



College of Letters & Science
UNIVERSITY OF WISCONSIN-MADISON

LIMNOLOGY NEWS

News for Alumni and Friends of the Center for Limnology

Fall 2025

The Ripple Effect of Our Freshwater Research

Read more on pages 4-5





Photo: Jeff Miller

2025 has been a remarkably challenging year for science in the United States. The Center for Limnology (CFL), like virtually every research program nationwide, has been affected by cuts, turmoil, and uncertainty at the National Science Foundation and other Federal science agencies. Federal grant funding historically supports around 80% of our annual research budget and, as this newsletter goes to press, the future of the North Temperate Lakes Long-Term Ecological Research as well as other programs remains highly uncertain (Ripple Effect, pg. 4).

One thing isn't uncertain. And that's the resilience of the CFL and the enthusiasm of so many people who support us. This year brought unprecedented giving to limnology during the UW-Madison's 'Day of the Badger' fundraising campaign. We raised more than \$32,000 from 109 individual donors. That money directly supported five amazing undergraduate research fellows over the summer, (Coolest Job Ever, pg. 3) ensuring that we can continue training the next generation of limnology leaders, no matter what.

Entrepreneurship and innovation continue to define the CFL community. Paul Hanson is taking the Environmental

Data Initiative to the next level, while Noah Lottig continues to refine the "Buoys for the People" initiative (From AI to DIY, pg. 10). We're also building new partnerships, as evidenced by the wildly successful Intertribal Manoomin Camp co-led by graduate student, Sagen Quale (Learning From Manoomin, pg. 8), as well as the launch of a brand-new Freshwater and Marine Sciences undergraduate certificate in the College of Letters & Sciences.

As I reflect on the past year and try to plan for the next one, my mind returns to a mantra we like to use - Global Leadership, Local Impact. No matter what the future may hold, our amazing faculty, staff, and students will continue to conduct science to inform the stewardship of inland waters around the world, and share what we learn with the communities we work in. Circumstances may have changed, but our mission stays the same.

Thank you once again for staying connected, and for your support for the Center for Limnology.

[Jake Vander Zanden](#)

Wayland Noland Distinguished Chair
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Limnology News

The “Coolest Job Ever” - Donor Support Helps Undergrads Find A Future in the Freshwater Sciences

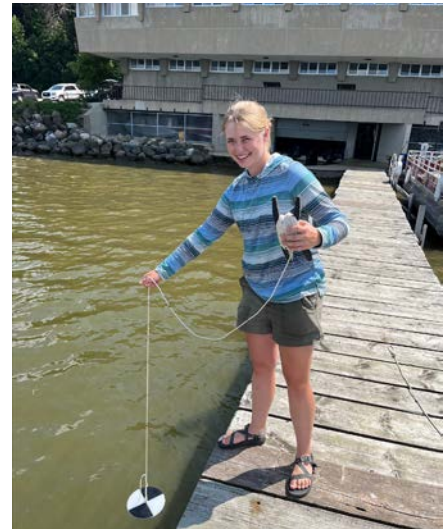
by Adam Hinterthuer

Not many people spent more time out on Lake Mendota this summer than UW-Madison junior, Kayla Bain. Bain was a summer undergraduate fellow on the aquatic invasive species team. She assisted researchers Joe Noeske and Joey Munoz on a number of projects.

From day one, Bain says, she knew she had made the right decision on how to spend her summer.

“My first day on the job was unlike anything I had ever experienced and it was the moment I knew this was going to be the coolest job ever,” she says, recalling how she was immediately thrown into boat safety and scuba training so that she could accompany the two Joes on a scuba diving outing to check on some of their research sites. As she sat in the boat and made sure the dive was going safely and smoothly, Bain remembers being excited about what the rest of her summer had in store.

Bain wasn’t the only student to have that experience. Thanks to unprecedented support from 109 individual donors during the UW-Madison’s “Day of the Badger” fundraising campaign, the CFL was able to add more than \$32,000 to its [Student Support Fund](#) this April. That money provided life-changing and career-defining fellowships for five incredible undergraduates.



Kayla Bain



Emily Ledin

Emily Ledin, a UW-Madison senior majoring in environmental sciences and life sciences communication, spent her summer helping out on the Cascade project, a long-running CFL research program based at the University of Notre Dame’s Environmental Research Center.

