine Department of Environmental Protection (DEP) to inquire as to whether or not they would allow the camp owners to apply barley straw to inhibit the growth of algae. Many area professionals including environmental engineers, professors and scientists, as well as the Maine DEP, were called on to lend their ideas and expertise to the restoration process. The more I learned, the more I wanted to know.

After nearly twenty years of endless determination by camp owners, Toothaker Pond is now free of pea soup algae blooms. Many individuals were called on to lend their ideas and expertise to the restoration process, including Maine DEP.

To make a long story short, the initiative came down to identifying and diverting a major source of phosphorus from an upstream fish hatchery that discharged into Meadow Brook, a tributary of the pond. The nutrient and bacteria-rich waste from the hatchery would “cook” during the summer months, resulting in major algal blooms. Secchi disk readings in those days often dropped below 1.0



Toothaker Pond resembled pea soup in 2003.



Toothaker Pond turnaround over 10 years later!

meters! The decision was made (and permitted by DEP) to redirect the brook into the lake, and to discharge the hatchery waste below the outlet of Toothaker, bypassing the pond altogether.

Once that hurdle had been achieved, the next step was to purge the pond of algae and phosphorus through a series of temporary drawdowns to enhance flushing of the pond. The first of these took place in September of 2007, and then again in 2009. In each case, the concentration of phosphorus in Toothaker was reduced. DEP was impressed with the response! In 2012, the pond outlet was rebuilt, and a small dam with flashboards was constructed, in order to be able to carefully control future drawdowns/flushing.

We have employed this method each August (when algae growth peaks) since 2012, except for one year when the pond was exceptionally low, due to a dry summer.

*I'm happy to report that Toothaker Pond is healthy once again! The days of green*

*foul-smelling algae are now a thing of the past. Secchi disk readings in recent years have improved to as much as 4.6 meters, and even the poorest readings of the season have been above 3 meters! Phosphorus levels that were once as high as 23 ppb in 2004 were as low as 8.8 ppb in 2017. The pond isn't crystal clear yet, but it is very close, and still healing. It just keeps getting better, year after year!*

Of course, as we all know, every lake is different. What works in one lake doesn't necessarily work in others, and our circumstances with the fish hatchery were unique.

These two photos (above) tell quite a story. Pea soup algae plagued Toothaker Pond in 2003, and as you can see, we had clear water in 2014. What a difference a decade, (and a lot of hard work) makes! ☘



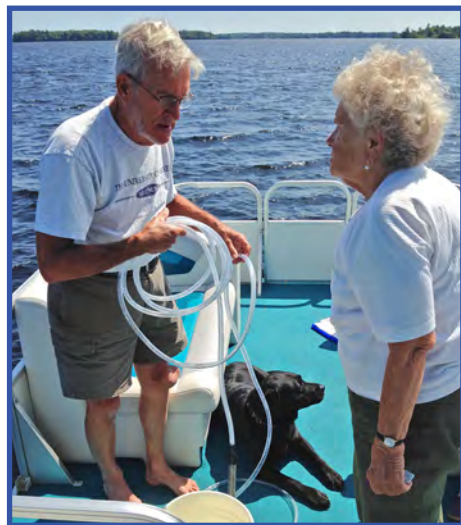
Adrienne Rollo, Toothaker Pond Lake Steward.

## In Appreciation of LSM Lake Stewards, Lou and Dorli Cloutier

Contributed by Rich Dressler, Greater  
Pushaw Lake Association; Pushaw Lake,  
Old Town



Lou and Dorli Cloutier have been long-time members of the Greater Pushaw Lake Association, LSM-certified water quality monitors for 12 years (*see photo at right*), and recently went through refresher training on invasive aquatic plants with Roberta Hill from Lake Stewards of Maine. They were the proud recipients of a LakeSmart Award for their camp (*see photo at left*), and also participate in the Annual Loon Count on Pushaw Lake. *Thank you, Lou and Dorli!* ☘



## In Appreciation of LSM Lake Stewards, Mary Ryan, and Wynn & Sandy Muller

Contributed by Friends of Wilson Lake;  
Wilson Lake, Wilton

**M**ary Ryan began monitoring the water quality of Wilson Lake in Wilton over 30 years ago, when she was trained and certified by LSM (*then VLMP*). She was motivated by, of all things, seagulls. Wilton had an open dump in the 1980s and it drew flocks of seagulls that ate at the dump and did their business in Wilson Lake. Very concerned about the effect on water quality, Mary began testing for water clarity and water quality in 1986. Recognizing the need for better oversight, she served as a founding member of the local lake association, Friends of Wilson Lake (FOWL) in 1989. Over the decades, Mary has served in various roles in FOWL, including president, and continues on the board of directors today.



Mary Ryan, having received her LSM 30-Year Service Award in 2016, pictured along with fellow LSM lake steward, Rob Lively.

In 1999, Mary was involved in the establishment of the 238-acre Foothills Land Conservancy at the head of Wilson Lake, with the goal of limiting the amount of erosion, run-off, and nutrients entering the lake. The property, which includes where Wilson Stream meanders into the lake, is open to the public, and is now used for educational tours and nature walks. Not surprisingly, her camp on the lake was one of the first to be certified as LakeSmart. She was

one of the crucial volunteers for two big Watershed Surveys, in 1994 and 2016. She also serves as one of the adult support team for the Courtesy Boat Inspection monitors.

*Mary has been taking Secchi disk readings on Wilson Lake each summer for 33 years. Such a sustained history of dedication makes her one of the longest-serving lake monitors in the state. Well done, Mary, you have made a difference!* (BTW—when Wilton closed the “dump” and became a transfer station, the seagulls disappeared.)

~ ~ ~ ~ ~

**Wynn and Sandy Muller**, ever since they arrived in Wilton in 1987, have been a dynamic duo in promoting the health of Wilson Lake through the Friends of Wilson Lake (FOWL; Wynn—president 2003-2015), and at the state level through Lake Stewards of Maine (LSM), and Maine Lakes Society (MLS). Their leadership, their encouragement of other organizations and individuals, and their continued emphasis on learning more and doing better, make them models of commitment for protecting and preserving our lakes for the future. Through the decades, they have devoted their talents, time, and appreciation of science to building community awareness (and taking action!) to protect Maine lakes.

A few of their accomplishments include:

- They are certified Stewards of LSM, and they facilitate re-certification workshops by providing their pontoon boat
- They conduct regular testing of Wilson Lake for transparency, dissolved oxygen and temperature, phosphorous, using their boat
- Continue to attend LSM workshops and classes in water testing, invasive plants, etc.



LSM lake stewards Wynn and Sandy Muller (certified 8 years), pictured along with Courtesy Boat Inspector Kahryn Cullenberg.

- Regularly provide free boat rides for individuals and organizations—residents and visitors, with commentary on lake wildlife and lakeshore management
  - Helped establish the Courtesy Boat Inspection Program (CBI) at Wilson Lake, and continue to be involved in its administration each summer
  - Helped coordinate 2016 Watershed Survey for Wilson Lake, Pease Pond, and Varnum Pond
  - Help facilitate the remediation projects and other recommendations that emerged from the watershed survey and a 319 government grant
  - Continually work to strengthen FOWL's relationships with Town of Wilton, UMF, and local businesses
  - Raise public awareness of lake issues through newspaper articles, the FOWL newsletter, and other opportunities
  - Work tirelessly to promote the LakeSmart and LoonSmart programs and to certify properties, welcoming new lakeshore residents and encouraging others
- The Mullers have a wide focus on what will help our lakes. Their ability to zero in on important short-term details as well as planning for large-scale future projects is a major part of why FOWL was named Lake Association of the Year by the MLS in 2018. Wynn and Sandy deserve personal recognition for their tremendous work on behalf of the lakes they love. 🌱

**Please note:** LakeSmart is a Maine Lakes Society program, and the Courtesy Boat Inspector (CBI) program is managed by Lakes Environmental Association. LSM works in partnership with both organizations.

*Inspired to share a story of your own?*

*We can't wait to see it! Please contact us today!!*

# Thank You!

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Major funding for LSM is made possible through grants from the Maine Department of Environmental Protection, and the US Environmental Protection Agency.

### In Kind

And for those of you who have donated your time, expertise, and dedication to the work of the LSM in the past year— many thanks!

### In Memory Of

*Louis & Claire Boeri ~ Charles & Linda Whitten*  
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### In Honor Of

*Ross & Bunny Wescott ~ Jefferson Eaton*  
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*The LSM Board is considering listing individuals by donation levels in the future.*

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<i>Allen Pond Improvement Association</i>	<i>Green Lake Association</i>	<i>Pleasant River Lake Association</i>
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<i>Greater Pushaw Lake Association</i>	<i>Pitcher Pond Improvement Association</i>	

# 2019 LAKE MONITORING CONFERENCE



A decade of hard work is recognized for these lake stewards (L-R) Buddy Cummings, Marsha Letourneau, Denis Mancine, John Welch, and Michele Windsor.



A hearty congratulations goes to Bob Susbury, for 45 years monitoring Howard Pond!



Accolades to this group of 5-Year lake stewards (*listed alphabetically*): Janet Bissell, Betty Chesley, Paul Chesley, Katie Greenman, John Greenman, Sharyn Reetz, Wayne Reetz, Willard Richards, and Debra Smith.



