



NEWICHAWANNOCK NEWS



The wedding of Gordon Lang and Eleanor Davis in June of 1950. They first met on Great East Lake.



The float plane on Great East that brought Ed McKay and Carolyn Porter together in 1954.

Great East Lake as the Matchmaker Through the Years

By Ron McKay

Great East Lake holds a special place in the hearts of many; whether it's a weekend getaway, an annual summer vacation, year round lake living, or generational enjoyment. Our family falls into the latter category, and has led to several marriages over the years from people "meeting at the lake."

This Lake and our family have seen many engagements, weddings, funerals, and other deeply rooted core memories throughout the years. We are certainly not alone in this, but we wanted to share our small piece of history with the GELIA membership.

It all started for us in the 1940s, when the Lang family bought a small camp lot on the Paul Beach area on the North Shore of Great East Lake. With the family living off Stoneham Rd. in Brookfield and then on High St. in Sanbornville, the Langs eventually built a camp on their lot on Great East. By the late 1950s, a young Gordon Lang, fresh off a stint in the

Army in Japan, met Eleanor Davis, who was visiting with her sister, Carmen, at the Knapp camp, which is just across the road from the Lang camp. Eleanor and Gordon's first date was a trip to Fletcher's Farm in Brookfield to buy some fresh picked corn. They were married about a year later and started expanding the camp for their growing family.

Around the same time, Betty and Lou McKay from Medford, MA bought a nearby camp on the North Shore section of the lake known as "Minister's Row." As their family grew, their grandkids were able to spend the whole summer up there experiencing lake life to its fullest. Betty & Lou also shared their camp and love of Great East with numerous friends, and many of them purchased places along the lake through the years.

During one of those summers in the early 1950s, one of Betty and Lou's sons, Ed, had purchased a float plane and started taking trips from MA up to the lake. During one of those trips, a group from down near what is now known as Lake Forest, trekked over to check out the plane.

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President's Column

*By Charles Crespi
President, GELIA*

As I write this column in early May, the last of the snow has recently melted, the lake level is at the level of the spillway, the spring peepers are peeping and the Second Basin loons are calling for each other. This is my favorite time of year. With the exception of dealing with fallen trees, the spring chores aren't a burden as they are preparation for another summer at the lake.

GELIA is also preparing for the summer season. We are interviewing prospective Lake Hosts for the boat inspection program, coordinating with the Loon Preservation Committee to get the wildlife biologist out on the lake to survey the loons and taking the scientists from UNH out on the lake for the spring water quality sampling. Staff from AWWA are already providing technical advice about controlling storm water and erosion. Everyone is looking forward to a successful 2024 season.

Over the winter, GELIA received the report detailing the results of the sediment sampling and analysis we performed last year. A summary of the report is included in this newsletter. A key learning from this work is that there are sufficient nutrients (phosphorus) in the lake sediments to substantially degrade water quality if we do not remain vigilant and keep nutrients (principally phosphorus) out of the lake. Our shoreline is >90% developed. Numerous smaller problems can quickly add up to a significant increase in nutrient load.

Over the years, camp roads have been one of the largest sources of sediment and associated nutrient pollution. Many problems have been addressed. Are there issues remaining with your camp road? Are any prior "fixes" in need of maintenance?

I have written many times about what individual property owners can do reduce nutrient pollution from their properties. The principles are simple and include:

1. Maintain your septic system and replace it promptly should it fail
2. Cover bare soil with mulch or vegetation, woody vegetation is preferred
3. Do not use fertilizers with phosphorus (the middle number on the package label) in the shoreland zone
4. Landscape to slow down storm runoff and give it time to soak into the ground (drip trenches, rain gardens, swales, etc.), the soil binds up phosphorus and purifies the water before it enters the lake
5. How are your prior projects faring? Are any in need of maintenance?

As always, technical and/or financial assistance is available from AWWA – visit awwatersheds.org for more information.