Emily was part of a crew taking samples every single day - even weekends - yet still reports that she loved her time in the Northwoods. For an aspiring scientist, the fellowship offered invaluable, hands-on experience both with collecting samples in the field and with bringing those samples back to the lab for analysis. One highlight for her was the independent research project which allowed her to “look at something not many researchers have looked at before,” she says.

Essentially, Ledin wondered if methane levels in a lake varied from the surface to the bottom waters and from the shoreline to the middle of the lake. “It’s an important piece of information,” she explains, “because methane is a very potent greenhouse gas and knowing how lakes contribute gases to the atmosphere is crucial to better understanding climate change.”

The experience convinced her that she’s on the right career track. “I have always been interested in carbon and nutrient cycling, but I wasn’t fully convinced to get on the greenhouse gas train,” she says. “The research I did this summer was so exciting and cool that I am definitely aboard now!”

UW-Madison junior, Steven Awve, also found his future goals getting clearer this summer. Awve, a double major in wildlife ecology and life science communication, served as the science communication fellow at Trout Lake Station (TLS).



Steven Awve

“There’s a lot of fascinating [research] going on in the Northwoods, but it isn’t always easy to communicate why it matters in a way that’s clear and relatable,” Awve says. “My job was to understand the research, figure out why it’s relevant to people’s lives, and then share it in accessible ways.”

(Continued on Page 7)





Members of the NTL-LTER crew on a sampling trip on Lake Mendota.
Photo: A. Hinterthuer

Long-Term Research and the Ripple Effect of Federal Funding

by Adam Hinterthuer

Earlier this year, we debuted a short documentary called [The Ripple Effect](#). The eight-minute movie highlights how federal support for science impacts so much more than just the academic faculty members who oversee their research grants.

The Ripple Effect focuses on [Trout Lake Station](#) and the [North Temperate Lakes Long-Term Ecological Research Program \(NTL-LTER\)](#), which has allowed the CFL to monitor and study eleven Wisconsin lakes for more than forty years. Support for NTL-LTER comes from the National Science Foundation and, as Trout Lake Station director, [Gretchen Gerrish](#) says in the video, that funding doesn't just stay on station.

"NSF dollars don't stop at our doorway, or at the doorway of UW-Madison," Gerrish says. "That money goes directly into our communities."

Funding for NTL-LTER supports the many researchers who live, work, recreate and raise families in the community. It allows the CFL to hire contractors to build new buildings and keep existing ones in good shape. It helps CFL researchers connect with area schools and introduce hundreds of children each year to the aquatic sciences and the importance of managing and conserving our lakes.

As Kathy Schmitz of the Vilas County Economic Development Board says, "to have a scientific research hub connected to the university in Vilas County is of tremendous importance. Not only for the research that they do, but for the quality of life they help enhance here."



Federal funding allows NTL-LTER researchers, like Gretchen Gerrish, to bring our research to area schools and into the local community. Photo: A. Hinterthuer

Another way that federally-funded research at the CFL impacts surrounding communities is in the relationships it allows us to build with the state and county agencies, local municipalities, and community members who help steward our waters.

In Madison, CFL research informs the efforts of non-profit groups like the Clean Lakes Alliance and Friends of Lake Wingra. It helps county resource managers monitor the results of efforts to improve water quality and reduce runoff into the lakes. The WI DNR uses NTL-LTER science to help them make decisions on fisheries management and invasive species.

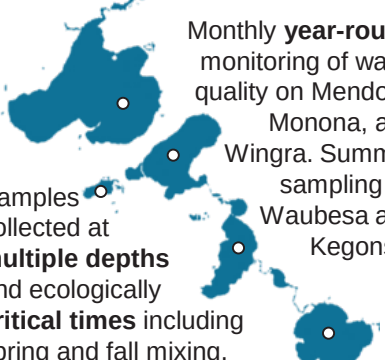
In short, federal funding for the sciences ripples far beyond the labs - or boats - where that science is being done. The NTL-LTER has been running for more than four decades and seven presidential administrations. That's over forty years of consistent, dedicated monitoring and world-class research on the waters of Wisconsin.

That research has led to important discoveries and new management practices. It has also supported dozens upon dozens of faculty, staff and students who live and work in our communities.

