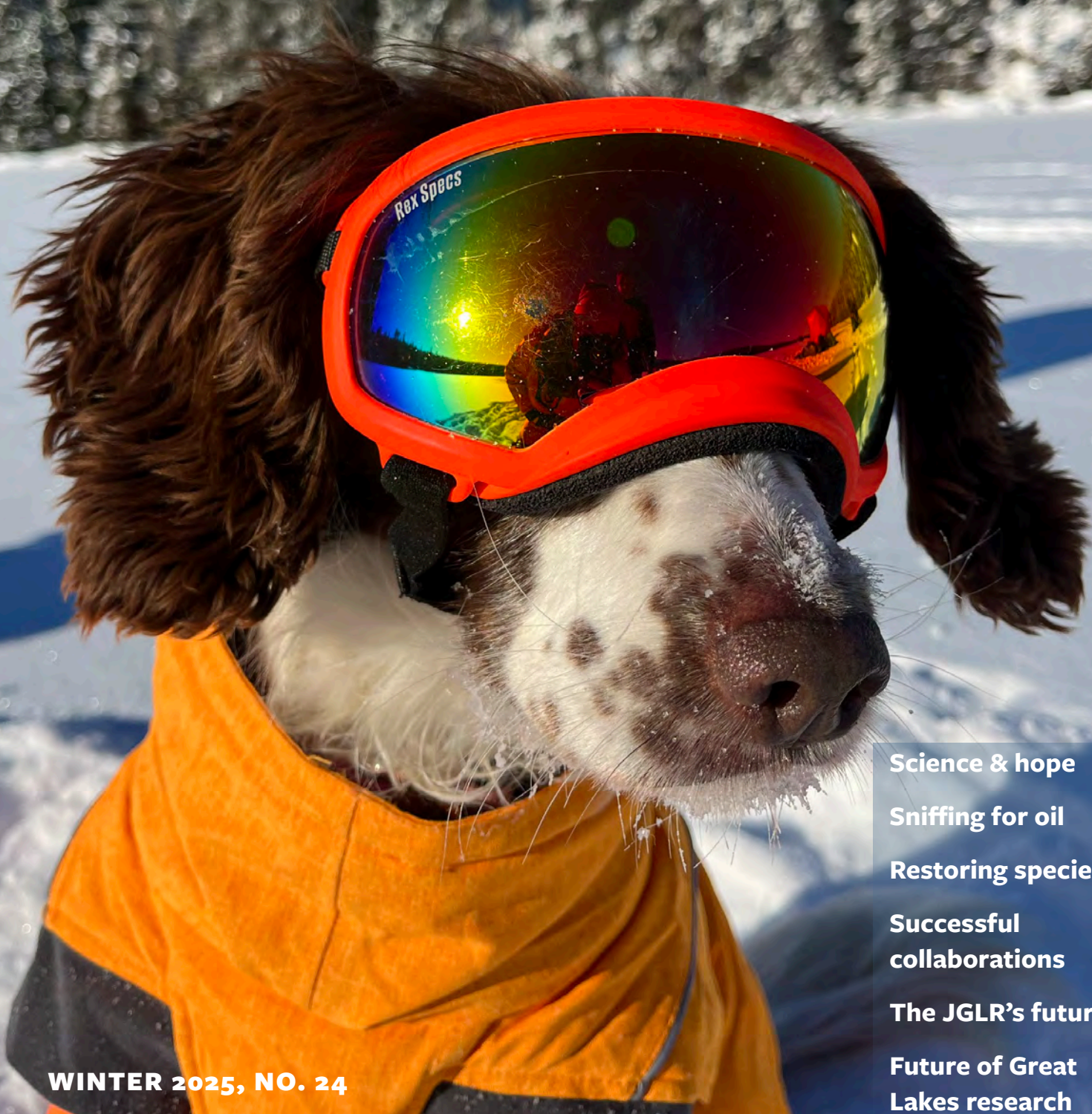




LAKE*S* Letter

SCIENCE & HOPE



Science & hope

Sniffing for oil

Restoring species

**Successful
collaborations**

The JGLR's future

**Future of Great
Lakes research**

WINTER 2025, NO. 24

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EXECUTIVE DIRECTOR'S NOTE



Since the last issue of *Lakes Letter*, the Great Lakes
science community has faced unprecedented
challenges under the newly elected U.S.
administration. Job losses, funding freezes—
particularly for IDEA+ initiatives and international
programs within academia, government, and
NGOs—and the removal of climate change data
have had a significant impact on many IAGLR
members, as well as on the organization itself.

These changes also affect colleagues outside the U.S. whose research depends on
collaborations, shared resources, and funding.