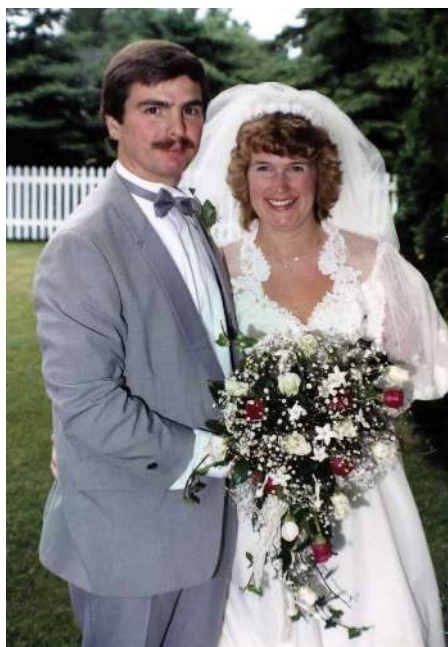
Remember, Great East Lake is fortunate to be a deep headwater lake with a small, largely wooded watershed. This geology makes Great East Lake both slow to degrade and slow to recover from degradation. By far, the easiest path is to prevent degradation.

Have a great summer.

Matchmaker *Cover story continued*

Two of these young explorers were Pat and Carolyn Porter, who also lived in Medford and were attending Medford High School, but neither knew Ed nor his older brother Jack. Pat and Carolyn had been staying summers at their Aunt Marion Wetmore's cottage, but never connected with the McKays until Ed's float plane brought them together. A romance blossomed between Ed and Carolyn, who were married in the Fall of 1956.

Fast forward to 1979, when Gordon and Eleanor's daughter, Kathy, met Betty and Lou's grandson, Ron, (son of Jack) on a warm early summer weekend in June during a get together with friends on the Paul Beach. That meeting led to a quiet midnight "sail" for the two of them, and an eventual "first date" at the Poor People's Pub.



Kathy Lang and Ron McKay at their June 1985 wedding in Wakefield, NH.

Several years later, Kathy and Ron were married at the Congregational Church in Wakefield. Their reception was held at the old Sunny Villa in Ossipee, and they had an after party bash back at the Lake. Since then, they have shared their love of the lake with their children and grandchildren, and are now retired here in Wakefield while still enjoying their camp on Great East.

Kathy and Ron's children (Christopher, Courtney, and Caitlyn) grew up and spent their summers here working as Lake Hosts and meeting new friends to go along with their core group of friends and families. As teens, this group was affectionately known as "locusts" as they swarmed from one cottage to another, enjoying all the lake had to offer. To keep everything straight, we ended up color coding the camps to avoid confusion.



Christopher McKay marries Ashley Lizotte in September of 2012 on the beach at Great East.

In 2007, Christopher met his future bride, Ashley, through friends on the lake, and eventually got married. They had a September outdoor wedding at the Hendrick camp, with a reception next door on the Paul Beach that was eventually forced inside due to tornado warnings, high winds and torrential rain.



Robert Baldwin proposing to Caitlyn McKay on the lake in August of 2017.

In 2017, from the same group of friends, Robert Baldwin proposed to Caitlyn on a pontoon boat on Great East in front of their friends and family, and they wed a year later. Robert's grandparents were originally introduced to the Lake by Ron's dad Jack in 1961, and they bought their first cottage here two years later. Their family remains here at the "yellow camp."

With the seventh generation already here and loving lake life, it will be interesting to see when and where our next marriage comes from!

Give Your Lake a Break!

A message from the Acton Wakefield Watersheds Alliance

Jon Balanoff

Executive Director, AWWA



Whether you visit our lakes on the weekends, live by them year-round, or only come up twice a summer, you've probably noticed some changes in the last few years. Ice out comes earlier than ever, shorelines are receding, algae and cyanobacteria blooms are happening more frequently and lasting longer. What is going on?

The answer to that question is not simple but the science behind it is clear, and the answer involves some hard truths: **Our lakes are under pressure. A lot of pressure, and like anyone who is under pressure for too long, they are starting to crack.** I went to the annual New Hampshire Lakes Congress recently, and listened to an amazing talk from Ted Diers, the Assistant Director of the Water Division at the New Hampshire Department of Environmental Services. Ted described our current water quality threat as a "wicked problem". This is a concept in philosophy defined as a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. Such is the case with our lakes. There are a variety of stressors that put pressure on our lakes. Nutrient loading, increased boat activity, increased rainfall, development, and hotter weather are testing the resilience of our lakes. Resilience refers to how much stress a lake, a person, or any system, can withstand before breaking... or changing into something else.