To learn more about the far-reaching impacts of our long-term research program, [The Ripple Effect](#) video tells the story of Trout Lake Station, and the infographic on the next page showcases some of the key insights and stewardship actions our research has led to in the lakes in and around Madison.

Decades of Discovery: Long-Term Science for Madison's Lakes

The only provider of comprehensive in-lake data for 30+ years



Monthly **year-round** monitoring of water quality on Mendota, Monona, and Wingra. Summer sampling on Waubesa and Kegonsa. Samples collected at **multiple depths** and ecologically **critical times** including spring and fall mixing, summer and winter stratification



We measure a full suite of variables including:

- Water clarity
- Dissolved oxygen
- Nutrients
- Chloride
- Chlorophyll (algae concentration)

We also monitor Fish Lake!

The NSF-funded North Temperate Lakes Long-Term Ecological Research Program at the Center for Limnology is proud to be the only provider of routine in-lake data on the Yahara Lakes



Data Viewers

Long-Term Monitoring Leads to Key Insights on Big Issues



Phosphorus Loading

We developed the first phosphorus budget for the Yahara watershed. Our recent modeling work has revealed the “pathway to recovery” that Mendota water quality will take under different phosphorus reduction scenarios.



Harmful Blooms

Our long-term data show that Mendota blooms are intensifying, due in part to increasing summertime rain and invasive species. The lakes now have earlier and larger, blooms, speeding up the annual onset of oxygen loss in bottom waters (i.e., “dead zone”).



Invasive Species

We were the first to detect zebra mussels and spiny water flea in the lakes and have documented their effect on water quality. The economic impact due the spiny water flea invasion in Lake Mendota was valued at \$100M.



Road Salt Pollution

Our data show that the Yahara lakes have been increasing in salinity, which is changing stratification patterns of the lakes. This has led to a push for new management strategies that balance winter safety with freshwater protection.



Freshwater Fisheries

Our data demonstrated the power of fisheries management to improve water quality. Removing carp from Lake Wingra and stocking predator fish in Lake Mendota, coupled with declines in cisco, increased water clarity and changed the food webs in both lakes.



Climate Change

We have linked shifts in the regional climate to increased rain and flows of phosphorus into the lakes, and warmer springs and summers to earlier occurrences of the spring clear-water phase, and more extensive oxygen loss in bottom waters.

Turning Science into Stewardship

Sharing Expertise

We collaborate with DNR, local governments, and organizations such as Clean Lakes Alliance and Friends of Lake Wingra, aiding their efforts to improve water quality in the Yahara lakes.

Informing Policy

Through policy briefs, expert testimony, and other interactions with policymakers and managers, our science has helped shape policies such as:

- statewide phosphorus ban in lawn fertilizer
- smarter road salt application on Madison's winter roadways
- WDNR management of sport fisheries

Education

We reach thousands in the county each year, educating on water quality issues through public talks, media interviews, community field trips, and our annual open house. More info on our website.



Recreational angling, not warming, is currently the biggest threat to fish species like this walleye. Photo: G. Hansen

Under Pressure: Fishing, Not Warming, Currently Has a Greater Impact on our Freshwater Fisheries by Adam Hinterthuer

A [new study](#) has found that, when it comes to our freshwater fisheries, recreational anglers currently have a greater impact on fish populations than climate change. And that may be good news, says the study's lead author, [Luoliang Xu](#), because, faced with warming waters around the world, "local fishery management becomes a very important tool we can use to reverse the decline in these populations."



Luoliang Xu

The study involved an "amazing" dataset of population trends and angler harvests for 521 different populations of fish across the Midwestern U.S. The dataset was compiled by researchers at the Univ. of MN and the U.S. Geological Survey and consisted mainly of warm-water species, like bass and bluegill, and cool-water species like walleye and northern pike. Ninety-eight percent of the fish populations studied were living in lakes that are getting significantly warmer.

Xu and his team ran computer simulations that projected what the 521 different fish populations would look like with no warming and then ran simulations in which fishing was removed from the equation.

Their results showed that "the catch from recreational fishing is a more important driver than warming," Xu says. In fact, of the populations they studied, "only one percent showed that warming was a more important driver [of population

declines] than fishing."