Celebrating 15 Years of Lake Stewardship are (L - R) Mike Cloutier, Fred Cummings, Buffy DeMatteis and Susan Sokol. *Missing from photo is Pixie Williams.*



Ellie and Willis White were honored for *Extraordinary Lake Stewardship and Leadership* in the Rangeley area, and beyond.



Lloyd Irland, PhD, presented his research on Maine lake ice-out dates and trends.



Debbie Roe, the driving force for early detection on Flying Pond in Vienna, is honored as *IPP of the Year*.



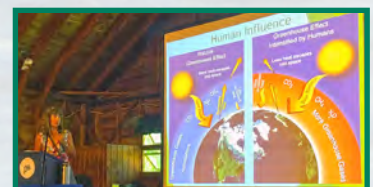
Katie & John Greenman accept the award for *IPP Team of the Year* for the Alamoosook IPP team, Alamoosook All Clear. LSM intern Sarah Hammond models Katie's amazing invasive plant costume.



Ross Swain is all smiles accepting his award for 25 years of lake stewardship!



Linda Bacon of Maine DEP informed conference attendees on the *Influences of Climate Change on Lake Water Quality*.



LSM's Roberta Hill presents on the *Effects of Climate Change on Invasive Aquatic Species*.



LSM's Spencer Harriman introduces LSM's new online app, *Maine Field Guide to Aquatic Phenomena* (available in app stores soon).



Congratulations to kayak winner and 7-Year lake steward, Tony Tedeschi, already on the prowl for invasive aquatic plants!



Peter Fischer of Boyd Pond (R) along with Bill Gawley (L) of Acadia National Park shared some thoughts on their multiple decades of lake stewardship.



Hancock County IPP Regional Coordinators, Mark Whiting and Catherine Fox were recognized for *Outstanding IPP Leadership*. Here, fellow Hancock County IPPer, Billy Helprin, accepts their award.

THANK YOU TO OUR GENEROUS CONFERENCE SPONSORS!\*



\*Please see page 20 for additional conference business supporters.

# ALGAL (CYANOBACTERIA) BLOOMS, HARMFUL ALGAL BLOOMS AND CYANOTOXINS IN MAINE LAKES

by Linda Bacon

LSM Quality Assurance Officer; Aquatic Biologist,  
Maine Department of Environmental Protection

## Background:

Cyanobacteria, formerly called blue-green algae, are photosynthetic bacteria that can be found in all Maine surface waters. Cyanobacteria blooms occur when the nutrient phosphorus in the water reaches a high enough concentration to support their reproduction. Nutrients get into our lakes due to erosion, stormwater runoff, failing septic systems in their watersheds, and to a lesser extent, from the atmosphere. Also, because our ice-cover season is decreasing, the lake's growing season is increasing, as are water temperatures. Warmer water temperatures promote more algal reproduction, so climate change is likely a contributing factor.

Not all algal blooms produce cyanotoxins. Maine Department of Environmental Protection (DEP) defines a *planktonic* algal bloom as a nuisance bloom when Secchi disk transparencies fall to 2 meters (6.6 feet) or less. When lakes reach this point, total phosphorus concentrations are generally above 15 parts-per-billion (ppb). We currently consider that lakes having Secchi disk transparencies less than 1 meters (3.3 feet) as having a Harmful Algal Bloom (HAB). This term is applied conservatively. Not all lakes that are experiencing a HAB are producing toxins.

DEP has been monitoring lakes for toxins for about a decade. Our initial work focused on lakes that are chronic bloomers to determine which toxins are problematic in Maine. Microcystin (MC) was the only toxin we found in our early work, so we have been focusing on determining how common it is in the state. In each of the past 5 years, we have visited chronic bloomers to identify the magnitude of MC concentrations. We've obtained samples from open water, near the shore, and from



algal scums, if present. We've re-visited a subset of these lakes for a few months to see how concentrations change over time.

We have also randomly chosen between 20-27 lakes each year to determine the extent of the problem in larger lakes in populated regions of the state, and have just set up the analytical test at the Health and Environmental Testing Lab so that samples can be processed in Maine. Results from the testing, including a list of lakes tested, should be available within a few months. These toxin results are only a snapshot of conditions, and are not representative of the conditions before or after samples were taken. We will use these results along with the other parameters we measure to define conditions that *could* result in toxin production. There are too many lakes in the state, and too many days during the summer, to ever know for sure

when toxins are present; but if we know what conditions lead to toxin formation, we can make informed decisions and manage risk.

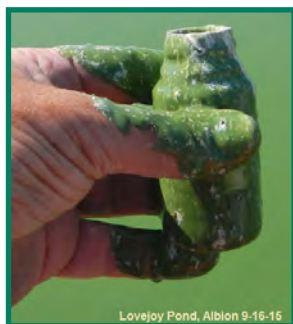
Toxins seem to be produced when blooms reach the point where the lake water looks and feels like pea soup. We've

measured the highest concentrations in blooms that are beginning to die off [mid- to late September, in algal scums that have accumulated along the shore (MC > 10,000 ppb)]. The worst scums look like green paint and produce odors that range from cut grass to a foul smell of decay.

In the meantime, we advise people to avoid spending time in water if they can't see their toes when standing in water chest deep (4-5 feet deep) and the water is green or olive-green. When one staff member was asked if she'd let her kids go into a lake that is blooming, she'd respond "absolutely not, but not because of the algae, because if they were to get hurt (hit their head and go unconscious), no one would be able to see them."



*Benthic* forms of cyanobacteria, more common in flowing waters than in lakes, can produce the toxin **anatoxin**. The nickname for anatoxin is 'very fast death.' This form grows happily on the bottom of rivers and streams until the mat they form gets too thick. During photosynthesis, these mats produce oxygen. When the mats get thick, the oxygen bubbles get trapped in the mat and cause it to rise to the surface, wash downstream and accumulate along the shore. These decaying mats stink. Dogs LOVE stinky things and are attracted



to them. If they inadvertently consume water around these mats, they may ingest anatoxin, which can kill them within a few hours. Early 2019 dog deaths in Fredricton, NB, were attributed to anatoxin poisoning from algae washed up on the shore of the St. John River. DEP staff are on the lookout for this type of algae in Maine waters. In fact, one small pond in a South Portland dog park was posted as a precaution in September of 2019 because the genus *Oscillatoria* was discovered, some species of which can produce anatoxin.

### Resources people can use to evaluate a Maine lake:

(1) One resource the public can use to help them evaluate the risk of encountering cyanotoxins in ‘their’ lake is the DEP website, which includes a list of lakes that have had one or more blooms: <https://www.maine.gov/dep/water/lakes/cyanobacteria.html>

The site provides some background information then toward the bottom (second-to-last section) there is a link to a list of ‘Lakes at risk of having an algal bloom.’ Clicking on the link brings up a list of 122 lakes (see above image). [Link address: <https://www.maine.gov/dep/water/lakes/bloomrisk.html>]

Each lake on the list has bloom **Frequency** and **Risk** listed in the right-hand columns. If a lake is not on this list, the likelihood that there is a bloom or algal toxins is Low.

(2) A second resource people can use is the Lakes of Maine website, where they can look up a specific lake. The address is: <https://www.lakesofmaine.org/>

On the right side of the page is a box with “SEARCH for Your Lake”. They can enter the lake name, click on the *Search* icon, and a list of lakes with the lake name they entered will

appear, along with an associated town. When they click on the lake name, the *Lake Overview* page appears (if there is only one lake with that name, it will immediately go to the overview page). Direct them to click on *Water Quality*,

elevated toxin concentrations, similar to how they can close town beaches when they find elevated bacteria levels. Thus far, DEP does not have statutory (legal) authority to close waterbodies. The Maine CDC will be using data

## Maine Lakes at Risk of Having an Algal Bloom

### Frequency of blooms

**Often:** Annually or near-annually  
**Sometimes:** 2-5 years (sometimes more in past)  
**Rarely:** One year on record

### Risk of future blooms

**Very High:** will likely bloom annually  
**High:** will likely bloom again  
**Moderate:** could occasionally bloom  
**Low:** unlikely given other data

Show  entries

Search:

LAKE	TOWN	LAKE ID#	FREQUENCY	RISK
ABRAMS P	EASTBROOK	4444	Sometimes	High
ADAMS P	BOOTHBAY	5366	Rarely	Low
ANASAGUNTICOOK L	HARTFORD	3604	Rarely	Low
ANDROSCOGGIN L	LEEDS	3836	Rarely	Moderate

just above the lake name. The page that appears contains *Color Ramp* graphics. The background color represents the range in water quality, with respect to algae, we see in Maine lakes. The yellow diamond indicates where the selected lake lands on this continuum. When the mouse pointer is placed over the diamond, the long-term average value for that parameter will appear. The first graphic is for Secchi transparency. If the number is more than 3 meters, the lake probably does not produce HABs. On the same page in the top right are HTML icons labeled *Station 1*, etc. If they click on the *Station 1* icon, the water quality report for the lake appears. The first graph shows a summary of all the data we have for the lake. Average Secchi Transparency for each year is indicated by the Secchi disk symbol, the minimum and maximum readings for each year are indicated by arrows above and below each symbol. If the minimums are above 2 meters, the lake hasn’t had any documented nuisance blooms and likely has no toxins.

### Additional Considerations:

There are Federal Standards that Maine uses to evaluate toxin concentrations. Local municipalities can close their properties to swimmers if they discover

collected by DEP to determine how best to approach the cyanotoxin issues (advisories, closures, etc.).