Here is another hard truth: lakes age. The fate of every lake is to become a meadow. Lakes fill in overtime and become swamps, bogs, and marshland. In a natural state, this aging process takes tens of thousands of years, not a timescale any of us need to fret about. However, when lakes get stressed (just like people) they age faster, and less gracefully. This brings the lake aging process down to a human timescale. Condensing a ten-thousand-year process into a hundred years. Lakes can put up with immense amounts of pressure, holding out for decades, but **once they start to make the shift into a new age group, it's extremely difficult to slow the process down, let alone reverse it.** This leads to the final hard truth: There is no silver bullet. No quick fix. We can't simply undo the damage, and there is no magic fairy dust to

turn the lakes blue again. To restore our lakes and increase their resilience, we need do the hard work to protect them, and then we need to keep doing it.

So what can you do to make your lake more resilient?

The power is in YOUR hands. YOU can create a vegetated buffer on your shoreline to insulate the lake from pollution. YOU can have a fertilizer-free lawn and keep those nutrients out of the lake. YOU can make sure your septic system is functional by having it inspected every year and pumped out at least every 3 years so it doesn't leach into the lake. You can pioneer a culture on the lake of mimicking nature instead of tamping it down. If YOU do your part, others will follow suit. If EVERYONE does their part, our lakes will finally get the breather they deserve and be able to age with grace.

If you're interested in learning how to do more, calling AWWA is a great place to start. We can give you the tools and resources you need to get started and we can often help out financially as well. **Many of these solutions are cheaper and easier than you would assume.** All it takes is a desire and dedication to give our lakes a break from the pressure they've been under. We all deserve a break now and then!

Reach out to AWWA to learn about what we do and how you can make a difference for your lake at info@awwatersheds.org or (603) 473-2500.



Photo credit: Tyler Garvey



Photo credit: Maureen Gillum

Is it OK to Scatter Ashes in the Lake?

By Charles Crespi

I was recently contacted by a local business. Someone had inquired about renting a boat for the purpose of scattering the cremated remains of a loved one on Great East Lake. The business could not help the individual and later contacted me for more information.

As you know, during cremation all the organic material is burned and only minerals remain. What is the composition of the minerals? It is 47.5% phosphate (a biological form of phosphorus), 25.3% calcium, 11% sulfate, 3.7% potassium, 1.1% sodium, 1% chloride and less than 1% each of other minerals. Cremated remains contain very high levels of phosphorus.



Photo credit: Maureen Gillum

In Maine and New Hampshire it is illegal to deposit cremated remains in any waterbody or in the shoreland zone. US Federal law allows scattering cremated remains in the ocean under certain conditions. Always check federal, state and local regulations before scattering ashes.

Please do not scatter cremated remains in or around Great East Lake or any other inland waterbody.

SAVE
the
date

GELIA Annual Meeting Saturday, July 13th

The GELIA Annual Meeting will be held on Saturday, July 8th at Weeks along the north shore of the lake.

All GELIA members and those considering being members are welcome.

The meeting starts promptly at 10 a.m. but the event opens at 9 a.m. with various displays, information tables and GELIA merchandise for sale so please plan to arrive early.

Our traditional lunch of hotdogs, chips and soda will be available after the meeting, compliments of GELIA.

Membership Update

By Susi Alvino

At Great East Lake, it is finally starting to look like spring. Although winter was generally mild, the sound of chainsaws can be heard all around from the powerful final bursts of winter's last gasp. Sad to say this will be my last newsletter because I am coming off the GELIA Board of Directors, as of the July Annual meeting. It was a unique and memorable experience as well as enriching. I enjoyed meeting so many members at the annual meetings. I made some great friends. This has been an educational and enjoyable multi term experience that I highly recommend to each of you. We always need concerned members on the Board of Directors. With that said, Effie Jaramillo will be the new Membership coordinator.