Olaf Jensen

In other words, ninety nine times out of a hundred, the fate of a freshwater fishery was tied to the amount of harvest of fish from anglers.

That's not to say warming isn't having effects. Two-thirds of the warm-water fish populations in the study were growing as they took advantage of new warm-water conditions while more than half of the cool-water species were declining.

Xu points out that much of their data came from lakes that are heavily fished, so the fact that fishing plays a role in population dynamics is to be expected. But, he says, the overwhelming impact fishing has compared to warming was "surprising."

"When you think of fishing in lakes, you think of a kid with a rod and a bobber.

How can that be anything less than idyllic?" says [Olaf Jensen](#), a co-author on the study and a professor at the CFL. But when you add up all of the fishing trips

taken by millions of people throughout the fishing season, recreational fishing becomes a powerful force acting upon our fisheries.

That doesn't mean that it has to be a negative force. When anglers caught more fish in a lake than the population could replace, the numbers obviously went down. But, just as important, when fishing pressure eased up, populations could often rebound and grow again.

It is also important to note, Jensen says, that as the climate - and our lakes - continue to warm, more and more species will see waters move beyond temperatures they can tolerate. "You can hit temperatures where the math changes," Jensen says. "Just a couple more degrees of warming, and all bets are off."

Still, for the moment, he says, this study provides some good news. "Climate change often leaves us with a sense of powerlessness because it's an inexorable force happening globally and our ability to impact it at the local level is minimal," Jensen says. "This research left me with a sense of hope. We may not be able to control power plant emissions in China, but we can certainly have an impact on fisheries regulations in our local lakes."

Continued from Pg 3 “Coolest Job Ever”

Awve did this through articles on the [CFL blog](#), posts to social media and by organizing an incredibly successful open house that saw more than 300 people visit the station.

He also left a lasting legacy by producing “[The Ripple Effect](#)”, an outstanding 8-minute video that highlights the work being done at TLS and the importance of federal funding in keeping the station a vibrant part of both the freshwater sciences and the surrounding community.

“Every place has its own character, and it takes time to understand what people value and how science connects to their daily lives,” Awve says. “That’s also what made this internship so rewarding. I wasn’t just working behind a desk—I was out experiencing the lakes, forests, and small towns that define northern Wisconsin.”

“Seeing people step up to make this fellowship possible,” he adds, “gives me real hope for the future.”

Back in Madison, Bain was, like Ledin and Awve, out experiencing the lakes and at work at all hours. She helped collect samples of zooplankton both at midday and at midnight. She spent countless hours bobbing in a boat, making sure Joe and Joey’s dives went smoothly. And she even got pulled into service for the long-standing Mendota Microbial Observatory project, sampling for microbes out at Lake Mendota’s deepest point.

The work constantly challenged her problem-solving skills and forced the team to be both good planners and flexible thinkers whenever something didn’t go according to those plans. “Every day brought a new challenge but, without fail, when I came out the other side, my life had been enriched in some form or another,” Bain says.

“A simple thank you cannot express my gratitude for the generosity from each and every donor,” she says. “Because of them, I now know what I want to spend the rest of my life doing and have been given an invaluable stepping stone to my future goals.”

Ice-Cold Research by Margaret Schreiner

Editor’s note: This is an excerpt of an [article](#) in the spring 2025 issue of Letters & Science Magazine. Kayla and Charlie are both back in Antarctica this fall for another research season!

The Center for Limnology (CFL) doesn’t just conduct long-term research on Wisconsin waters. Thanks to work in associate professor, [Hilary Dugan’s lab](#), we also have a relationship with the [McMurdo Dry Valley Long Term Ecological Research](#) site in Antarctica.

Last fall, graduate students Kayla Hubbard and Charlie Dougherty (’23) spent a research season there. It was Charlie’s third season on Earth’s coldest continent, and it was Kayla’s first.

Charlie’s research focused on permanently ice-covered lakes in the McMurdo Dry Valleys – specifically on how the ice on these lakes thickens and thins over time. Kayla studied how groundwater interacts with lakes beneath the frozen surface – an under-researched area of study that could give more insight into hydrological connections between glaciers, lakes and even the ocean.