While IAGLR does not rely heavily on direct federal funding, recent proposals
aimed at supporting inclusion and diversity have been put on hold. We are also
closely monitoring participation in our upcoming conference to assess any
broader effects on our community.

Earlier this month, the IAGLR Board of Directors met to discuss our response.
Our values and mission remain unchanged. In collaboration with like-minded
scientific societies, we are urging the U.S. Congress to halt the implementation
of recent executive orders that threaten scientific progress. You can find IAGLR's
full statement on page 4.

Meanwhile, plans for our annual conference in Milwaukee this June are well
underway. Dr. Harvey Bootsma has assembled a 500+ piece program puzzle,
which will be unveiled in March when registration opens. Be sure to check out
the optional field activities scheduled for Monday and Wednesday afternoons—
Milwaukee has much to offer!

I'm also pleased to announce that IAGLR has formalized a partnership with
the African Center for Aquatic Research and Education (ACARE) through a
newly signed memorandum of understanding. This collaboration will enhance
opportunities for African scientists to participate in IAGLR programs (see page
5 for details). Looking ahead, IAGLR and ACARE are working together on a
joint conference in Arusha, Tanzania, in February 2026, followed by our annual
conference in Winnipeg in May 2026, co-hosted with the Society of Canadian
Aquatic Sciences.

As always, we welcome your input. If you have comments, suggestions, or
would like to get more involved in IAGLR, please don't hesitate to reach out to
your board members.

Looking forward to seeing many of you in Milwaukee!

Best regards,
Jérôme Marty

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ASSOCIATION NEWS

In support of science: IAGLR's response to recent U.S. federal actions

WE ARE DEEPLY CONCERNED about recent actions taken by the U.S. federal government to dismantle diversity, equity, and inclusion commitments; indiscriminately fire federal employees; threaten scientific advancement through defunding and stifling of international collaboration; and disrespect the sovereignty of other nations. To those directly harmed by these actions, we see you, and we recognize that, ultimately, these actions affect us all. Thank you for all that you do to protect the Great Lakes and safeguard our shared environment.

In a meeting in early February, the IAGLR Board of Directors reaffirmed that our core values—collaboration, diversity and inclusion, excellence, learning, and stewardship—are even more vital in these challenging times. In a letter sent to members and friends, IAGLR President Donna Kashian reiterated our commitment, noting that IAGLR continues to respect the “diverse values, beliefs, and backgrounds of its members and the broader Great Lakes community. Despite current challenges, its mission remains unchanged: to advance science-based understanding and stewardship of the world’s large lakes.”

North America’s Great Lakes region is an economic powerhouse whose prosperity depends on healthy ecosystems and the ongoing expertise of scientists to inform decisions about their management. IAGLR serves as a trusted source of science-based knowledge on the Laurentian Great Lakes and other large lake ecosystems to support these decisions. This understanding

requires interdisciplinary collaboration and the inclusion of multiple ways of knowing, including Indigenous and community-based science. In uncertain times, science remains the heart and center of what we do, reinforcing IAGLR’s dedication to collaborative efforts for a sustainable future for the Great Lakes and beyond.

Therefore, we urge those in positions of power to take action to restore and protect the country’s tradition of a strong scientific enterprise, including programs that train the next generation of scientists. This commitment has served the prosperity, health, and security of society for the past 80 years. We call on U.S. courts to overturn harmful executive orders that strip the nation’s science funding and talent. We urge elected officials to continue bipartisan support for vital programs that protect U.S. waters, including about one fifth of the world’s surface freshwater contained in the Great Lakes. We denounce efforts that threaten international collaborations in both North America as well as on the African continent. We pledge to uphold our values to ensure our association remains welcoming, collaborative, and inclusive. And we encourage all scientists to speak up for science to their elected representatives and within their own communities, recognizing that every effort counts.

We invite you to visit the [About IAGLR](#) webpage to learn more about our beliefs and values. Please feel free to contact IAGLR President [Donna Kashian](#) or Executive Director [Jérôme Marty](#) with your comments and concerns.



Job	Deadline
Research Assistant – Invasive Plant Treatment (Student Services Contractor), 5 positions US Geological Survey Great Lakes Science Center Ann Arbor, MI	Mar 14, 2025
Assistant Professor-Tenure System Department of Fisheries and Wildlife, Michigan State University East Lansing, MI	Until Filled
Postdoctoral Research Associate University of Wisconsin-Madison Madison preferred	Until Filled
Post-doctoral position, Great Lakes benthic ecology University of Wisconsin-Milwaukee, School of Freshwater Sciences Milwaukee, WI, USA	Until Filled
Field and Laboratory Technician Henderson University Tiffin, OH	Feb 28, 2025
Research & Monitoring Seasonal Field Assistant Minnesota Creek Watershed District Minnetonka, MN	Feb 26, 2025
Water Quality Intern The Watershed Center Grand Traverse Bay Traverse City, MI	Feb 26, 2025
Hydrologic Data Specialist University of Michigan, Cooperative Institute for Great Lakes Research Ann Arbor, MI	Feb 26, 2025
Environmental Data Specialist University of Michigan, Cooperative Institute for Great Lakes Research Ann Arbor, MI	Feb 26, 2025

ARE YOU HIRING?