The GELIA 2024 annual Membership drive is beginning. Look for the Membership envelope in the mail. Thank you to the members who have already donated. We cannot continue to provide the services to you and the lake without your ongoing support. I encourage you to learn more about what GELIA does, by going to our newly improved website at greateastlake.org. You may join our membership or donate to our Invasive Species Defense Fund (ISDF) through the website. As always, you can mail your tax-deductible donation to GELIA Membership, PO Box 67, Acton ME 04001. Thanks so much, your contributions are integral to keeping our lake the clean and special place we enjoy year-round.

Please encourage your neighbors to join our organization. I hope you have a wonderful spring and summer. See you on the lake.



Thanks to our Valued Members

By Effie Jaramillo

GELIA gratefully acknowledges the 432 Members with contributions, for 2023, dues totaled \$57,950 – an increase of \$2,175 from 2022. Donations to the Invasive Species Defense Fund totaled \$7,765, an increase of \$1,160 from 2022. The list of 2023 Contributing Members was incorrectly printed in our recent membership mailing. Our apologies to all.

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Love Our Lake

As we look forward to another great summer on Great East Lake, please remember that keeping the lake special depends on each of us doing our part.

That begins with basic courtesy and respect – for our neighbors and other users of the lake, for our water and wildlife, and for the laws and rules that help protect our lake and keep us safe.

Please observe headway speed laws, watch your wakes, steer clear of loons and other wildlife, and remember that sound and light travels far over the water.



You can download a copy of GELIA's Love Our Lake flyer by scanning this QR code with the camera on your phone or at our website greateastlake.org/love-our-lake. Please post it in your home and include it in your rental materials so that your guests and tenants are also aware of what they can do to help protect our lake.

Cyanobacteria is a growing threat to the lake, and elsewhere in this newsletter you can read more about the science of cyanobacteria and the connection between phosphorus and cyanobacteria. Here are some practical steps you can take to keep phosphorus out of the lake:

Don't use lawn fertilizers near the lake

Please do not use fertilizers in the shoreland zone. Many fertilizers contain phosphorus (it is the middle of the three numbers used on the label to describe the amounts

of nutrients in fertilizers), and when it rains, that phosphorus can run to the lake. The use of agricultural lime to maintain pH is lake-friendly.

Stop erosion from your property

Runoff happens when we build roads, houses, lawns and driveways. These impermeable surfaces do not absorb storm water. In addition, storm water runoff picks up pollutants such as soil, fertilizers, pesticides, spilled petroleum products, not to mention other harmful bacteria (from human and pet waste) and other toxic materials from the land. There are simple steps you can take to minimize erosion, including the slowing or diversion of storm water and planting vegetation buffers. Learn more about what you can do stop erosion from your property by visiting awwatersheds.org/conservation-practices-for-homeowners.

Septic systems

Please ensure that your septic system is functioning properly and pumped on a regular schedule. Promptly replace failed systems.

Avoid churning up the bottom of the lake

Phosphorus is contained in the sediment at the bottom of lake. When we churn up the bottom, including wake or propeller action, that phosphorus can be released into the water, promoting cyanobacteria growth. Some amount of churn is unavoidable, but please do your best to minimize churn, especially in shallow areas.

Keep fireworks out of the lake

Fireworks contain nitrogen and phosphorus which are carried into the lake with fireworks debris. Please do not use fireworks over the water or the Shoreland Zone.



Water Quality Fun Facts: The Importance of Metals in Sediments

By Charles Crespi

In my last “Water Quality Fun Facts” article I discussed the importance of oxygen for water quality in general and more specifically for keeping phosphorus locked-up in the sediments. In this article I discuss how phosphorus becomes locked-up in the sediments and how it can be released into the water column. It all comes down to the amount and types of metals in the sediments.

Where do the metals come from?

A wide variety of metals are present in the rocks of the earth’s crust. Natural weathering and erosion release the metals from rocks (and soil which is mostly small rocks) and they are naturally washed into waterbodies and their sediments.

Which metals are most important for water quality?

The work of lake scientists has identified two metals, aluminum and iron, as having an important role in water quality. Aluminum and iron are also the most abundant metals in the earth’s crust.

