



College of Letters & Science
UNIVERSITY OF WISCONSIN-MADISON

Trout Lake Station News

News for Alumni and Friends of the Center for Limnology

Summer 2026



Emeritus scientist Susan Knight poles a rowboat through a bed of lily pads in Allequash Lake. Photo: B. Richter



Photo: Kevin Sink



As I sit writing this note by the fire pit on the shore of Trout Lake (yes, many of you likely know the exact spot!), I assure you that the cool and calm depths of this water persist.

Persistence is the guiding principle that keeps all of us at Trout Lake Station (TLS) focused on our ultimate mission to support the next generation of students pursuing water knowledge. Trout Lake students will engage in a variety of research projects this coming summer. Planned student projects include testing how forward-facing sonar changes catch efficiencies for different game fish species, evaluating aquatic plant and fish interactions in lakes invaded with Eurasian watermilfoil, testing the implications of plant succession in Manoomin (Wild Rice) waters, and measuring greenhouse gas production across lake productivity gradients. Other students will write about these projects and create art, media, educational and outreach materials to share.

We are so grateful for everyone's Day of the Badger support which goes directly toward these student experiences. The Center for Limnology was a top five Day of the Badger fundraiser for all of UW-Madison in 2026. Your support directly translates to more student research experiences at TLS and Hasler Lab this summer and beyond!

While the federal funding landscape continues to be tumultuous, we are working hard to ensure the persistence of the North-Temperate Lakes Long Term Ecological Research ([NTL-LTER](#)) program. Federal funding remains a possibility and alternate funding models are being considered with new partners throughout the state. We are also exploring innovative fee-for-service activities like our new community-engaged water temperature data collection service using DockSensiQ™ (pages 4-5).

The summer of 2026 is gearing up to be one of our busiest seasons yet with every cabin full of student and early career researchers. New and returning projects continue to build and grow in scope and in the number of people employed and partnering throughout the region. In addition, Trout Lake Station staff are already starting to plan for the next Intertribal Manoomin Camp in September and Science in the Northwoods in October. Keep your eye out for our Save-the-Dates for these upcoming opportunities to connect.

And come visit this summer during our annual [Open House](#) on Friday, July 31st to see all the amazing work. While here, join me by the lake to enjoy some of that cool calm Trout Lake holds and to meet some of our young, emerging leaders. Enjoy a few of their stories shared here!

[Gretchen Gerrish](#), Director, Trout Lake Station
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A Case of the Blues: Measuring Lake Resilience to Algal Blooms

by Danny Szydlowski, PhD

My oars creak and mosquitoes hum as I row my boat out onto Peter Lake, surveying the results of our experiment. Brilliant streaks of teal water swirl behind the boat with each stroke of the oars. Even though I know why Peter Lake has a case of the blues, the water still looks out of place in the Upper Peninsula of Michigan. Usually, the lakes here come in shades of brown or are clear enough that you can see down 30 feet. Instead, I feel like I'm paddling in the Caribbean. It's the summer of 2024, and we're in the thick of our latest whole-lake experiment.



Peter Lake in August of 2024. Peter Lake was dyed blue as part of a study on lake resilience to algal blooms.

I make my way back to the dock and step out of the boat. From a standing position I can see nearby Paul Lake, which is nearly identical in shape and size to Peter. The two lakes are separated only by a thin strip of dirt and gravel, but today they couldn't look more different. Peter is a sharp cerulean while Paul remains naturally clear with some brown staining. Their proximity and similar size make them an excellent place to do lake science (limnology). Since the 1980's, the Cascade Project has been changing the conditions in Peter and comparing it to Paul, which is always left alone.

At the edge of the dock sits the plastic carboy we used to dye Peter Lake blue. It is still stained by Aquashade, a dye designed to block light from reaching algae. Unchecked algal growth can diminish recreational opportunities and negatively affect drinking water supplies because harmful blooms make the water look or smell unpleasant and may even secrete toxins into the water. But algae, like other plants, need light to grow, and

the dye limits some of that growth. To be clear, we're not recommending that lake users go out and dye their lakes blue. That would be impractical at a large scale and the long-term effects on the ecosystem are unknown.