It is important that people are aware that they should never drink untreated lake water. There are things that can make them sick, like Giardia– a parasite which causes ‘beaver fever,’ Cryptosporidium– another parasite that can cause flu-like symptoms, coliform bacteria and other pathogens.

The DEP Cyanobacteria web page (<https://www.maine.gov/dep/water/lakes/cyanobacteria.html>) includes the following tips to avoid problems:

- Do not accidentally ingest or drink lake water during a bloom. Well-maintained domestic water treatment systems may make lake water safe to drink by removing bacteria and parasites, but they are not guaranteed to remove algal toxins.
- If you shower with lake water, keep showers brief because breathing toxins in shower mist could cause health issues.
- Do not swim, water ski, or boat in areas where algae are visible (e.g., pea soup, floating mats, scum layers,

**Algal Blooms . . . continued on page 32**

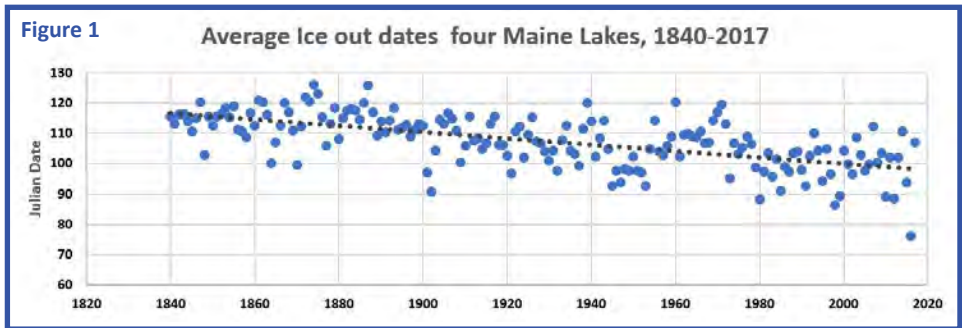
# Maine Lake Ice-Out Dates and Ice-Free Periods: *What's the Trend?*

Contributed by Lloyd C. Irland, PhD;  
Forester & Economist, The Irland Group

When the ponds are again open to the sky every spring, we all notice. We can all recall seasons when the ice-outs occurred very early or very late, or when lakes froze over unusually early, as they did in 2018. Few of us write them down and keep the notes over long periods, but a few people have done so. What are these records telling us? I have been making a hobby of collecting this kind of information and writing about it. The ice-out data here are taken from a USGS publication by Glenn Hodgkins, records kept by the Lakes Society, and updated from the Maine Bureau of Parks and Lands website and other sources. Here, I show you some results presented at the LSM Conference last summer. Not being an aquatic ecologist -- and lacking space -- I will not discuss the biological significance of these changes, but only observe that many scientists regard them as very important.

Ice-out and ice-in dates are interesting because the date a lake opens up integrates a host of influences, not all of which we can readily measure for scientific study. Factors such as previous season's weather, current temperatures, accumulated degree-days, late season snowfall or rainfall events, and windiness are all involved.

Ice-out dates are not instrumented observations. But they are usually taken by onsite observers with a specific need for the information. For a large lake, an observer may declare ice out when the view from a single point shows open water to the opposite shore or cove. It is understood that other arms of the lake may retain ice; ice in shaded coves could



persist for days. Many large northeastern lakes were raised by outlet dams in the 19th century, which may have caused a step change in dynamics of ice-outs. Some lakes have long been managed for log driving, power, and even flood control. A few have been raised in several stages. Adjusting the dates for such factors would be a difficult process. These charts show ice-out dates as Julian dates, which are the number you get when you number the days throughout the year, instead of within months.

*Surely there are more such records out there in private hands, in obscure reference works, minutes of lake association meetings, diaries, or town histories? My wife's uncle had a farm overlooking Sabbathus Lake; he wrote the ice-out date on a doorpost for many years. Do you have a relative who did this?*

A statistician looking at these numbers would observe a few things. These time series have a lot of volatility, but in fact their peak values rarely exceed 15% of the long-term averages. The dates show little correlation from year to year. Interestingly, the dates for nearby lakes are often not correlated at all, suggesting the importance of the lake's shape, orientation relative to prevailing winds,

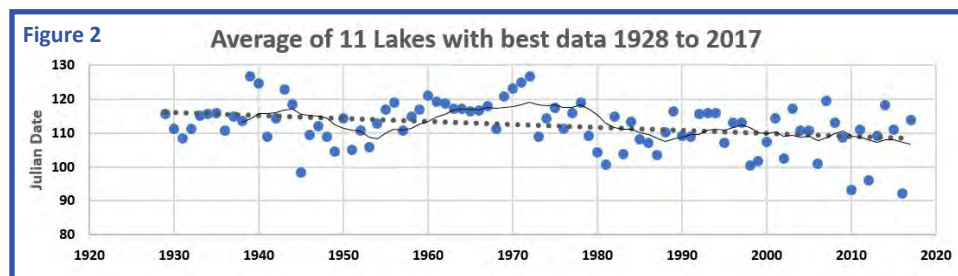
depth, and local weather.

This region's climate has undergone several long trends since the 1840's, all of which might affect lake ice cover. So, we are trying to analyze changes in lake ice cover regimes during a time of:

- Rebounds from Little Ice Age, up to roughly 1840s-1860s
- Rebounds from human disturbances of 1840-1940
- Ecosystem responses to post-1900 climate changes

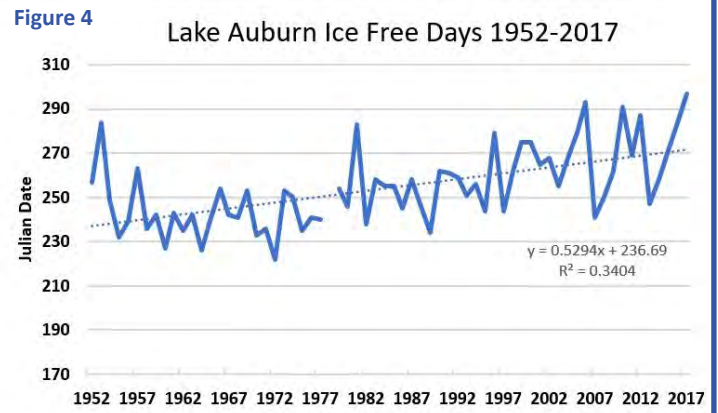
But what is the long-term trend? A sample of four large lakes (**Fig. 1**) with the longest records is a good place to start. The lakes are Cobbossee (5,516 acres), Sebago (29,992 acres), Lake Auburn (2,277 acres), and Damariscotta (4,486 acres). All are heavily used recreationally and support important fisheries. I prepared averages of all four from 1840 to 2017 (178 years). For perspective, Thoreau first visited Maine in 1843. Meteorologists use 30-year periods to define "normal" weather. Using that as a guide, ice-out dates from Thoreau's visit to the end of this period moved earlier, on average, by 15 days, or two weeks. When you realize that ice-in dates in fall moved later, the ice-free season on these 4 lakes is likely 3-4 weeks longer than in 1840-1869.

For a larger sample, we have fewer years of data. I chose 11 lakes with complete data since 1928, representing all the regions across the state (**Fig. 2**). This includes the 4 lakes above, plus 7 more. This chart shows a similar pattern, with an average change over the period of 0.89 days per decade.





Beginning stages of ice-out on Lake Auburn earlier in 2019.



Lake ice-out dates exhibit no regular, periodic cycles, but they often show deviations from the very long-term trend. Our longest series is for Sebago Lake (**Fig. 3**). The long-term trend is statistically highly significant. Looking at 10-year moving averages, though, you can see significant periods when the dates moved against the long-term trend. From the late 1820's to the 1870's, the dates moved later. Then they entered a roughly 75-year period on a declining trend, which once again reversed itself for 20 years; the late 80's to late 00's were against the long-term trend once again. Such reversals could easily happen again.

I promised to discuss lake ice regimes in this article, and not just lake ice-out dates. I can find only a few long-term records that show ice-in (freeze-up)

dates alongside the ice-out dates. These include 2 from Maine (Moosehead and Lake Auburn), one from New Hampshire (Mirror Lake), and one from Vermont (Lake Champlain). As **Figure 4** shows, the data from Lake Auburn, kept by the local water utility, shows a striking increase of 26 ice-free days between the averages of 1952-1971, and the 1998-2017. This difference is statistically highly significant. A change this large must have important biological effects.

In summary, a few things stand out: First, the large changes in ice-out and ice-free days since the 19th century accompanied a very small change in average annual temperatures. This is why seasonal weather regimes are so

important, and are obscured when people only talk about "Global Warming".

Second, the long-term trend, despite annual variability, is highly statistically significant. It is not a result of some random process.

Still, for brief periods, ice-out dates can move away from long-term trends. Any single year with a record early or late date has no significance.