Are these metals present in a form like the shiny metals used in building vehicles and other useful things?

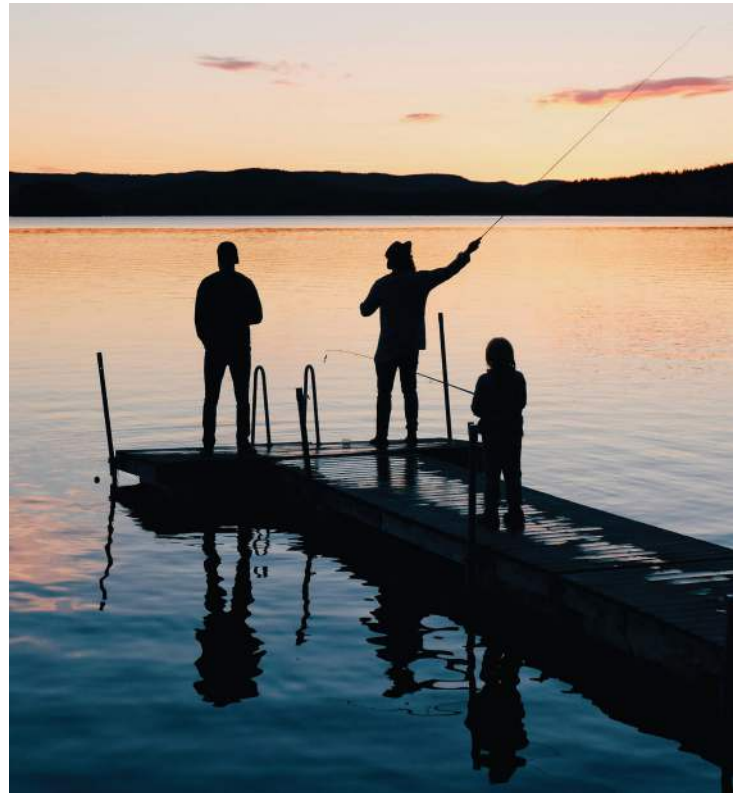
No. Those shiny metals are insoluble in water. When metals combine with oxygen (become “oxidized”) they acquire an electrical charge which gives them solubility in water. Aluminum acquires three positive charges while iron can acquire either two or three positive charges depending on how much oxygen is present.

Can you tell me more about iron?

When oxygen levels are high, iron has three positive charges. This is the form of iron which is called “rust,” the orange enemy of all useful things made of iron. When oxygen levels are very low, iron has only two positive charges. This form of iron has a blue color and in the presence of oxygen it is rapidly converted to iron with three positive charges.

Does phosphorus also have electrical charges?

Phosphorus also combines with oxygen and acquires an electrical charge. The preferred form for phosphorus for living things is phosphate which has three negative charges.



What is the importance of these electrical charges?

With electrical charges, opposites attract and nature will always seek to balance the charges. When the charges are perfectly balanced, the attraction of two components can be very strong.

So how does this relate water quality?

The attraction between aluminum (**three positive** charges) and phosphate (**three negative** charges) is very strong and the phosphate is locked-up with aluminum in sediments regardless of the amount of oxygen. In the presence of oxygen, iron with **three positive** charges is present which also strongly attracted to phosphate (**three negative** charges) which is again locked-up in the sediments. Without oxygen, the iron has only **two positive** charges, the attraction to phosphate (**three negative** charges) is much weaker and phosphate is released from the sediments, promoting cyanobacteria and plant growth.

So, if there is much more aluminum than iron in the sediments it is good for water quality?

Yes!

Is this the situation for Great East Lake?

Please read the accompanying article with the sediment testing results on page 11.

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Great East Lake Sediment Analysis

By Charles Crespi

While we think of Great East Lake as a single waterbody, geologically it is a large deep lake connected to three much smaller and shallower basins. The water from the basins flows through the main lake to the Salmon Falls River. While the entire lake is considered oligotrophic (low phosphorus, high water clarity) the phosphorus level in the basins is at the high end of the range for oligotrophic while the phosphorus levels in the main lake are near the median.