“It’s a privilege to be able to work in such a unique and harsh environment,” says Kayla. “We gain a lot of perspective doing science somewhere so remote and untouched. [Antarctica] is so different from anywhere else on this planet, and that is amazing.”

Kayla is currently working on her PhD as part of Hilary Dugan’s lab at the CFL. Charlie just completed his master’s degree and is now the manager of the [Mountain Limnology Lab](#) at the University of Colorado-Boulder’s Institute of Arctic and Alpine Research.



Kayla Hubbard (left) and Charlie Dougherty were part of a Long-Term Ecological Research study in Antarctica

Intertribal Manoomin Camp Helps Community Learn From and With Wild Rice by Gretchen Gerrish



Esiban Parent (left) joined family, colleagues and community members to pick through processed rice late into the night. Photo: G. Gerrish

This summer, a plant known as “the good berry” brought people together for a four-day event of learning and community at the North Lakeland Discovery Center. While many people know the plant as “wild rice,” Indigenous communities have been in relationship with it for centuries and it goes by many names – *Manoomin* to the Ojibwe, *Psíj* to the Dakota and *Manòmin* for the Menominee.

Esiban Parent, the *Wiidookaage* or “wild rice helper” for the [Great Lakes Indian Fish and Wildlife Commission](#) (GLIFWC), helped organize the Intertribal Manoomin Camp and loved being able to sit side-by-side with family, colleagues, and community members as they gathered around long tables and picked through processed rice late into the night.

Their work showed that the harvest of Manoomin is about community, Parent says. “When you can come together and realize that in a real way, you’re depending on certain people with skills and knowledge to share ... wild rice connects us. We’re all connected. This is just one of those practices that reminds us of that.”

The idea for the event came from Kathy Smith, the *Manoomin Ganawandang*, “she who takes care of the rice” at GLIFWC. Smith had talked about planning an Intertribal Manoomin camp for some time.

“My dream was always ... to include everybody, all walks of life, no matter what your belief system is, or your background, but to get us excited about harvesting good, clean food, and also to share teachings and to have a space that is inclusive for everybody,” Smith says.

As part of [Trout Lake Station](#)’s ongoing research on declining rice populations, Smith connected with [Sagen Quale](#), a CFL and Agroecology graduate student, who has spent the last few summers up at Trout Lake Station. Quale proved to be a motivated and trusted partner to lead the planning. Seeded by many partners, the camp grew to support more than 150 people, including members from 20 different tribal communities.

Cultural knowledge holders taught attendees how to prepare materials including knockers, push poles, parch paddles, mats, moccasins, and winnow baskets. These tools were put to the test as attendees took canoes out to nearby lakes, searching for beds of Manoomin, assessing ripeness of the seeds, and harvesting where the rice was ready.

Quale was grateful for the knowledge shared in planning and among participants at the camp. The work was a continuation of Quale’s own relationship with Manoomin. Earlier this year, Quale received the “Fan Favorite Award” from the [Planet Forward Storyfest](#) competition for her short documentary, “[Seeding Stories](#).” The Intertribal Manoomin camp helps her keep working towards valuable, far-reaching outcomes for growing knowledge and support for Manoomin’s future.

In Quale’s own words, “You take teachings as they are given to you and take them forward as you can.”

Major funding provided by *America the Beautiful Grant* (GLIFWC and WDNR), *UW Madison Wisconsin Idea Baldwin Grant*, *UW Agroecology*, *Wisconsin River Alliance* and partners.



Kathy Smith watches as Manoomin is dried, or parched, over an open fire. Photo: G. Gerrish

Field Samples: Graduate Students and Postdoc



Moira McCarthy (MS, Wilkinson)

Moira grew up in St. Paul, MN and graduated from the Univ of MN in Ecology, majoring in Evolution and Behavior with minor in Leadership. Moira's childhood involved family vacations in the Northwoods canoeing, birding, swimming, and asking countless questions about the environment. This sparked her to pursue a career in research. She started her masters in May of 2024 up on Peter and Paul Lakes at the University of Notre Dame's Environmental Research Center as part of the Cascade Project. Specifically she studies greenhouse gas and nutrient dynamics in these north temperate lakes.