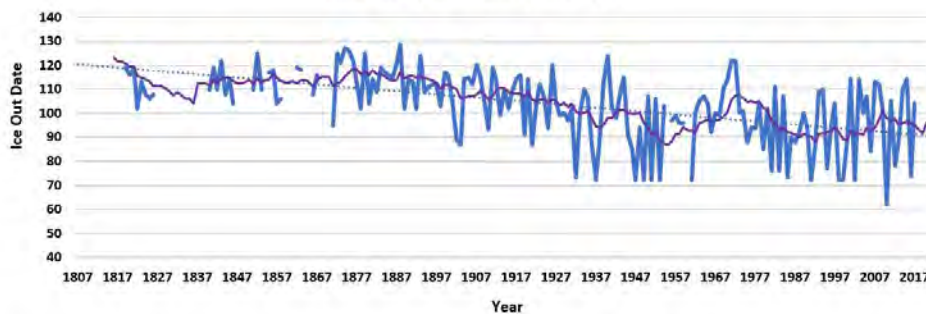
Finally, while we only have sparse data on total ice-free days per year, what we know suggests that ice-free days increase by more than just the shift of the ice-outs to earlier dates. ☀



Lloyd C. Irland was a junior author in the 2000 National Climate Change Assessment and the 2005 millennium Ecosystem Assessment; he attended the Copenhagen and Cancun Global UN Climate Summits; has lectured on climate change and forests in the US, Ukraine, China, India, and Greece. He is a Fellow of the Society of American Foresters.

**Figure 3**

Sebago Lake Ice-out Dates, 1807-2017  
with ten-year moving averages



## **WANTED:** Volunteer Water Quality Regional & Data Coordinators

Help with activities such as scheduling re-certification workshops, communicating with volunteers, and data entry. For more information, please contact us at [stewards@lakestewardsme.org](mailto:stewards@lakestewardsme.org), or 207-783-7733.

**REMINDER TO ALL  
LSM LAKE STEWARDS:**  
Help ensure the  
*Lakes of Maine* website  
will be complete by sending in  
any late data *today!*

Chinese mystery snails are native to parts of Southeast Asia. They were brought to North America as a food source for Asian markets. It is believed that imported snails were intentionally released in some areas to create a locally-harvestable supply. Since their introduction, Chinese mystery snails have spread to many parts of the United States, and can now be found in dozens of Maine lakes and ponds.

Once established in a waterbody, Chinese mystery snails may achieve very high densities and adversely impact native aquatic food webs. Chinese mystery snails may be transported, as adults or tiny juveniles, via bait buckets and water-holding areas on boats. When they die, they often wash up on shore, where their large shells can be easily seen and (unpleasantly) smelled. *Like other freshwater snails, Chinese mystery snails may serve as a vector for various parasites and diseases.*



The large invasive snails may compete with native snails for food and habitat and may contribute to their decline. Here, larger invasive Chinese mystery snails feed on a fish carcass alongside their smaller native counterparts. *Photo courtesy of Dennis Roberge.*

Chinese mystery snails are distinctively large, roughly the size of a walnut or golf ball (half-again as large as Maine's largest native freshwater snail). Unlike many aquatic snail species that prefer to live in flowing water, Chinese mystery snails prefer the quiet water of lakes, ponds, and slower portions of streams. Most feeding, mating and birthing takes place in shallow water during the warmer months of spring through fall. In the fall, Chinese mystery snails begin migrating to deeper water where they spend the winter. *C. chinensis* feeds non-

## Under the Hand Lens:



Snails and slugs eat with a jaw and a flexible band of thousands of microscopic teeth, called a radula. The jaw cuts off larger pieces of food and delivers them to the radula, which churns them up; snails also use the radula to scrape smaller particles from the substrate. Here a mystery snail cleans the aquarium wall. *Photo courtesy of AquariumCareBasics.*

selectively, primarily by scraping organic and inorganic material, including algae, from the bottom sediments and the surfaces of higher plants.

Like all snails, Chinese mystery snails are soft-bodied mollusks with attached protective shells composed primarily of calcium and other minerals obtained through the snail's diet. The snails are permanently connected to their shells by strong ligaments and other soft tissues. The surface of the foot, which terminates in a pointy 'tail,' is covered with tiny motile projections (cilia) which augment the wave-shaped muscular contractions of the foot, and facilitate the gliding motion.

Chinese mystery snails belong to a group of snails that have a hard "lids" made of protein on their tails called an operculum (oh-pur-ke-lum). Unlike some freshwater snails that are descended from land snails and obtain oxygen through a simple lung, operculate snails

are descended from marine ancestors and extract oxygen from the water with a single gill. In general, operculate snails are slower-growing and longer-lived than land-descended species.

Like other operculate snails, Chinese mystery snails are dioecious, meaning that reproduction requires two distinct organisms: a male and a female. Female mystery snails live up to five years, while males live up to three (occasionally four) years. In eastern North America, females generally contain embryos from May to August and young are born from June through October in shallow water.

Chinese mystery snail females give birth to live young. More specifically, an egg hatches inside the female and the juvenile

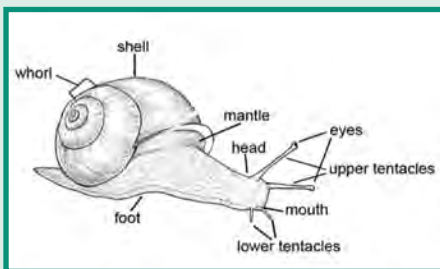


In addition to being uncommonly large, the shells of Chinese mystery snails are globe-shaped, almost as wide as they are high, with six to seven whorls, terminating in a cone-like tip. The inner coloration of the shell is white to pale blue. The outside of the shell is coated with a thin layer of tough pigmented material called the periostracum (pair-ee-oh-strac-um), that gives the shell its color. Adults are typically olive green, greenish brown, dark brown, or reddish brown, while juveniles may be lighter in color. *Photo courtesy of Moon Lake Riparian Association.*



When a Chinese mystery snail is threatened by a predator or problematic environmental conditions, the entire body of the snail can retreat inside the shell—head first, followed by the foot. When the snail is retracted into its shell, the hard operculum slams shut, providing an extra layer of protection for the snail. The opercula of Chinese mystery snails are distinctively concentrically-marked. *Photo courtesy of Jenna Turcott.*

snail grazes in a special pouch inside the mother's body. After a few weeks of feeding, a juvenile snail (about ¼-inch long), crawls outside the mother's body,



The snail's body is comprised of three distinct sections: a well-defined head with scraping mouth-parts and eyes strategically-perched atop protruding tentacles; the shell-encased mantle, folds of soft tissue that contain the internal organs; and a large muscular foot that is the animal's primary means of locomotion. *Image adapted from M.L. Coppolino.*

at which time the young snail is fully functional and ready to feed. Over the course of her life, a single female snail may give birth to more than 170 young.

The best way to help prevent the spread of Chinese mystery snails (especially those that are young and hard to see) is to ALWAYS CLEAN, DRAIN, and DRY your boat and gear between waterbodies. CLEAN plant debris, mud and algae from all boating and fishing gear and dispose in trash. DRAIN live well, bilge water, and engine water away from waterbody. DRY any gear that comes into contact with water.

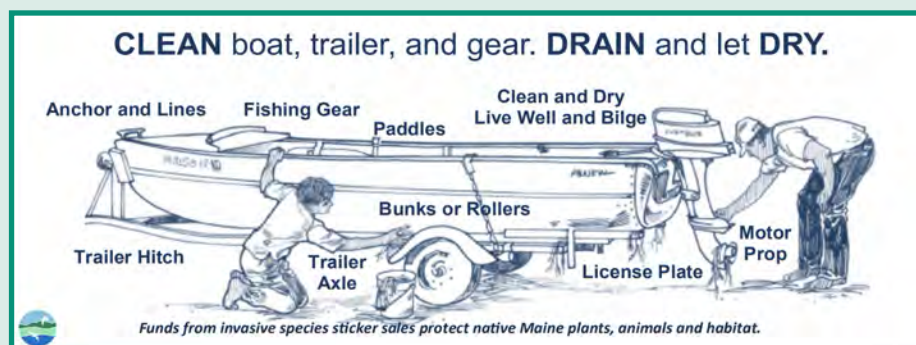
Snails are a common food item for many species of ducks, fishes, crayfishes, and turtles, so making sure your lake ecosystem stays healthy, providing excellent wildlife habitat will also help to keep snail populations under control.

To learn more about how one community in Maine deals with Chinese mystery snails, please see *Square Pond Snail Snatchers* on page 10.



Juveniles also have a detailed pattern on their periostracum consisting of rows of tiny hairs with hooks on the ends. (The rows of hooked hairs, best seen with magnification, can help in distinguishing a young Chinese mystery snail from similarly-shaped native snails.) *Photo courtesy of Minnesota Department of Natural Resources. Inset: Newborn snails. Photo courtesy of Life With Pets.*

Lake Stewards of Maine (LSM) currently manages a statewide database on reported sightings of *C. chinensis malleatus*. You can assist the effort to get a better handle on this invasive organism by reporting any sightings to LSM at 207-783-7733 or [stewards@lakestewardsme.org](mailto:stewards@lakestewardsme.org).