To help those looking for jobs in large lake research, we encourage you to post your job openings on the IAGLR Job Board. It’s free to both post and browse. Jobs are also shared in our monthly *IAGLR E-Notes* newsletter.

iaglr.org/jobboard

IAGLR, ACARE announce strategic partnership to strengthen global freshwater research

The International Association for Great Lakes Research (IAGLR) and the African Center for Aquatic Research and Education (ACARE) are pleased to announce a formal partnership through a newly signed memorandum of understanding (MOU) for the years 2025–2029. This collaboration builds on shared goals of advancing freshwater science, promoting education and mentorship, and fostering global cooperation in large lake research.

IAGLR, a leader in Great Lakes research since 1967, and ACARE, a key organization dedicated to the African Great Lakes and freshwater resources, will work together to expand opportunities for scientists across North America and Africa. Key initiatives under this MOU include joint efforts to enhance scientific exchange, support emerging researchers, increase participation in conferences, and promote collaborative publications—particularly research led by African scientists in the *Journal of Great Lakes Research*. Additionally, ACARE will facilitate IAGLR memberships for its African network members and



Attendees gather at the Annual Meeting of the African Great Lakes Stakeholder Network in Lusaka, Zambia, earlier this month. Scientists and decision makers from 10 countries and seven lakes convened to share knowledge and plan for freshwater collaboration.

sponsor participation in IAGLR's annual Conference on Great Lakes Research.

This partnership marks an important step toward building a stronger, more inclusive global freshwater research community. By combining expertise and resources, IAGLR and ACARE aim to

ensure that the world's large lakes are valued, protected, and better understood for future generations.

Meet the new members of the IAGLR Board of Directors

Congratulations to the following IAGLR members, recently elected to serve on the IAGLR Board of Directors. Their terms will start in June.



Navjot Dhaliwal
York University
CANADIAN STUDENT
MEMBER



Mike McKay
University of Windsor
TREASURER



Leigh McGaughey
St. Lawrence
River Institute of
Environmental Sciences
CANADIAN REGULAR
MEMBER



Pengfei Xue
Michigan Technological
University
U.S. REGULAR MEMBER



Student Travel Award

IAGLR student members, defray your travel costs to attend the conference. Apply for a Student Travel Award! We've set aside funds to help support your travel, with awards ranging between 25% and 100% of registration costs. First come, first served as funds allow so apply early. Remember to sign up for your 2025 IAGLR membership to qualify!

Apply by April 7.



MEMBER NEWS

Kudos

Congratulations to the following IAGLR members.

NOAH GAUTHIER (University of Ottawa) for completing his Master of Science in Environmental Sustainability, where his thesis broke new ground in examining the possibilities of using CRISPR technology in the Great Lakes.

ALICE HAMISI (ACARE) for being accepted into the Fisheries Training Program of the Centre for Capacity Development, Sustainability & Societal Change. The six-month training fellowship takes place in Iceland to strengthen the professional capacity of participants in fisheries policy and management, aquatic resource assessment and monitoring, quality management of fish handling and processing, and sustainable aquaculture. Successful graduates receive a UNESCO certificate of completion.

KELLY HOYER (Central Michigan University) for completing her dissertation titled “Factors which affect growth and survival of larval and juvenile lake whitefish (*Coregonus clupeaformis*) and cisco (*C. artedii*) in the Upper Great Lakes” and publishing the first paper from her research on routine metabolism of early life stage whitefish and cisco.

DEBORAH LEE (NOAA Great Lakes Environmental Research Laboratory) on her retirement this month. With more than 40 years of federal civil service, Lee most recently served as GLERL’s director, regional team leader, and Great Lakes Restoration Initiative program manager for 10 years. An active supporter of IAGLR, Lee has been a member since 1991 and served on the IAGLR Board of Directors from 1997 to 2000. As IAGLR Conference Committee Chair, she was also instrumental in the planning of our 42nd Annual Conference on Great Lakes Research in Cleveland, Ohio. Lee is considering opportunities to remain involved in the Great Lakes community.