Instead, in our small experimental lakes, we're interested in the ecological response to changing light conditions and the resilience of the lake. That is, how difficult is it to cause an algal bloom? Being able to measure the resilience of lakes to algal blooms is the first step towards being able to manage them and make them more resilient in the face of global change. We followed the dye additions in Peter with fertilizer—again, don't try this at home! Like light, nutrients are another important part of plant growth. We were surprised when, despite the dye, Peter changed from blue to green.

Fast forward to summer 2025. We added the blue dye to Peter again, but did not add any extra nutrients. This year, the lake stayed blue rather than green!

We think that Peter Lake bloomed despite the light-blocking dye in the first year because rain kept washing out the blue pigment. But, preliminary analyses suggest these blooms were shorter in duration and harder to induce than blooms in years before the Aquashade treatments when Peter only had nutrients added or was not manipulated at all. That's the beauty of whole-lake experiments; because they happen

with all the messy processes of a real ecosystem. There are always surprises. And surprises mean you always learn something.



Danny Szydlowski (left) and Dat Ha (right) use a carboy to add a blue dye to Peter Lake. The dye is mixed into the water using an electric trolling motor. Photo: Grace Wilkinson

DockSensIQ™: Expanding the Reach of Lake Science Through Community Monitoring

by Noah Lottig, Paul Schramm, and Gretchen Gerrish

For decades, the Center for Limnology (CFL) has helped shape our understanding of lakes through long-term, place-based research. From the North Temperate Lakes Long-Term Ecological Research ([NTL-LTER](#)) program to countless individual studies, this work has revealed how lakes respond to human use, extreme weather, and long-term climate trends.

But even with this legacy, one challenge remains: most lakes are not monitored. Across Wisconsin and around the world, lakes are central to communities and economies, yet only a small fraction are sampled regularly and many of those just a few times each year. These snapshots are valuable, but they often miss many interesting patterns. High-frequency data from sensors collecting measurements every hour or more, has transformed our understanding of lake dynamics, revealing patterns that were once invisible. However, this kind of monitoring is limited by the cost and complexity of instrumentation and data management.



Noah Lottig assembling and soldering a DockSensIQ™ sensor at Trout Lake Station

The solution to that knowledge gap may not come entirely from more research programs or larger budgets. It may come from the people who are already out there, on the docks, in the boats, and along the shorelines, who care deeply about these lakes and have the ability to observe them every single day.

Over the last several years, Trout Lake Station (TLS) researchers Noah Lottig and Paul Schramm have been working towards this goal. For years, both have helped engineer and operate the Trout Lake and Lake Mendota buoy platforms, measuring temperature, oxygen, algae content, light, and more for the NTL-LTER project. Working with these systems every season, the question that kept coming up was a simple one: why couldn't something like this exist for everyone? The technology itself wasn't the barrier, it was the cost, the complexity, and the data management burden that limited high-frequency monitoring to well-funded research programs. Stripping those barriers away, while preserving the scientific value of continuous, reliable data, became the challenge worth solving. The result is DockSensIQ™.

The sensor records water temperature every hour and transmits data to the cloud in real time, viewable on the web or a simple app installed on your phone. Real-time, accessible data is shareable with family, friends, lake groups, or lake management teams.

a lake is put our toes in. Water temperature is something we all instinctively care about, but it is also one of the most important measurements we can make from a scientific standpoint. Temperature is a master regulator of lake ecosystems. Virtually every physical and biological process in a lake is connected to it in some way.

Water temperature is the most practical place to start when designing a sensor for citizen scientists. As we build out this new generation of accessible monitoring tools, temperature gives us a high-value, continuous window into lake dynamics that anyone can understand and provides useful data for limnologists and other scientists. DockSensIQ™ aims to build a network of people collecting lake observations that extends far beyond any single research program. The data can be aggregated across many lakes and become something far more valuable. "High-frequency measurements across many lakes provide a coherent regional system view. Patterns that are invisible at a single site, such as synchrony, regional responses to heat waves, and rates of seasonal transition, become measurable and comparable. The

The first thing most of us do when we get to



DockSensIQ™ real-time mobile app for viewing water temperature from anywhere on your mobile device.