SOURCES: Chinese Mystery Snail Review - J Waltz 2008; Citizen Lake Monitoring Network; Freshwater Snails in Maine - K Hotopp 2016; Global Invasive Species Database; Gulf States Marine Fisheries Commission; Indiana DNR; Michigan DNR; NOAA GLANSIS; US Fish & Wildlife Serv; US Geological Surv; Wikipedia

## MAINE'S INVASIVE PLANT PATROL

2019 was another banner year for Maine's Invasive Plant Patrol (IPP). Thanks to the support of our friends, funders and partners, LSM was able to conduct 16 IPP training events across the state of Maine in 2019. Over 287 people attended one of more training events in 2019 and of these, 95 opted for IPP Certification, bringing the current total number of Certified IPPs to 704. *We especially wish to thank our 2019 IPP workshop hosts! Without your leadership, energy and efforts, the IPP program—as we know it—would not be possible!*

7 Lakes Alliance Abrams Pond Acadia National Park Acton-Shapleigh Youth Conservation Corp Alamoosook Lake Assoc  
Barker Pond Assoc Bickford Pond Assoc Branch Lake Assoc Chemo Pond Lake Assoc China Lake Assoc Citizens Assoc  
of Liberty Lakes Colcord Pond Assoc Craig Brook Hatchery Estes Lake Assoc Friends of Cobbossee Watershed Friends of  
Patten Pond Friends of Silver Lake Friends of Wilson Ponds Assoc Great East Lake Improvement Assoc Great Moose Lake  
Assoc Green Lake Assoc Hancock County IPP Hancock County SWCD Kennebago Lake Camp Owners Assoc Kennebunk  
Pond Assoc Lake Wesserunett Assoc Lakes Environmental Assoc Little Ossippee Lake Assoc Lovell Invasive Plant Prevention  
Committee Maine Association of Wetland Scientists Maine Audubon, Fields Pond Center Megunticook Watershed Assoc  
Mousam Lake Region Assoc Pickerel Pond Assoc Rock Haven Lake Assoc Sokokis Lake Assoc Somes-Meynell Wildlife  
Sanctuary Spectacle Pond Assoc Square Pond Improvement Assoc The Friends of Quimby Pond Toddy Pond Assoc Wilson  
Lake Assoc York County Invasive Aquatic Species Project York County SWCD

## Maine's Goodwill Ambassador for Maine Lakes 2019 Speaking Tour!

Last summer, LSM Advisory Board member, Matt Scott, volunteered several days of his time, and drove hundreds of miles throughout Maine to meet with 13 lake groups to present information regarding the vulnerability of Maine's lakes, and the individual lakes represented by the associations. Matt's several decades of professional experience in the Maine DEP, Maine DIFW, the North American Lake Management Society, the American Fisheries Association, the Maine Board of Environmental Protection, and others, combined with his vast knowledge of the State's lakes, provided the fortunate meeting attendees with a broad personal and professional perspective on the history and future of their lakes.

Matt represented Lake Stewards of Maine and the Maine Lakes Society as he spoke from personal experience about the many individuals with whom he had worked through the years, both at the local and state level, on behalf of individual lakes.

The 2019 tour started with a presentation that Matt made to the attendees of Maine's Annual Lake Monitoring Summit, followed by Pierce Pond in New Portland, where Matt encountered snow squalls! He next met with the Raymond Waterways Protective Association, which represents several small area lakes, where he encountered LSM Directors Bob and Sibyl French. From there, Matt met with a local chapter



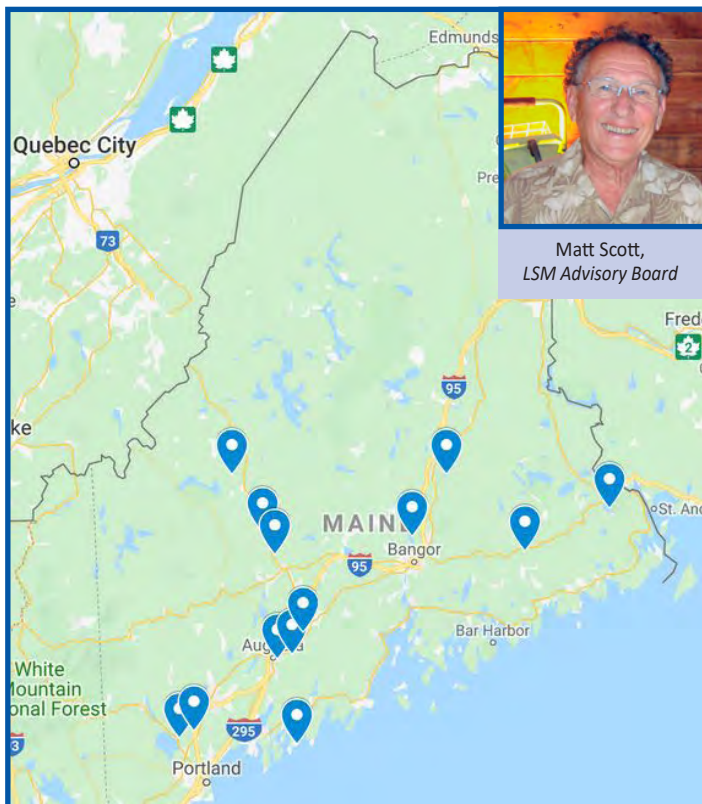
Matt Scott (L) was recently presented with a Lifetime Achievement Award from the USEPA, recognizing his many years of public service on behalf of Maine's environment. Pictured with him are (L - R) Jennie Bridge (retired EPA), Jeff Dennis and Barry Mower of Maine Department of Environmental Protection.

of Trout Unlimited in Waterville, and then to Togus pond to discuss the challenges their association has encountered with a recent severe algal bloom. Along the way, Matt was asked to address a number of controversial issues, among which was the potential impacts of the reintroduction of Alewives in lakes.

Next on the tour was Wesserunset Lake in Madison, where Matt met Will Reid, a fellow expert on Maine Crayfish, and long-time certified volunteer lake monitor for LSM. Crystal Lake in Gray was next, a sensitive and threatened lake, followed by China Lake, a public water supply lake with a history that made headlines in the 1980's, at which the phrase "The China Lake Syndrome" was coined, describing a lake in which phosphorus begins to recycle internally, setting off a decline in water quality. Maine's first formal citizen watershed survey was conducted in this lake watershed.

The Greater Pushaw Lake Association was the next beneficiary of Matt's experience and wisdom – another threatened lake, and then a long drive to Cold Stream Pond in Enfield, a sensitive lake with a slow flushing rate, a "gem" by Matt's account, and a high priority lake for fishery management. Knickerbocker and Adams Ponds in Boothbay Harbor were next, followed by Pleasant River Lake in Matt's home territory where the impact of fireworks on lakes was discussed, among other topics. Meddybemps Lake in Washington County was the final stop where Matt discussed the fishery and protecting water quality through the use of best conservation practices for new development and roads.

In total, Matt met with nearly 700 individuals throughout the state last summer. We are very appreciative of his generous donation of personal time and resources, combined with his broad knowledge and perspective. *Thank you, Matt!* 🍷



**SAVE THE DATE! 2020 LSM ANNUAL LAKE MONITORING  
CONFERENCE WILL BE HELD ON SATURDAY, JULY 25TH**

possible through the Maine Lake and River Protection Sticker program, a Federally-certified Invasive Aquatic Species Action Plan, and an excellent team of experienced invasive species professionals within the DEP. Free invasive aquatic plant manual control trainings are offered annually, as are networking events such as the Maine Milfoil Summit. Locally-powered infestation monitoring and mapping efforts, essential to the success of any management effort, are equally well-supported through Lake Steward of Maine's Invasive Plant Patrol (IPP) program.

And the best news of all, perhaps, is the fact that Big Lake has a number of deeply-rooted friends and allies, allies that provide historical and cultural perspective, strength, vibrancy and resilience. Big Lake is in the very heart of the Passamaquoddy Tribe's ancestral homeland. Passamaquoddy have lived and flourished within this homeland at the least since the time when the Laurentide glaciers melted away from this part of North America, from ten-to-fourteen-thousand years ago. The tribe still holds land along the northern shore of Big Lake, and the lake has long been central to Passamaquoddy life, providing fishing, hunting, boating, swimming, aesthetic values and supporting essential cultural and spiritual practices. Many of the tribe's most treasured archeological sites are concentrated around the shorelines of the waters in this region. LSM has been partnering with the Passamaquoddy Environmental Department on water quality monitoring efforts since 2004.

Downeast Lakes Land Trust (DLLT) is also a major stakeholder in the region. Founded by local residents in 2001, DLLT is dedicated to the long-term economic and environmental well-being of the Downeast Lakes region, working to conserve the region's woods and waters through land acquisition and sustainable forest management. In 2016, DLLT significantly expanded its land holdings in the region, adding nearly 22,000 additional acres to the 34,000 acres it already owned. The additional acreage, extending from West Grand Lake, east to Big Musquash Stream includes more than four miles of shoreline on Big Lake. DLLT partnered with the New England Forestry Foundation to purchase a

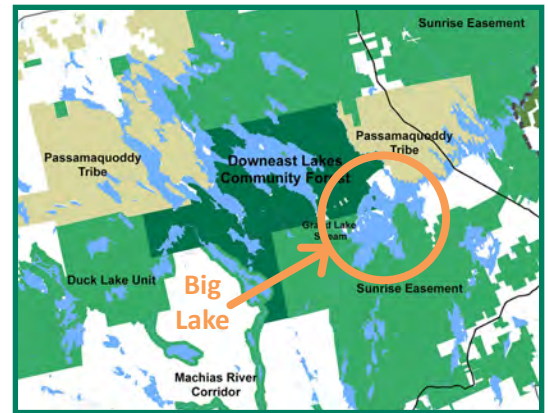
312,000-acre conservation easement that protects 70% of the remaining shoreline from development.