TREVOR PITCHER (University of Windsor), professor at the Great Lakes Institute for Environmental Research and director of the Freshwater Restoration Ecology Centre, for being appointed the editor in chief of the *Canadian Journal of Fisheries and Aquatic Sciences* as of January 1, 2025.



AMBER SCHMIDT (University of Illinois Urbana-Champaign) for completing her Master of Science in Natural Resources and Environmental Science.

Submit a kudo

IAGLR members, don’t be shy—we’d like to help you celebrate! Let us know about your dissertation defense, graduation, award, new job, retirement, or other good news. We welcome submissions at any time, but to make the next issue, please send a brief note by Friday, May 2, to lakesletter@iaglr.org.



New members

Welcome to the following members who joined the association between November 2024 and January 2025.

Adedapo Alakija
Lian Anderson
Omowunmi Aworinde
Anne Jefferson
Leonard Korreshi
Megan Lewan
Luke McAllister
Willis Onyango
William Perry
Urmila Selvakumar
Benjamin Spitz
Anna Vincent
Julianna Wanke
Mark Warman

Renew your IAGLR membership today!

It takes a strong,
diverse community to advance
understanding of the world’s great
lake ecosystems. Add your voice
to those who stand for
Great Lakes science.

Complete your
member profile &
opt into the member
directory

iaglr.org/membership

Meet our SP²ARK fellows

A new six-month science communication training program for early-career aquatic scientists kicked off in November. Organized by the [Consortium of Aquatic Science Societies](#), the [SP²ARK Fellowship](#) (Scientists Promoting Policy, Access, Research, and Knowledge) program invited three members from each of the 10 CASS societies to participate. On the following pages, we introduce IAGLR's SP²ARK Fellows, Anna Hill, Julia Obuya, and Molly Wick. Congratulations to all fellows selected for the program!

SP²ARK FELLOW

Anna Hill

Msc Student
Purdue University

Describe your work or studies.

I'm a master's student at Purdue University, focusing on the early life history of alewife in Lake Michigan. My research examines their age, growth, and diet to compare these characteristics to historical data to identify long-term trends.

What inspired you to enter this work?

I was inspired by how information is often oversimplified or exaggerated on social media. Seeing important topics distorted highlighted the need for clear, accurate communication between scientists and the communities affected by their work. I believe fostering that connection can make a real difference.

What are your professional aspirations?

My dream job would combine research with community engagement. I aim to be a bridge between scientists and stakeholders, ensuring that research findings are accessible and meaningful to those with a vested interest in natural resources.

How is science communication important in your work?

The more I engage with anglers and community members connected to aquatic resources, the more I appreciate the deep history and passion they have for these ecosystems. I believe that improved science communication can foster better understanding and lead to

more effective, community-supported management practices

What is something about yourself that you'd like to share with other IAGLR members?

I've had the opportunity to work directly with both scientists and community members, from tagging programs in Alabama to studying fish populations in the Great Lakes. These experiences have strengthened my belief in the importance of collaboration between researchers and the public to protect and manage our aquatic resources effectively.

The more I engage with anglers and community members connected to aquatic resources, the more I appreciate the deep history and passion they have for these ecosystems.



SPARK FELLOW

Julia Obuya

Ph.D. Candidate
Bowling Green State University

Describe your work or studies.

I am a Ph.D. student at Bowling Green State University in Ohio where I focus on using molecular techniques to understand and address the current threat of cyanobacteria harmful algal blooms (cHABs) in freshwater systems. My research integrates genome-resolved approaches to explore the ecological interactions of cyanobacteria and investigates potential mitigation strategies. My work is particularly relevant to large freshwater bodies like the African Great Lakes and North America's Great Lakes, where harmful algal blooms pose significant environmental and socioeconomic challenges.

What inspired you to enter this work?

My inspiration stems from growing up near Lake Victoria, Kenya, where I witnessed firsthand the devastating impacts of water quality deterioration. Cyanobacteria blooms in the lake have contributed to fish kills, compromised drinking water safety, and disrupted local livelihoods that depend on fisheries. Seeing local communities struggle with these challenges sparked my curiosity about the underlying ecological drivers and the need for science-based solutions. This motivated me to pursue a career in aquatic research, with the goal of understanding and mitigating the threats posed by cHABs. My academic journey has been shaped by my passion for freshwater conservation and the desire to contribute to sustainable management strategies for water bodies facing similar threats globally.

What are your professional aspirations?

My long-term career goal is to bridge the gap between research and policy by translating scientific findings into actionable strategies for managing freshwater ecosystems. I aspire to contribute to global efforts in mitigating

cHABs by collaborating with scientists, policymakers, and local communities to develop sustainable interventions. I am also committed to mentoring young scientists, particularly in Africa, to build capacity in molecular ecology and environmental genomics. I hope to establish collaborative research initiatives that empower the next generation of researchers and provide practical solutions for aquatic resource management.