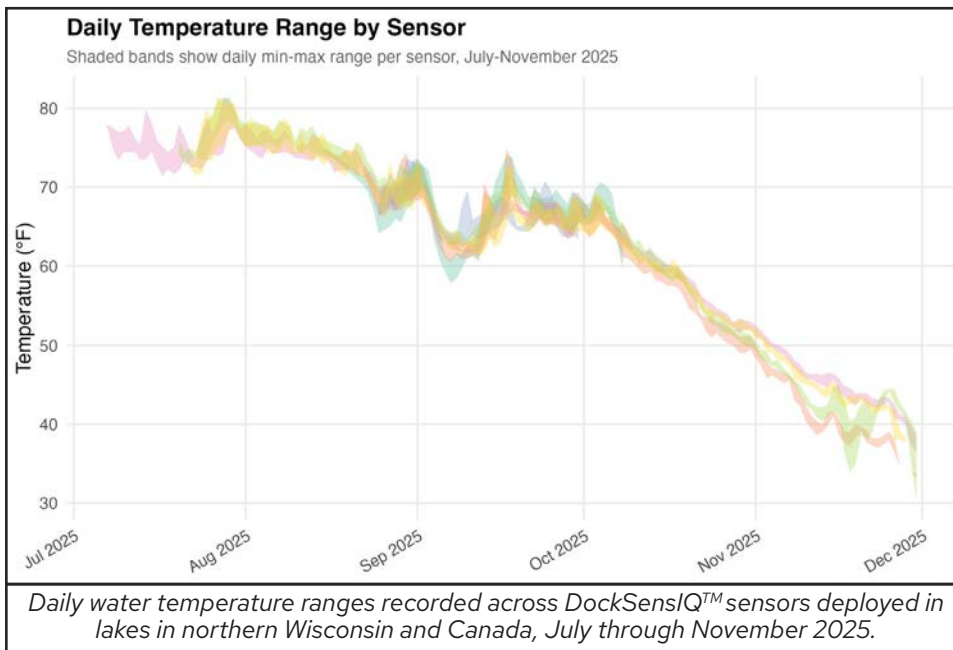
Noah Lottig deploying a DockSensIQ™ sensor on a Vilas County lake.

outcome is understanding how entire landscapes function and respond,” notes Paul Hanson, research professor at the CFL. That kind of regional understanding has been out of reach until now – not because the science isn’t there, but because the data hasn’t been.

Early deployments have already drawn strong interest from lake associations and community partners eager to better understand the lakes around them. A lake association that participated in last year’s beta deployment saw more than 200 visits to their real-time temperature app in the week following ice-out this spring. As one board member put it, “the more engaged our members are with the lake, the more stewardship of these waters will become a priority.”

Research like this is hard to support through traditional grants, as it doesn’t fit cleanly into the boxes that funding agencies tend to work with. For Lottig and Schramm, that was a real barrier for years. The solution was a different kind of funding model: a fee-for-service program where the people who use the technology help sustain it. Participation fees cover the real costs of hardware, data infrastructure, and support, but they also do something more. Pooled across a growing network of lakes, they make it possible to pursue research that would otherwise not happen. It is a small shift in how science gets funded, but one that matters, both for what it enables and for what it says about the relationship between researchers and the communities they work with.

The near-term goal is building and refining this network of sensors across Wisconsin and the broader Great Lakes region. If you have a dock, know someone who does, or are connected to a lake association looking to better understand their lake, we hope you’ll consider joining us.



The platform itself is also still evolving. This summer, we will be working with undergraduate students to add water level monitoring to the DockSensIQ™ platform, expanding what a dock-mounted sensor can tell us about the lakes we care about. Longer term, we are working toward a more capable, research-grade platform that could be deployed from the center of a lake, measuring a full suite of biological, physical, and meteorological parameters similar to the buoy systems we currently operate in our own research programs.