Last year, GELIA retained Don Kretchmer, a lake scientist, to conduct an analysis of phosphorus levels in the lake sediments. Under conditions of low oxygen (anoxia), phosphorus retained in lake sediments can be released into the water column causing cyanobacteria blooms and other adverse effects. GELIA wanted to learn the degree to which Great East Lake was at risk for such an adverse event. GELIA also wanted to learn how sediment phosphorus levels in Great East Lake compare to other lakes in the region.

Below is a summary of the work performed and the interpretation of the data. If you would like a copy of the full report, email me at president@greateastlake.org.

Lake sediments were sampled at eight locations around the lake. These were the five, routine UNH water quality sampling sites, plus sites in the First Basin, Third Basin and the northern part of the Second Basin. Sediment samples from one of the Second Basin sites and the Third Basin site had a slight sulfurous odor which is indicative of some anoxia. All the sediment samples were sent out for determination of the amount of phosphorus associated with several metals and organic materials.

A graphic summary of the phosphorus concentration data is provided below. As is typical, the amount of phosphorus in the sediments increases with the depth of the lake at the sampling site.

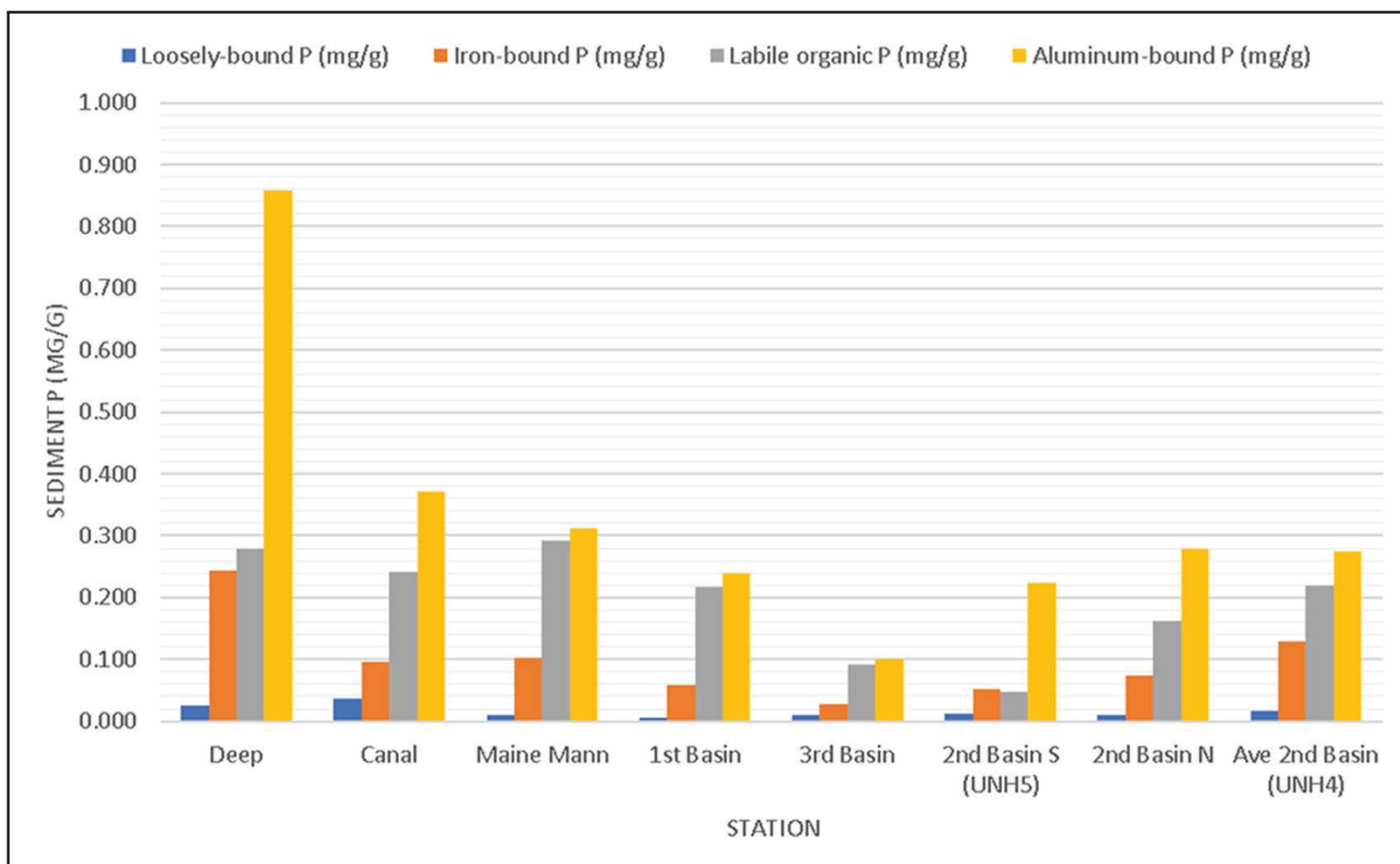