Given the tremendous investment the organization has made in the future well-being of this pristine area, DLLT will certainly be a valued partner in the effort to address this new threat to the ecological and economic health of the region. "This region of Maine is defined by its lakes and waterways," says DLLT President and CEO, David Montague. "The news of this infestation is deeply concerning for our communities, our local tourism economy, and the way of life that depends on healthy lakes and the fisheries they support. We feel very fortunate to have the support and expertise of Lake Stewards of Maine to help us address this new threat to our watershed. We have been lucky to avoid these issues in the past, but now we find ourselves at the start of what will, undoubtedly, require a long-term, sustained effort to protect the spectacular natural heritage of Big Lake and prevent the spread of aquatic invasive species to the other lakes in our region."

Part of a vast area known for its pristine water resources, the region surrounding Big Lake is also home to a number of thriving hunting and fishing camp establishments, a cadre of experienced Maine Guides, and a host of private camp owners, all of whom have a tremendous stake in the long-term health of Big Lake.

Add to all of the above the dozens of trained and experienced early detectors (IPPs) from the more-southerly counties who have already signed on to help with the Big Lake survey in 2020, and the dozens more we hope to train, mentor and engage, and one begins to see that we have ample reason for optimism!

In the weeks and months to come, LSM will participate in a flurry of planning meetings and outreach events, working in collaboration with all stakeholders to help develop a comprehensive plan for responding effectively to the Big Lake infestation. In addition to public meetings and strategy sessions, LSM will offer a series of IPP trainings in the Big Lake area next summer, with the goal of engaging and strengthening the capacity of the local community as they move forward



**Downeast Lakes Land Trust and the Passamaquoddy Tribe are major stakeholders in the region.**

to develop and carry-out their ongoing monitoring and management efforts. We also look forward to piloting some new strategies for establishing a vibrant survey effort in this more sparsely-populated part of the state.

There is no doubt that the Big Lake infestation is a game changer for Maine. To say that a well-established infestation in such a remote part of the state represents a challenge for our state, seems a glaring understatement. But there is also, as discussed earlier, much working in Big Lake's favor. LSM is committed to helping in every way that we can. This means, of course, that we too will need a great deal of help. In this time of need, we consider ourselves fortunate, indeed, to have all of you, our fellow lake stewards to turn to!

To learn more about how you can get involved in the Big Lake IPP Response, please contact Roberta Hill at [Roberta@lakestewardsme.org](mailto:Roberta@lakestewardsme.org) or 207-783-7733. 🌿

### **IMPORTANT IPP UPDATE**

In light of the sudden change in priorities for next year, we have made arrangements to postpone plans for the Eagle Hill course until 2021 or 2022. For those of you who were looking forward to this week-long aquatic plant extravaganza in 2020, we are truly sorry to disappoint. On the bright side, while we are searching for and mapping milfoil up on Big Lake next summer, we are sure to encounter (and enjoy getting to know) many native plants! Please consider joining us for a stint of what just may be the ultimate hands-on learning IPP experience!

# LSM Staff Provides Technical Support For Lake Auburn “Alum” Treatment

Lake Auburn, MIDAS #3748, is located in Androscoggin County in Auburn, Maine. It has an area of 2,277 acres, and a maximum depth of a little over 36 meters. It is the primary drinking source for many of the 59,000 residents of Lewiston and Auburn. The historical water quality of Lake Auburn has been very good, with Secchi disk readings averaging 7.3 meters, and late-summer dissolved oxygen concentrations remaining sufficient to support a high-value coldwater fishery — Lake Trout and Landlocked Salmon. *However, in 2012, Secchi disc readings dropped to just 2.9m, dissolved oxygen concentrations plummeted, and the lake experienced a severe fish kill.* Increasing water temperature from an unusually warm spring and early ice-melt, combined with a severe rain event in June (several inches in 24 hours and causing severe soil erosion and phosphorus loading from the watershed), are thought to have been the major contributors to the algae bloom. In 2018, with phosphorus levels once again creeping up, and worry about diminishing Secchi disk transparencies (similarly, 2.9m), the Lake Auburn Water District was motivated into preemptive action — first with the one-time, stop-gap measure use of an algaecide. A decision was then made to conduct an “alum treatment” in 2019 — a process that essentially inactivates the amount of biologically-available phosphorus in the lake.

On July 7<sup>th</sup>, 2019, with the sound of Fourth of July fireworks still fresh in their minds, a group of colleagues, consisting of Lake Stewards of Maine (LSM) staff, the cities of Lewiston and Auburn, the Lake Auburn Water Treatment Facility (LAWTF), Lake Management consultant, Ken Wagner, SOLitude Lake Management company, the Maine Department of Environmental Protection, and Tighe & Bond Engineering, among others, assembled to discuss the proposed alum treatment. The purpose of the meeting was to discuss and coordinate



LSM Alum Treatment Survey Team (L - R) Wendy Dennis, Mark Dennis, Tristan Taber. (Spencer Harriman not pictured.)

the methodical treatment of Lake Auburn with two chemicals (aluminum sulfate and sodium aluminate) which when properly applied are able to strip phosphorus from the lake water column. *The vital role of monitoring the effects of the alum project application fell to the LSM survey team, which consisted of Tristan Taber, Mark Dennis, Wendy Dennis, and Spencer Harriman.*

The application process consists of having a barge, in this case operated by SOLitude, apply a 2:1 mixture of the two potentially-caustic chemicals in a designated area of the lake. In theory, the chemicals mix, neutralizing the pH of one another, and flocculate — the process by which colloids (a mixture with microscopic or dissolved particles) come out of suspension to form a “floc” or flakes. The aluminum floc forms extremely strong bonds with available phosphorus in the water column, and sinks to the lake bottom in a stable compound that “ties up” both the aluminum and phosphorus, therein removing phosphorus from the water that could stimulate algal growth, as well as preventing the aluminum from reaching toxic levels to the lake biota and consumers of the lake water. Managing the pH throughout this process is critical to the safety of the lake and the public as it is less soluble and toxic when at a neutral pH.

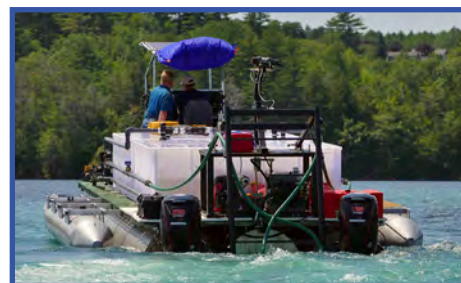
Over a period of several weeks, the Lake Stewards of Maine team followed the barge, monitoring and assessing pH and conductivity “snapshots” to

by Tristan Taber; LSM Training and Technical Outreach Coordinator

ensure that proper application rates were maintained. Should a clump of material block a point on the barge’s application manifold or in a hose, ratios would deviate from their neutralizing levels and the LSM team could detect the deviation and alert the barge operators. In addition, we (LSM) monitored a pre- and post-treatment “control” point, located outside of the treatment area, in order to detect changes in the lake, as well as other special samplings that were monitored during the course of the treatment. Because Lake Auburn’s water treatment facility is a non-filtration plant, it was necessary to allow the dissolved aluminum levels in the lake to settle down, and the treatment was broken up into two time periods, with the treatment process wrapping up on October 23<sup>rd</sup>.

During the course of the treatment, we witnessed a few deviations from neutral pH — one was due to the thermal properties of the chemical on an especially cold morning — but we were able to notify SOLitude, who promptly worked to correct the flow rates and rebalance the application. The project was a great experience for the LSM team, and an opportunity to work with and provide support to our environmental partners and neighbors at the water district treatment plant. The team of people working on the treatment were diligent and cautious, keeping the welfare of the lake environment and

~ Alum Treatment . . . continued on page 33



Barge, operated by SOLitude, applying a 2:1 mixture of two chemicals (aluminum sulfate and sodium aluminate) in a designated area of the lake.

# TOXIC ALGAE BLOOMS IN SOCIAL MEDIA & THE NEWS

by Scott Williams

## Don't Panic – But Do Become Informed and Mindful of this Threat

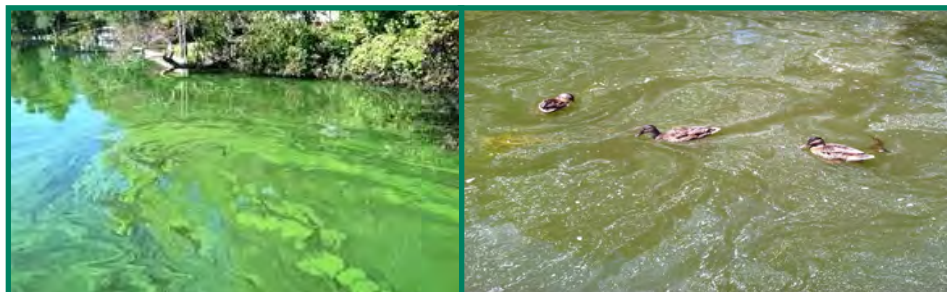
Last summer, more than one social media post went viral concerning toxic algae blooms, and the resulting death of domestic dogs that ingested water from ponds that were experiencing a bloom. Over a period of several weeks, LSM staff received dozens of concerned inquiries about this phenomenon from citizen lake steward/scientists, lakeshore property owners, lake associations, and the media (several newspapers, TV and radio stations throughout Maine)!