I would like to ensure that scientific knowledge does not remain confined to academic and policy discussions but is effectively disseminated to the people most affected by environmental changes. Many times, researchers focus on generating data but overlook the importance of making that information accessible to local communities—the true end-users of scientific knowledge. I want to be actively involved in simplifying technical jargon and engaging directly with community members, fisherfolk, and water resource managers to help them understand the ecological challenges they face and the science behind possible solutions.

How is science communication important in your work?

Addressing algal blooms requires an interdisciplinary approach that involves researchers, policymakers, water managers, and local communities. Effective communication helps ensure that research is not confined to academic circles but instead informs water quality management strategies, public health policies, and community-driven mitigation efforts. I actively engage in outreach activities, such as community education programs and stakeholder engagement forums, to share knowledge about sustainable use of aquatic resources. Through these efforts, I hope to promote evidence-based decision making and encourage proactive measures to mitigate algal blooms.



What is something about yourself that you'd like to share with other IAGLR members?

I enjoy outdoor adventures, especially exploring nature and engaging in conservation efforts. I also like traveling to different areas, appreciating biodiversity and meeting new people and different cultures. I have a deep passion for mentoring and supporting young researchers, particularly those from underrepresented regions, as they navigate their scientific careers.

I want to be actively involved in simplifying technical jargon and engaging directly with community members, fisherfolk, and water resource managers to help them understand the ecological challenges they face and the science behind possible solutions.

SP²ARK FELLOW

Molly Wick

Postdoctoral Fellow
EPA Duluth Minnesota

Describe your work or studies.

I am a postdoctoral fellow with Oak Ridge Institute for Science and Education, hosted by the Great Lakes Toxicology and Ecology Division of the U.S. Environmental Protection Agency in Duluth, Minnesota. I am an interdisciplinary social-ecological scientist, and I study connections between communities and waterfront ecosystems to try to inform better and more equitable decision making. My current research focuses on cultural ecosystem services, or the less tangible human well-being benefits associated with nature. My focus is on Great Lakes waterfront ecosystems, especially in Areas of Concern like the St. Louis River estuary. My postdoc research project explores how mapped ecosystem service potential—for activities like fishing, boating, and bird watching—relate to realized benefits for different sociodemographic populations. Our interdisciplinary team of scientists is applying mixed qualitative and quantitative methods and community-engaged approaches for this work.

What inspired you to enter this work?

Earlier in my career, I worked as a habitat restoration project manager. I noticed how environmental decision making is intended to benefit people and communities, but tools and methods for the explicit consideration of people or communities were not built into our restoration work. I decided to go back into research to help address that gap and find ways for environmental decision makers to incorporate community considerations directly into their work, with the intent of ultimately making outcomes more equitable and beneficial to all.

What are your professional aspirations?

I am currently looking for a permanent position with a government agency or NGO where I can apply my skills in both



research and science communication! I would love to find a position where I can continue to apply interdisciplinary community-engaged research approaches to locally identified needs to improve environmental decision making.

How is science communication important in your work?

Communication is the foundation of everything we do, from collaborating with close colleagues to making sure our research finds the right audience out in the broader world. For our research to ultimately improve decision making, we must be able to effectively communicate research results to decision makers and those who influence decision making. I am excited to apply what I'm learning in the SP²ARK Fellowship to do just that.

What is something about yourself that you'd like to share with other IAGLR members?

My excitement for communication overflows into the rest of my life as well—I love creative writing also, and read dozens of books every year for fun.

I noticed how environmental decision making is intended to benefit people and communities, but tools and methods for the explicit consideration of people or communities were not built into our restoration work. I decided to go back into research to help address that gap.

HOPE_{SHORTS}

Choosing hope

HOW CAN ONE WRITE ABOUT HOPE at a time like this? The theme for this issue—*Science & Hope*—germinated several months ago, but now it seems almost insensitive—naïve at best. As I write these words, I have one screen open to a story about the successful restoration of lake trout in Lake Superior, and another with news about the dismissal of federal employees who implement the sea lamprey control that makes this restoration possible. Collaboration is the beating heart of IAGLR and large lake science worldwide. Yet news stories tell of U.S. scientists who are no longer allowed to freely communicate with their Canadian collaborators.

Does hope have something to offer us now? The benefits of hope on mental and physical health are well-documented. With hope, people better tolerate pain, adhere to medical treatments, and recover from illness. A recent global study suggests that people need hope from their leaders much more than trust, compassion, or stability. Other studies show that nonscientists overwhelmingly associate science with hope (see page 21 of this issue). This indicates that scientists can play a significant role in inspiring hope, especially in difficult times.