Figure 5: Fractions of sediment phosphorus in upper 10 cm by station. Great East Lake, 2023.

Sediment Analysis continued

As explained in my accompanying article, aluminum bound phosphorus is considered locked-up permanently in the sediment while iron bound phosphorus can be released under conditions of low oxygen (anoxia). Iron-bound phosphorus is present in all the Great East Lake samples. Could this level of iron-bound phosphorus become a problem?

Don Kretchmer analyzed the ratio of aluminum to phosphorus. It is known that if this ratio is above 25, there is sufficient “extra” aluminum present to bind all the phosphorus regardless of oxygenation status. Unfortunately, the aluminum to phosphorus ratio for Great East Lake is only 13. In other words, if the oxygen levels drop in Great East Lake, iron-bound phosphorus will likely be released from the sediments into the lake.

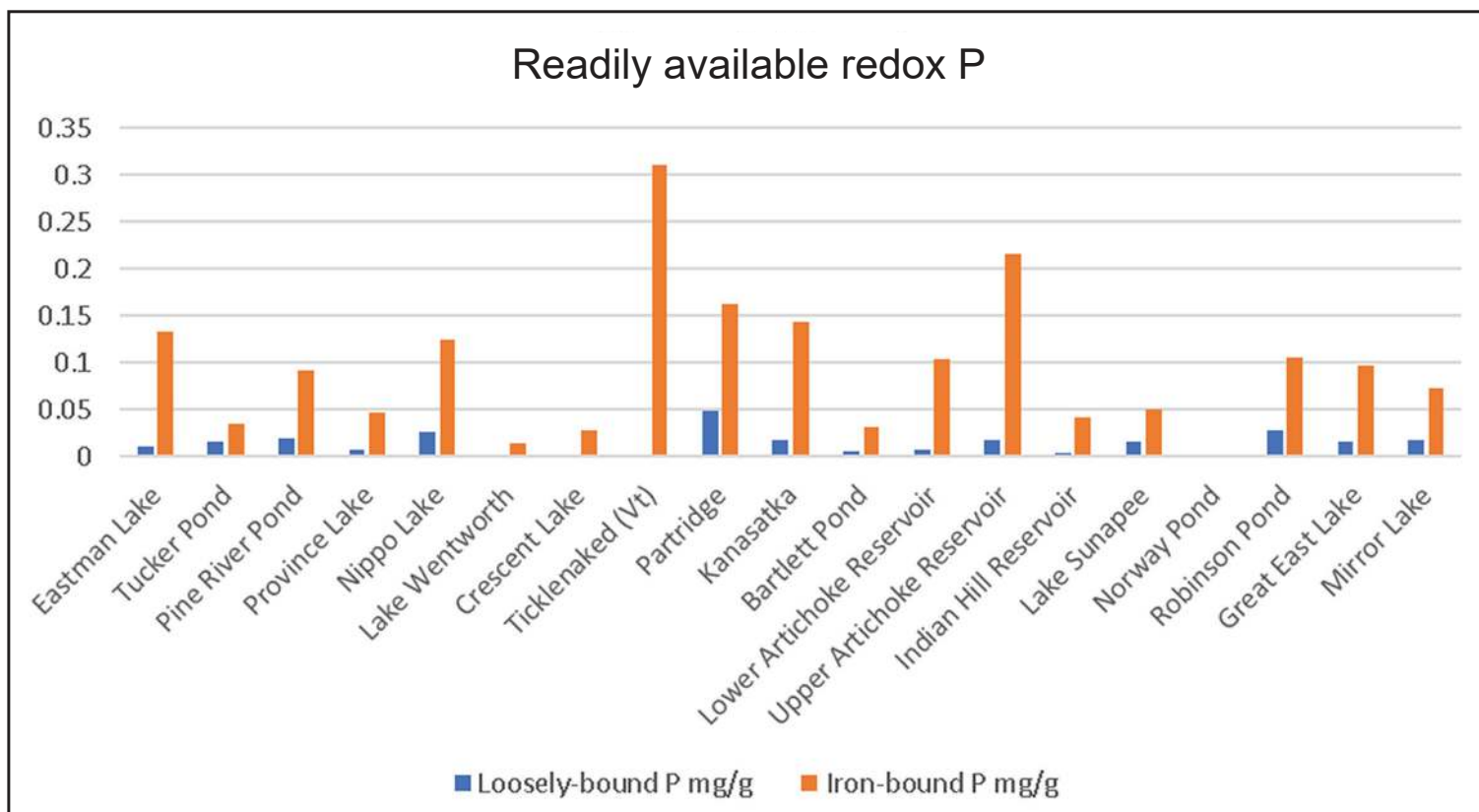
How much phosphorus could be released? Don Kretchmer estimated how much phosphorus would be released during a theoretical 30-day period of anoxia. The model predicted that this relatively short period of anoxia would result in a 28% increase on phosphorus levels for Great East Lake. Such an increase is substantial and just a few such events would reduce Great East Lake’s trophic status from oligotrophic (highest water quality) to mesotrophic with a reduction in water clarity and more cyanobacteria issues.