Sophia Skoglund (PhD, Hanson)

Sophia is from East Bethel, MN and earned her BA in Environmental Studies and Studio Art from St. Olaf College. Inspired by childhood dreams of becoming an astronaut and summers at her grandparents' lake house, she joined NASA's DEVELOP Program and set off down a career path in satellite remote sensing of water quality. Now pursuing her PhD at the CFL, Sophia recently led a field campaign on Lake Mendota that entailed simultaneous water sampling from a boat and hyperspectral imaging from a plane. She also helps curate incoming data packages for the Environmental Data Initiative.



Luoliang Xu (Postdoc, Jensen)

Luoliang grew up in China and completed his BS in Marine Fishery Science and Technology at Shanghai Ocean University. He earned his PhD at the Univ of Maine, where he focused on fisheries stock assessment and management. Luoliang's current research at the CFL explores how climate change and fishing pressure interact to affect fish populations in lakes. He is particularly interested in how warming and fishing alter fish growth, reproduction, and productivity, and how these changes can be incorporated into management strategies.

Alumni At Work



Photo Left: [Gretchen Hansen](#) (2012 PhD, Vander Zanden & 2013 Postdoc, Carpenter) and her daughter, Billie, (top of boat on the left) with scientists at Yellowstone National Park, who are removing tons of invasive lake trout every year on Yellowstone Lake to enable recovery of native cutthroat trout. Gretchen is on the science advisory board of the project and an associate professor of fisheries ecology at the Univ of Minnesota-Twin Cities.

Photo right: [Martin Perales](#) (2020, PhD Vander Zanden) and colleague, Paul Web, conduct steelhead surveys in spring along a reach of York Creek in California's Napa

County. The creek was recently made accessible to anadromous fish through a dam removal project and Martin is looking for evidence that the fish are successfully traveling in from the Pacific Ocean to spawn. Martin is a senior project manager for the Napa County Resource Conservation District.



From AI to DIY: New Frontiers for Lake Research by Adam Hinterthuer



Paul Schramm (left) and Kevin Gauthier Jr. get “megabuoy” ready to be anchored in Trout Lake. Photo: N. Lottig

For centuries, buoys have bobbed in waterways across the world, marking safe passage for nautical traffic. They began about as “low tech” as you can get – basically something that floated tied to something that sunk – a wooden cask chained to a stone, for example. Over the last several decades, however, scientists began attaching different sorts of instruments to buoys, allowing them to record data on things like wind speed, water temperature, dissolved oxygen, and dozens of other variables. What’s more, unlike human research crews, buoys can work around the clock and through any kind of weather.

Today, the CFL is helping chart new frontiers for these technologies.

An accepted theorem in aquatic ecology is that you need to sample at twice the frequency of a phenomenon to understand it, says [Paul Hanson](#), a research faculty member at the CFL.

“There are a lot of important processes, like lake metabolism, photosynthesis, and zooplankton migration that happen on a daily schedule driven by sunrise and sunset, which means we

repeatedly need to sample at least twice a day to understand these dynamics,” he explains.

Buoys can record data 24 hours a day, seven days a week, which makes them ideal to answer these questions. But it also makes traditional methods of interpreting all of that data impossible. That’s where things like artificial intelligence and machine learning come in, says Hanson. The rapid evolution in computing capacity means that researchers can now build sophisticated models that utilize the millions of data points collected by buoys to make increasingly reliable predictions about how lakes will behave in a changing world.

That work also requires “data repositories” where all of that information is stored. The CFL runs the [Environmental Data Initiative](#), which archives and organizes huge ecological datasets from across the world and then ensures that data is available for other researchers to use to ask their own questions. It is a powerful way of expanding our ecological knowledge, Hanson says.

Another powerful way that the CFL is expanding limnological horizons has less to do with getting high-quality data to scientists and more to do with getting affordable scientific instruments to interested members of the public.

The project is affectionately known as “Buoys for the People,” and is “grounded in making advanced water monitoring technology available to the general public by reducing costs and making data visualization easy and accessible,” says research scientist, [Noah Lottig](#).

The big idea behind the project is, essentially, to help representatives of lake associations and other interested members of the public create low-cost technologies to answer questions they might have about their lakes. “When folks first engage with a lake,” Lottig says, “they dip a toe in to test the water temperature or look for the bottom to evaluate water clarity. Buoys are just another way people can get relevant information for their daily lives.”