Elin Kelsey argues that the very nature of global environmental challenges requires hope. In Hope Matters, she writes that “the environmental crisis is also a crisis of hope.” She believes that hope is essential to addressing climate change, biodiversity, and other environmental crises.

But what *is* hope? It’s not just wishful thinking or optimism. Researchers highlight several dimensions with a common thread: hope involves envisioning a desired future, acknowledging challenges, and taking action. Kari Grain defines this combination as “critical hope” and says it requires engaging with current difficulties.

At the recent American Association for the Advancement of Science annual meeting, CEO Sudip Parikh emphasized that hope must be channeled into strategy and focus. President Willie May went a step further, saying that scientists have a responsibility to envision the future and plan how to achieve it.

So, what can be done? Much advice centers on sharing stories about science. Communicate your work and its importance to your community and society. Have a conversation with your elected officials. Some groups encourage scientists to write opinion pieces in local newspapers and participate in rallies like the Stand Up for Science event on March 7, with the mantra that “science is for everyone.” Multiple science institutions, including IAGLR, have issued statements, and their leaders advise scientists to “remain focused on the long game.” This includes continuing to support students and early career researchers in this time of uncertainty.

Kelsey encourages us to look for and share proven trends that are providing the desired outcomes. In The Book of Hope, Jane Goodall also calls for sharing stories to fuel hope. She considers hope to be a



human survival trait that helps us take action toward our desired future, even in the darkest of times. Her co-author, Douglas Abrams, calls it a *social gift*.

In this spirit, the current issue of *Lakes Letter* highlights success stories throughout the large lake research community. These include habitat protection, species restoration, and the adoption of new technologies—all made possible by collaboration with diverse individuals and talents, even oil-sniffing dogs! We hope these stories guide us toward critical hope, providing examples of how we can move toward the future we envision.

Paula McIntyre is editor of *Lakes Letter* and serves as IAGLR’s communication director and strategy advisor.



Hope through Indigenous leadership

THE KEWEENAW BAY INDIAN COMMUNITY'S (KBIC) recent climate impact study reveals an encouraging path forward for Indigenous-led environmental research. Despite documenting changes in forest ecosystems, the study found that climate challenges are actually strengthening some aspects of cultural knowledge transmission and community bonds. Many Tribal participants reported that climate-related changes have enhanced their spiritual connections to the land and increased their commitment to sharing Traditional Ecological Knowledge with others.

The study exemplifies successful collaboration between Tribal and academic partners, following KBIC's Research Guidance protocols to ensure community priorities drive the research. This model demonstrates how centering Indigenous voices and Traditional Knowledge can create more inclusive, culturally relevant climate adaptation strategies. The approach holds great potential for application in managing large lake ecosystems, where Indigenous Knowledge could significantly strengthen community engagement and enhance restoration practices. As one participant noted, this work can contribute to "increasing public education and awareness about cultural and ecological importance while encouraging more involvement in environmental causes through community engagement and respect for Indigenous cultures."

Thi Mai Anh Tran, Valoree Gagnon, Chelsea Schelly, Michigan Technological University; Erin Johnston, Karena Schmidt, and Rachel Tarpey, Keweenaw Bay Indian Community.



Volunteering for the love of suckers

SUCKERS (CATOSTOMIDAE) are the most abundant migratory fishes in the Laurentian Great Lakes region, but they are understudied and underappreciated given their important roles in ecosystems. To overcome the lack of data for the species, we designed a citizen science program to engage volunteers in documenting the migration phenology of white suckers and longnose suckers across a latitudinal gradient.

Beyond collecting data, participants in the program have become vigorous advocates for these species and their environments, allowing for peer-to-peer messaging that complements traditional science communication. Seven years of data from our network of volunteers reveal that temperature is the primary trigger for sucker spawning migration; cumulative degree days over 43.3 F (6.3 C) is the best predictor of migration timing across sites and years. Based on our experience, we provide readily transferrable strategies for soliciting and retaining volunteers as well as ensuring high data quality standards. Our citizen science network exemplifies the untapped potential for involving the public in fish conservation activities. See [Murchie et al. 2024](#) to learn more.

Karen J. Murchie, Ph.D., Director of Freshwater Research, Conservation Research Department, John G. Shedd Aquarium.



Refugia of hope: Life in submerged karst sinkholes

WITH HARDLY 15% of the Laurentian Great Lakes floor mapped, several submerged sinkholes have been discovered. Karstic sinkholes—with actively venting ground water having no-oxygen, but high-chloride and high-sulfur—nurture vibrantly colored biodiverse benthic microbial mats of photosynthetic cyanobacteria and chemosynthetic microbes, possibly containing a trove of novel species.