How does the amount of readily available phosphorus in Great East Lake sediments compare to other waterbodies in the region? The graph below should the average amount of this type of phosphorus in Great East Lake relative to other lakes? The data are presented below. (Great East Lake is second from the right side.) We are about in the middle.

If we just consider the three waterbodies on the right side, Robinson Pond, Great East Lake and Mirror Lake, the readily available sediment phosphorus levels are very similar, however, Robinson Pond and Mirror Lake frequently have anoxia at the lake bottom (and the associated phosphorus release) while Great East Lake does not. Why is Great East Lake different? Robinson Pond is eutrophic (high phosphorus in the water column) and Mirror Lake is mesotrophic (medium levels of phosphorus in the water column). Great East Lake is oligotrophic with low levels of phosphorus in the water column.

In 2024 GELIA is beginning to sample tributary stream to test for phosphorus levels. This will enable the development of models of the phosphorus flow into and out to the lake and help us better manage lake water quality.

Continued on page 13



Sediment Analysis continued

To summarize the findings:

- There is enough available phosphorus in Great East Lake’s sediments to significantly degrade water quality should the lake experience low oxygen levels near the sediments.
- We don’t have issues now because phosphorus levels in the water column have remained low.

As you know, the climate is warming and the lake water is warming. Warm water is more prone to become anoxic. In addition, warmer air holds more water can lead to more precipitation which leads to more nutrient-containing runoff. The magnitude of these effects is currently unknown but it certainly won’t help. Regardless, property owners and road associations need to keep up good work of keeping excess nutrients (especially phosphorus) out of the lake. A large portion of the nutrients that enters the lake is used by plants, algae and cyanobacteria and after the organisms die the phosphorus ends up in the sediments. If the phosphorus is released from the sediments, it can be used a second time or multiple times creating a destructive cycle called internal loading. We don’t want this to happen to Great East Lake.



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Continued from page 10

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**Photo excerpt from
*Newichawannock Reflections***

One of the earliest West Shore campers, E. F. Hamlin (right), is pictured in this 1920s photo from the Morrison archives.

Also pictured: Roger Morrison (center), and Herbert Wentworth, the boat "chauffeur."

Courtesy of Mary Lou (Morrison) Monnat