Lottig, along with researcher, Paul Schramm, leads buoy-building workshops up at Trout Lake Station.

Schramm says it’s fun to help people build a “little tech hub” that not only “empowers them to know their lake in another way, but also creates knowledge and curiosity about the long-term data and big science platforms that exist” at the CFL. The program also benefits aquatic science, he says. While there will never be a research-grade monitoring buoy in every lake, Buoys for the People does help build a network of sensors across lakes that helps provide, he says, “a gradient of understanding” that can be brought to local, regional and even national questions.

Whether it’s using AI to build better computer models or DIY workshops to build affordable buoys, there is an important point to remember, says Hanson. “Science is a people business. Success is based on the community that supports it.”



Attendees at a buoy building workshop at Trout Lake Station work attach sensors to an inexpensive buoy design. Photo: N. Lottig

Why Zooplankton Rise With The Moon

by Steven Awve

Most people work a 9-to-5 job. But for some of the smallest creatures in our lakes, the active part of their day begins at sundown.

Each night, under cover of darkness, zooplankton—tiny aquatic animals—rise from deep waters to the surface to feed. By morning, they retreat to the depths to avoid being eaten themselves. This phenomenon, called diel vertical migration, happens in nearly every lake on Earth. In the ocean, it comprises one of the largest daily movements of biomass on the planet.

This summer, I got the chance to go out with researchers who are exploring these daily migrations. One night our team left Trout Lake Station at 9 p.m. and headed to the University of Notre Dame Environmental Research Center, which is home to three famously studied lakes that are part of the Cascade Research Program.

Working under dim red headlamps to avoid disturbing plankton behavior, we paddled to the center of each lake. One team took a snapshot of the lake's water quality using a sensor that measures temperature, dissolved oxygen, and chlorophyll throughout the water column. Meanwhile, my team collected zooplankton from different depths using a device called a Schindler trap—a cube-shaped sampler with ends that seal off and “trap” a section of water (and any zooplankton swimming in it) once you've lowered it to your desired depth.

Even though it was late, we weren't the only ones on the lake. As we wrapped up the last few samples a loud crash snapped us to attention—a beaver slapping its tail on the water. We couldn't see it, but we could hear it moving closer, the sound of water slaps echoing across the still lake. An eerie—but awesome—reminder that we aren't alone on the lake after dark.

By the time we finished sampling all three lakes and preserved our jars with ethanol, it was nearly 3 AM. Then came the 9 AM wake-up call to go back out and repeat the process, collecting the same data during the day.

Why does this matter?

Recently published research shows that if we only sample during the day, we may be drastically underestimating how many zooplankton are actually in the lake. That's because many species spend daylight hours deep in the water column to avoid predators, only rising to the surface under the cover of darkness. In fact, nighttime surface samples can contain 5 to 500 times more zooplankton than daytime surface samples. If we don't look at night, we miss a huge part of the story.

Plankton are often considered the base of the aquatic food web. A nuanced understanding of plankton behavior is essential to correctly understanding and modeling other aspects of lake ecology like predator-prey dynamics, lake food webs, and how energy flows through aquatic ecosystems. And every sleepless night spent studying them brings us one step closer to a clearer picture of the lakes we love.

Read the [full CFL Blog post](#).

Steven was the Trout Lake Station summer science communication intern, a fellowship made possible by support from the Day of the Badger campaign chronicled on page 3.



Acrylic painting by Christina Weatherford of a nightly zooplankton migration.



Rhett Krovitz lets water filter out of the Schindler trap.
Photo: S. Awve

THANK YOU FOR SUPPORTING THE CFL

The generosity of our supporters allows the Center for Limnology to continue to train the next generation of limnologists, generate new knowledge about inland waters, and share this knowledge with diverse audiences. Please consider making a gift to the Center for Limnology.

CFL Support webpage:

<https://limnology.wisc.edu/support/>
or

Contact Jake Vander Zanden at
608-262-3014 or mjvanderzand@wisc.edu

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Highlights from Summer Open Houses



For nearly 15 years, the Center for Limnology has opened our doors to the public each summer for our [annual open house](#) at both Hasler Lab and Trout Lake Station. This summer, several hundred people turned out to learn a little bit about our lakes, proving that there's still incredible public interest in the freshwater sciences!