In addition to providing a window into life on early Earth, these physiologically versatile mat worlds in sinkhole refugia serve as models for testing ecological theories and phenomena—including life’s evolution and biogeography and Earth’s carbon burial and oxygenation—across sharp transition zones and within extreme habitats (Biddanda et al. 2023).

Moreover, mat ecosystems where bacteria, archaea, and viruses coexist in close and intense dynamic cooperation, competition, and conflict are likely rich in bioactive compounds of pharmaceutical value. For example, what are occasional large mobile metazoan visitors, such as this Burbot (*Lota lota*) pictured, doing hanging out over these microbes-only mats? Existing and future Great Lakes National Marine Sanctuaries and Marine Protected Areas should incorporate known submerged sinkholes ensuring their long-term protection and conservation.

Bopi Biddanda, GVSU-Annis Water Resources Institute; Phil Hartmeyer, NOAA-Ocean Exploration and Thunder Bay National Marine Sanctuary; and Steve Ruberg, NOAA-Great Lakes Environmental Research Laboratory.



Mat ecosystems where bacteria, archaea, and viruses coexist in close and intense dynamic cooperation, competition, and conflict are likely rich in bioactive compounds of pharmaceutical value.

Major milestone reached; lake trout (*Chinamekos*) fully restored in Lake Superior

A REMARKABLE CONSERVATION TRIUMPH is unfolding in Lake Superior, or *Anishinaabewi-gichigami* in Anishinaabemowin. After nearly 70 years of dedicated effort, native lake trout populations have been restored in most of the lake. Chinamekos, as the fish are known in Anishinaabemowin, nearly disappeared from Lake Superior in the mid-1900s due to overfishing and predation from sea lampreys. Controlling sea lamprey populations kicked off a series of additional management strategies, including strict fishing regulations and the introduction of diverse lake trout strains through stocking programs. The success of these efforts led to a significant increase in naturally reproducing lake trout populations. Today the lake trout’s status in Lake Superior meets an ambitious management goal set in 2003. The lake is now home to genetically diverse self-sustaining populations of lake trout that mirror those found in the lake before 1940.

“Rehabilitating lake trout in the world’s largest freshwater lake did not happen overnight,” says Great Lakes Fishery Commission Chair Ethan Baker in announcing the news. “It required an unwavering commitment to a shared vision across multiple generations of fishery managers from Indigenous, provincial, state, and federal agencies. It is undoubtedly one of the most successful stories of native species restoration in the world. Lucky for us, we have a front row seat.”

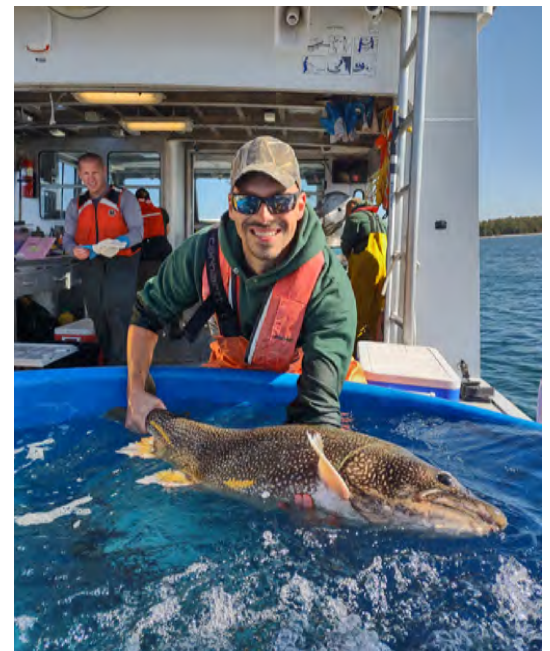


Photo courtesy of Great Lakes Fishery Commission.

Bringing back Arctic grayling (*Nmégos*) to Michigan

A NATIVE FISH THAT DISAPPEARED from Michigan nearly a century ago may once again ply the coldwater streams of the state's Lower Peninsula. Arctic grayling, or *Nmégos* in Anishinaabemowin, is the area's only native stream salmonid. By the 1930s, they were wiped out due to logging, overfishing, and competition from introduced species.

A coalition of more than 50 partners known as the Michigan Arctic Grayling Initiative (MAGI) hopes to change all that. In 2016, the Little River Band of Ottawa Indians (LRBOI) and the Michigan Department of Natural Resources (MDNR) proposed the initiative. Its aim is to establish self-sustaining populations of grayling within its historical Michigan range. MAGI partners visited Montana to study a successful grayling reintroduction program there, and they tested new technologies on northern Michigan streams to identify the most suitable locations and methods for reintroduction. In 2019, they received fertilized eggs from Alaska and ultimately raised three generations of broodstock.