The longer-term vision extends well beyond Wisconsin. A dense network of high-frequency temperature data could help

researchers detect emerging climate signals, improve lake heat budgets, and identify conditions that precede ecological change. It could give lake managers better information and give communities a more immediate connection to the lakes they care about.

More than anything, it changes who gets to participate in lake science. Instead of data being collected only by researchers at a handful of sites, monitoring becomes something communities can see, understand, and contribute to directly. Lakes stop being places we visit occasionally and become living ecological systems we observe in real time.

If you’re curious, we’d love to hear from you – www.aquasens.io.

A Summer of Shoreline Science

by Madeline Hetland, 2025 Littoral Zones Undergraduate Fellow at Trout Lake Station



Madeline Hetland gets ready to collect aquatic insects with her bucket and dip net.

Photo: Madeline Hetland

I had the opportunity to spend last summer at UW-Madison's Center for Limnology Trout Lake Station (TLS). My work was part of an undergraduate research fellowship through the North Temperate Lakes Long-Term Ecological Research ([NTL-LTER](#)) program. Under the guidance of Dr. Katie Hein, a Research Scientist at TLS, I studied how shoreline restoration influences life in the littoral zone - the shallow, nearshore area where land and water meet.

My project focused on the response of aquatic macroinvertebrates to changes along the shoreline, as these organisms play key roles in nutrient cycling and provide food for fish, amphibians, and birds.

A Living Laboratory on Crystal Lake

Our study site was Crystal Lake, where a large-scale shoreline restoration project began in 2011 led by researchers at Michigan Technological University and Wisconsin DNR. Around 300 meters of previously manicured lawn with no understory were replanted with thousands of native trees, shrubs, and grasses. After this extensive restoration, we had a lot to learn about how these changes affected aquatic life over time.

As someone especially interested in aquatic macroinvertebrates, I carried out an independent project to compare these communities along different shoreline types. Macroinvertebrates include insects, snails, worms, and other small animals that live in the water. Insects especially respond to changes in habitat quality and shoreline structure, making

them a useful way to measure these differences. I wanted to understand how shoreline development and restoration affect aquatic macroinvertebrate communities, and whether disturbed sites can recover enough to support the same kinds of bugs and critters as a natural shoreline.

Using a dip net, I collected samples from each site and then spent hours in the lab sorting and identifying them under a microscope. I used a statistical program called R to analyze the data and compare the communities across sites.

The Results: Nature Bounces Back

What I found was both exciting and encouraging. The restored shoreline supported much more diverse insect communities than the developed shoreline, and in many cases was comparable to sites with minimal human disturbance. Certain groups of insects, like mayflies, caddisflies, and some dragonflies, were present at the restored site but completely absent from the developed shoreline. In terms of the number of different insect types (what we call "taxon richness"), the restored shoreline matched or even exceeded the natural sites in some cases.

This tells us something important: restoration works! Even after significant disturbance, native vegetation and shoreline improvements can create conditions that support complex and healthy aquatic communities.

Science, Stewardship, and Gratitude

This fellowship was a defining experience for me. I got to ask real questions, do hands-on fieldwork, and contribute to a bigger picture of how we care for our lakes. I am deeply thankful for the opportunity to have been part of the work at Trout Lake Station and research that will support healthy lakes for generations to come.

I'd like to give a special thank you to Dr. Katie Hein for providing mentorship and guidance throughout this project. My research was funded by the National Science Foundation, specifically the NTL-LTER Research Experiences for Undergraduates.

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Six Decades by Gretchen Gerrish

Every year, visitors and alumni circle back to Trout Lake Station (TLS) to visit the people, places, and science that inspired their futures and that continue to grow their connections. Recently, multiple generations of past and present Trout Lakers connected to try and track water flea, mysis shrimp, and cisco migrations on Trout Lake one sunny and cold fall day.