The public is justifiably concerned about this significant threat to the health of Maine's lakes, and to those who recreate in, on and around them. But let's begin by putting this information in perspective: *The social media posts were largely about situations that occurred in the southern part of the U.S., where algal blooms (toxic and otherwise) are much more common than in Maine.* Other common names that are sometimes used to describe this phenomenon include "bluegreen algae" or "cyanobacteria" blooms, and the events may also be referred to collectively as "harmful algal blooms" or "HAB's".



Typical warning sign posted on a lake in bloom.

*Cyanobacteria are not new to Maine's lakes. They have existed for thousands of years, and they can be found in all our lakes, but generally at very low densities.* However, warmer water temperatures, combined with higher concentrations of phosphorus may favor a proliferation of cyanobacteria in many lake ecosystems that have historically not been known to experience algal blooms.



Planktonic algal blooms may or may not consist of cyanobacteria/bluegreen algae, but should be avoided, and assumed to be potentially harmful. "Scum" consists of concentrated algal cells on the water surface or shoreline, and may be highly toxic.

## Most Maine's Lakes Continue to be Clear & Healthy – But Things are Changing

Historically, Maine lakes have been, and continue to be less likely to experience a toxic algal bloom than lakes situated in more southerly areas for a number of reasons: 1) *Maine's climate is relatively cool.* For thousands of years, our lakes have been covered by ice and snow for half of the year, or more. The Cyanobacteria/bluegreen algae associated with HAB's are more likely to reach bloom levels in warmer climates, where the lake water is warmer. 2) *Maine's "glacial till" soils are less fertile* (less phosphorus) than soils throughout much of the country, which means that the ingredients that are essential to algae growth are in naturally short supply – provided that soils are stable and erosion is minimal. 3) *Maine's population is relatively small.* These three factors have had a strong positive bearing on maintaining the health of our clear, clean lakes.

But clear lakes bring millions of visitors to the State annually, and as a result, a growing number of lake shorelines and their upland watersheds have become moderately developed. Development in all forms results in the disturbance and erosion of soils, reduced natural vegetation, and an increase in stormwater runoff. Studies conducted in Maine and the rest of the country have consistently shown that *runoff from developed areas contains higher concentrations of phosphorus, compared to runoff from undeveloped*

areas. An increase in phosphorus in lake water generally leads to an increase in the growth of algae, and under the right circumstances, may lead to the development of bloom conditions.

*A warming climate will likely add to, or worsen the effects of watershed development in at least two obvious ways.* First, lake water will be, and has been in recent years, warmer overall. The shortening of the duration of ice cover from the onset in the fall to melting in the spring is a major factor in this change (see Lloyd Irland's article on page 24). *Warmer lake water, combined with a longer period of time for sunlight to penetrate into the lake water column, generally favors the growth of cyanobacteria/bluegreen algae.* Secondly, extreme weather events that are associated with climate change, during which large volumes of precipitation often occur in a relatively short period of time can, and will very likely, result in substantially greater soil erosion from lake watersheds, and therefore, greater annual loading of phosphorus to lakes. *These climate change effects will likely offset the natural benefit to Maine's lakes of our relatively low-nutrient soils, resulting in a "triple whammy" scenario that is likely to have a significant negative influence on our lakes over time.*

## Unanticipated Changes Are Occurring-Now!

All of this is more than just speculation. Unanticipated and unusual phenomena have been documented in a growing number of Maine's lakes in recent years.

**Toxic Algae Blooms... continued on page 33**

# Passings

In the spring, solid ice breaks up on Maine lakes and their waters flow free again in turbulence or tranquility. Maine lake organizations and their members renew their activities to protect and preserve them. Lake Stewards of Maine, Maine Lakes Society, Lakes Environmental Association and individual lake associations are all such "lake stewards". The late

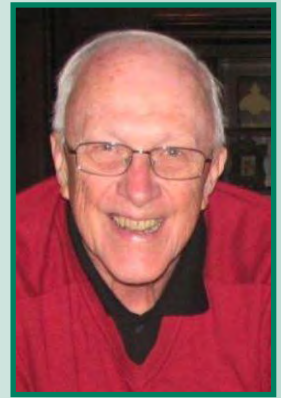


**Peggy Hallee**

Margaret Anne "Peggy" Hallee was a member of all of them. She was also the elected leader of the Cathance Lake Association/CLA. Peggy was a very effective and respected director of all of its activities. Ralph Waldo Emerson once wrote: "Nothing great was ever achieved without enthusiasm". All the members of CLA will affirm she was an especially zealous, even impassioned leader. She awakened enthusiasm to support and participate in any old or new activities. Her outspoken love of Cathance Lake was a shared inspiration to all CLA members. They will miss this lake steward!!

*Contributed by Karen Holmes*

Art Schilling hailed from New York, and married his Oswego College love, Jeanne Keckley. They spent 64 years building a beautiful life together. Art served in the Army, taught high school, and worked in the insurance industry managing pension offices for 30 years.



**Art Schilling**

One of Art's favorite activities was barbecuing, martini in hand, surrounded by his family and friends. His love for family, and his quality character are deeply embedded in the children and grandchildren with whom he spent so much time.

Art was a man of many passions, and enjoyed spending time perfecting his famous smoked salmon, ribs, and many other family favorites. Art was also a master woodworker, and would showcase his talents every year with the incredible works he gifted to family and friends. He loved wine and had an extensive collection. He was an avid traveler, reader, and gardener. Art was an LSM-certified Invasive Plant Patrolter for 15 years, and was a member of the Five Kezar Ponds Watershed Association. He will be sorely missed.

*We care deeply about Maine's volunteer lake monitors. If you would like to share news of a monitor's passing, please contact us.*

## Algal Blooms . . . continued from page 23

etc.), where water is discolored, or where musty odors are present. A simple rule of thumb is: if you are standing in water chest deep (4-5 feet deep) and you can't see your toes because the water is so green, you should get out; if you are looking into water that is 4-5 feet deep and can't see the bottom of the lake because the water is so green, you should not go in!

- *Because algal scums along the shoreline have the highest concentrations of*

*toxins, do not let children play in water that is discolored, where you see mats of algal material, foam, or where musty odors are present. Do not allow pets or livestock to swim or drink water from these areas.*

- Rinse off with fresh water and soap, if available, as soon as practical if exposed to water that has dense algae present. This will reduce skin exposure for humans and pets.

In addition, dogs should always have access to fresh water outside to reduce the temptation for them to drink lake

water. If you see algae scums along the shore, avoid them and don't let dogs drink that water. If your dog does get sick, bring them to a veterinarian as soon as possible, and be sure they check for toxins in the blood. This is the only way to definitively identify which toxin is responsible.

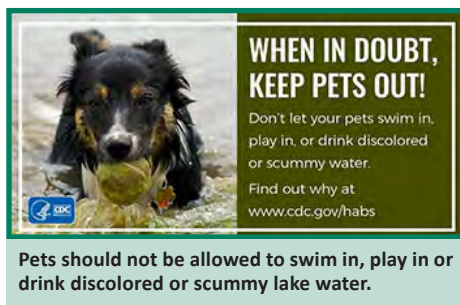
On another note, NEVER feed your dog food containing THC, the psychoactive active ingredient in marijuana, as it can cause convulsions in a dog that resemble anatoxin poisoning. ☹

## SAVE THE DATE!

**2020 LSM ANNUAL LAKE MONITORING CONFERENCE  
TO BE HELD ON SATURDAY, JULY 25TH**

### Toxic Algae Blooms... continued from page 31

They range from shorter periods of ice cover to the proliferation of some species of algae, including the colonial cyanobacteria, *Gloeotrichia*, which has increased dramatically in some Maine lakes (including some of the clearest and least developed), to “Metaphyton”, the collective term used to describe a number of species of filamentous algae that grows in shallow areas, and typically has the appearance of “green cotton candy-like clouds”. LSM and DEP staff have received hundreds (perhaps thousands) of concerned inquiries from lake users in recent years about what appears to be a significant increase in metaphyton, often in lakes of varying trophic state. Climate change very likely plays a role in both cases. *Of greater concern, however, is the increase in the occurrence of severe planktonic cyanobacteria/bluegreen algae blooms in lakes that have not experienced them historically. These have, for the most part, been “whole lake” events, and they have included bodies of water*



*that have not been known to experience lakewide blooms in the past.*

### When is it Not Safe to Go in the Water?

Although the overall risk of encountering unsafe conditions for you or your dog in a Maine lake is low, you should be aware of the potential, especially if you are not familiar with the body of water. Puddles and small pools are likely to warm very quickly, and under the right circumstances, could become toxic. Avoid allowing your pet to drink the water from such unknown sources.

*Short of taking a water sample for analysis, the following are two relatively simple ways to judge whether or not lake water may contain unsafe levels of algal toxins. If you are a Certified LSM Lake Monitor, your Secchi disk is a reliable tool that can be used to quickly assess conditions in the lake. If the Secchi reading is greater than 2.0 meters (approximately 6 feet) depth, it is unlikely that any toxins in the water that may be associated with cyanobacteria exceed the health risk threshold. This guideline is based on research conducted by the DEP on a number of Maine lakes that have experienced blooms in recent years.*

As mentioned in an earlier article, another simple option is to wade into

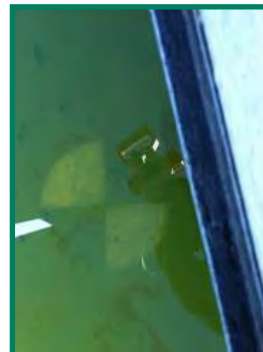
the water in a relatively shallow area until you are up to your neck, and look down. If you can clearly see your toes the water is probably free of algal toxins. This method should not be used by small children, because someone who is only 4 feet in height might still be able to see their feet during severe bloom conditions.