Lars Rudstam (photo left) started visiting TLS as an undergraduate studying zoology at UW-Madison in 1976-78 and then moved back and forth between Sweden and Madison where he completed his M.Sc. and postdoctoral work in limnology with professor emeritus John Magnuson and others working on acoustics and ciscoes. Rudstam now serves as the Director of the Cornell Biological Field Station at Shackleton Point where he continues to build knowledge and collaborations around fisheries, acoustics and ecosystem dynamics throughout the Great Lakes.

Richman and became committed to the field of limnology. He continued on to Cornell University for his PhD, then returned to Wisconsin to complete a postdoctoral fellowship at the Center for Limnology (CFL) with professor emeritus John Magnuson, working on climate change and zooplankton vertical migration. He retired in 2025 after being a professor at Lawrence University for 33 years. During his time teaching aquatic ecology, DeStasio brought over 700 students to TLS for annual fall field trips from 1988-2019.

Bart DeStasio (photo right) first came to TLS in 1978 as a Lawrence University undergraduate with professor Sub



Gretchen Gerrish (photo left) was an undergraduate at Lawrence University and on one of DeStasio's early TLS field trips. She followed up to spend the summers of 1996 and 1997 at TLS working with DeStasio and former TLS director Tom Frost to study zooplankton recovery following the Little Rock Lake acidification project. When Gerrish returned to TLS as the director in 2019, she reconnected with DeStasio to collaborate on a multiyear project studying zooplankton diel vertical migration.



Joe Mrnak (photo right) first came to TLS as a technician for the WDNR Escanaba Research Station in 2016

before joining Greg Sass and CFL professor Jake Vander Zanden for his graduate work. He worked extensively with hydroacoustics, testing its accuracy for estimating forage fish populations and also applied the technology to track cisco restoration efforts, as part of his PhD dissertation project completed in 2024.



Bennett McAfee (photo left) was an undergraduate at Lawrence University when he joined TLS virtually as a fellow during the 2020 summer of COVID-19. He put his data analysis skills to work graphing zooplankton data from NTL-LTER lakes. In 2022, he finally got a chance to work onsite at TLS as a technician studying ice dynamics and lake phenology. McAfee completed a M.Sc. in 2025 with CFL research professor Paul Hanson that focused on applying machine learning to modelling Lake Mendota ecosystem dynamics.



This crew, representing six decades of TLS connections, brought together their zooplankton, cisco, hydroacoustic, modeling and data analysis knowledge to test how the vertical distribution of small and large zooplankton and cisco fish changed from day to night. While the data analysis is still in progress, perhaps more importantly, the team's shared search for understanding, camaraderie, and time on the water together will keep this crew (and many like them) circling back to Trout Lake Station for decades to come.

Trout Lake Station - limnology.wisc.edu/trout-lake-station-overview

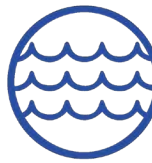
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Give to the Trout Lake Station Fund.
Donations to the fund will go directly to TLS to help improve our facilities and support our mission of freshwater research, undergraduate training, and public outreach.

Individual donors make a BIG difference
by funding summer internships, innovative Northwoods research projects and more.

Please consider making a gift to Trout Lake Station.

CFL and TLS support webpage:
limnology.wisc.edu/support

or contact

Gretchen Gerrish at
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or

Jake Vander Zanden at
mjvanderzand@wisc.edu (608-262-3014)

Maamakaaj (Awesomeness!)



Postdoctoral researcher Dr. Raymond Allen was chosen as a [2026 National Geographic Explorer](#) as part of a cohort of scientists protecting America's most iconic species. Dr. Allen will focus on assessing the health of regional Ogaa (walleye) populations with an emphasis on sustaining their cultural and nutritional kinship with the Ojibwe people.



Graduate student Sagen Quale was selected as a 2026 [Dreamstarter](#) by Running Strong for American Indian Youth, in support of her leadership and vision for the Intertribal Manoomin Camp. This year, Sagen will expand the workshop to incorporate additional traditional harvest, food preparation, and preservation activities. The camp will also include reseeding a nearby waterbody with Manoomin (wild rice) to emphasize the importance of giving back and reciprocity when harvesting.