In either case, if the water is greenish, and there is a buildup of scum on the surface or near the shore, it would be best to avoid contact with the water

altogether. And regardless of water clarity, remember that it is never safe to drink untreated lake water. Algal toxins are just one of many potential contaminants that could make you ill.

Fortunately, very few of Maine's thousands of lakes and ponds have experienced a severe algal bloom (see Linda Bacon's article on page 22). Nonetheless,

increasing development, combined with the influences of a warming climate, increases the risk factors for a bloom to occur. When in doubt, it is generally best to err on the side of caution. If your lake is not already being routinely monitored by a certified LSM Lake Monitor, please contact us. We can help! 🌱

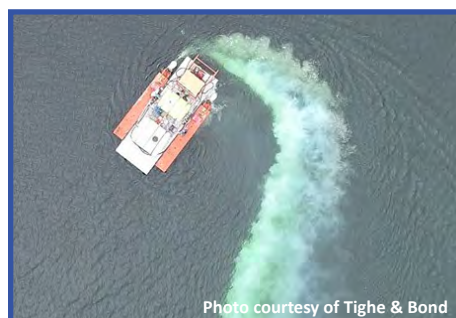


The Secchi disk is a valuable tool for detecting algal blooms.

### ~ Alum Treatment... continued from page 30

water customers as the central focus in their decision-making process.

This project offered several interesting challenges that have not been experienced before as far as we could find in the literature, including those related to the size of the lake, conditions of the water at two different parts of the year, and related to the non-filtration status of the water treatment plant. We hope to see positive results from the alum project, although phosphorus levels in the lake were already diminished somewhat, possibly from large volumes of wintertime water flow in the early part of 2019.



Painting with Caribbean Blue. Here the ALUM application barge is captured by an unmanned aerial system in the act of turning at the edge of a treatment sector.

With increasing temperatures, reduced duration of ice cover, and extreme weather events, Maine's lakes are facing increasing threats to water quality. Alum

projects are very costly. *It is important to note that “internal” lake restoration projects such as this are only capable of controlling phosphorus that has already entered a lake, and will not be effective unless substantial “external” lake protection work (in the watershed) has first taken place! That is why lake watershed assessment (surveys) to identify and resolve sources of phosphorus from the watershed are a critically important first step in lake protection and restoration. It takes a holistic approach to keep an in-balance environment and healthy lakes. In the iconic words of Red Green, “Remember, I’m pulling for you. We’re all in this together.” 🌱*

# Welcome, New Lake Stewards!

## New Volunteer Lake Monitors Certified in 2019

Weston Alley - Knickerbocker Pond, Adams Pond  
Peter & Sandi Andrews - Quimby Pond  
Patrick Anzman - Pleasant Pond  
Tom Arminio - Minnehonk Lake  
Jim Ashmore - Georges Pond  
Emma Barefoot - Long (Great) Pond, Somes Pond  
Abraham Barker - Upper Wilson Pond  
Carol Batchelder - Mooselookmeguntic Lake  
Douglas Bateman - Pleasant Pond  
Helene Begley - Abrams Pond  
Robbie Bickford - China Lake  
Ellen Blanchard - Whetstone Pond  
Bill Boucher - China Lake  
Unn Boucher - Round Pond  
Barbara Brady - Mousam Lake  
Lisa Branch - Georges Pond  
Tod Brown - Keoka Lake  
David Burns - Mousam Lake, Square Pond  
Yvonne Buswell - Pine River Pond, NH  
John Castellot - Balch & Stump Ponds  
Greg Cauldwell - Basin Pond, David Pond, Minnehonk Lake, Parker Pond  
Robert Cavicchio - Bauneag Beg Lake  
Barbara Chisholm - Lovejoy Pond  
Melissa Clay - Tacoma Lakes  
Corey Cleasby - Tacoma Lakes  
Justin Cook - Long Pond  
Gary Cortelyou - Flying Pond  
John Crespi - Great East Lake  
Peter Cummings - Holland (Sokokis) Pond  
Debra Cunningham - North & Little Ponds  
Bruce Custer - Quimby Pond  
Deborah & Norm David - Whitney Pond  
Ross DeLorenzo - Millinocket Lake  
Maggie Denison - Long (Great) Pond, Somes Pond  
Christine Deshler - Whittier Pond  
Michelle Dodge - Alamoosook Lake  
Michelle Durocher - Whittier Pond  
Paul Durr - Panther Pond  
Hoyt Emery - Saint George Lake  
Brigitte Emmons-Touchette - Loon Lake  
Amy Eskins - 7 Lakes Alliance Lakes  
Benton Foglio - Mousam Lake  
Eugenie Francine - Big Kennebago Lake  
Robert Franck - Tripp Pond  
Ryan Gabriel - Big Lake  
Amanda Gavin - Kezar Lake  
Tracy Gay - Damariscotta Lake  
Charleyne Gilbert - Alamoosook Lake  
Brian Gomez - Dodge Pond  
Eli Goodwin - Virginia Lake, Keewaydin Lake  
Nancy Goodwin - Keoka Lake, Sebec Lake  
Lisa Grant - Georges Pond  
Bill & Kathy Griffin - Kennebunk Pond  
Pam Grindle - Alamoosook Lake  
Roy & Ruth Guercio - Quimby Pond  
Kent Haake - Mousam Lake  
Bob Haas - Estes Lake  
Addie Halligan - Damariscotta Lake  
Zachary Harder - Damariscotta Lake  
Rosie Hartzler - Highland (Duck) Lake  
Holly Hoglund - Thomas Pond  
Charlene Hood - Saint George Lake  
Parker Jalbert - Square Pond, Mousam Lake  
Will Jeffries - 30MRWA Lakes  
Peggy Jensen - Panther Pond, Raymond Pond



John Johnston - East Grand Lake  
Meredith Jones - Ward Pond  
Melanie Joy - Branch Lake  
Karen Kane - Kennebunk Pond  
Maggie Kelly - Kezar Lake  
Chloe Kenyon - 30MRWA Lakes  
Hela Knowlton - Whitney Pond  
Peter Koltai - Piper Pond  
David Landry - Mousam Lake  
Bob & Peggy Lavigne - West Pond  
James LePage - Echo Lake (Crotched Pond)  
Jim Lukens - Big Kennebago Lake  
Cindy Mackenzie - Mooselookmeguntic Lake  
David & Linda Maxfield - Echo Lake (Crotched Pond)  
Tom McCoomb - Bauneag Beg Lake  
Harry McNally - Sabbathday Lake  
Gabi Mercier - Whitney Pond  
Amy & Bruce Merluzzi - Echo Lake (Crotched Pond)  
Stephen Merrill - East Grand Lake  
George Miceli - Rangeley Lake  
Marie Michaud - China Lake  
Charlie Mills - Big Island Pond  
Donna Morrill - Swan Pond  
Jude Morrison - Highland (Duck) Lake  
Donna Morton - Square Pond  
Karen Moynihan - Kennebago Lake (Big)  
Dana Murch - Ward Pond  
Sarah Nelson - Harriman Pond  
Michael Olson - Upper & Lower Hadlock Ponds, Jordan Pond  
Lisa Panepinto - Hatcase Pond  
Mark Perakslis - 5 Kezars Ponds  
Marie & Walter Phero - Georges Pond  
Carrie Phinney - Mousam Lake  
Jessica Pierce - Adams Pond (Rock Haven)  
Carl Plassmann & Cheryl Shattenberg-Plassmann - North Pond  
William Powell - China Lake  
John Powers - Thompson Lake  
Louise Proulx - North & Little Ponds  
Patricia Ramsey - North & Little Ponds  
Michael Rice - Sandy (Freedom) Pond  
Deanne Ricker - Tacoma Lakes  
Michael Rienbeau - Estes Lake  
Ryan Roderick - Hatcase Pond  
Roger Rossignol - East Grand Lake  
Kennedy Rubert-Nason - Cross Lake, Mud Lake  
Eric & Sara Sandberg - Pemaquid Pond, Biscay Pond  
John Schooley - Watson Pond  
Anne Shure - Saint George Lake  
Kurt & Robyn Silberstein - Toddy Pond  
Ryan Sporcic - Tacoma Lakes  
Douglas Squires - Kennebunk Pond  
Iva & Ted Sussman - East Grand Lake  
Kathy Tayman - Hogan Pond  
Steve Triggs - Collins Pond  
Leonid Tsvetkov - Parker Pond  
David Upton - Great East Lake  
Judy Verity - Mousam Lake  
Jim Viehl - Long Lake  
James Weber - Loon Pond  
Richard Whittier - Cargill Pond  
Allen Wicken - Gull Pond  
Geoff Williams - Echo Lake (Crotched Pond)  
Holly & Warren Williams - Branch Lake  
Rose Wingo - Molasses Pond  
Derek Young - Long Lake

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# MAINE FIELD GUIDE TO AQUATIC PHENOMENA

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