In May, the MDNR will provide approximately 400,000 grayling eggs from this broodstock to the LRBOI, the Little Traverse Bay Bands of Odawa Indians, and the Grand Traverse Band of Ottawa and Chippewa Indians. These partners will reintroduce the eggs at locations along the North Branch of the Manistee River, the Maple River, and the Boardman-Ottaway River.

"The reintroduction of *Nmégos* serves to reconnect the Anishinaabe people with their cultural heritage that has been lost for such a long time," notes Archie Martell, LRBOI Fisheries Division Manager. "I am very excited about this introduction of *Nmégos* back into Michigan waters and for the opportunity for everyone to interact with this fish soon."



Photo courtesy of Michigan Department of Natural Resources.

Taking a cue from successful efforts in Montana, partners will place grayling eggs in streamside incubators to hatch directly into the rivers rather than raising them in hatcheries and then relocating the young fish. This approach will allow the newly hatched fish to imprint on the unique chemical signature of their home river and use it to return there to reproduce. "Without imprinting, Grayling may migrate far from where they are planted, and fail to reproduce in streams and rivers that are best suited for survival," write Martell and LRBOI Fisheries Biologist Dana Castle in a 2020 stewardship plan. "Grayling need to imprint on their home stream."

Researchers suspect that previous efforts to reintroduce grayling were unsuccessful in part because the fish were released later in their life cycles and failed to imprint. MAGI partners will closely monitor the hatching and development of the fry, as well as follow up on how they move through these systems as they grow.

Journal highlights

Enjoy a few highlights of promising research from the latest issue of the *Journal of Great Lakes Research*, which features a special section titled Lake Superior: Current conditions, trends, and emerging threats.

Isotope tracers offer a new tool to help us better understand the extent of legacy mercury contamination in wetland sediments and species and evaluate the impact of restoration efforts in Great Lakes Areas of Concern, given that high mercury levels can contribute to fish consumption advisories.

Researchers advise Great Lakes managers to use networks of nearshore protected areas to benefit lake whitefish across multiple habitats as tools for conserving spawning biomass, maintaining diverse population demographics, and enhancing recruitment and population stability.

Lake Superior's fish community has been stable this century, after a 30-year recovery period starting in 1970 that followed decades of ecological disturbance. Despite warming temperatures, more sea lampreys, and less stocking, researchers found that recreational fisheries were stable, including for lake trout, lake whitefish, and cisco. Priorities now include rehabilitation of native species, including brook trout, lake sturgeon, and walleye.



Academic publishing at a crossroads

Optimistic about the JGLR's future

BY MARGARET DOCKER

WITH THE COMPLETION of the 50th year of the *Journal of Great Lakes Research* (JGLR) and the start of my tenure as lead editor, it's a good time to look ahead. In many ways, we're at a crossroads in academic publishing. Growing unease with the seemingly asymmetric relationship between the scientific community and for-profit publishers has made authors, reviewers, and associate editors think more critically before entrusting their work or volunteering their time and expertise to a journal. Recognition of potential biases and other weaknesses of the peer review system—not to mention reviewer burnout—is resulting in a call for changes to the review process. However, given the generosity and collegiality that I've witnessed among associate editors, reviewers, and authors, I'm confident that the JGLR will navigate these transitions successfully while maintaining its integrity and quality.

When authors are choosing a journal for their work, there are many things to consider, including its aims and scope, various journal metrics, and ethical factors. The JGLR is the leading publication of scholarship on large lakes of the world, and the advantages of society journals are many (e.g., [Why should I submit my article to a scientific society journal?](#)). Among the many reasons why I applied for the JGLR lead editor position was its focus on the community that it serves and knowing that a substantial portion of the open access fees go back to IAGLR to support its numerous [awards and scholarships](#).

There is also a growing recognition that there's more to a journal than its impact factor. [The influence of a paper in its field is not the same as a journal's impact factor, and regional or taxon-specific publications can be critical for informing policy and conservation decisions](#). The value of the JGLR and its multidisciplinary scope to research and policy issues in the Laurentian Great Lakes and other large lakes of the world is significant. This isn't to say that the JGLR will be everyone's choice for all their papers, but I encourage IAGLR members—and

others—to consider it. Your manuscript will be in good hands.

Despite reviewer fatigue and service overload, I continue to be impressed and appreciative of the largely unseen labor that JGLR reviewers and associate editors generously provide. Despite the many “Reviewer 2” memes out there about the harsh, nitpicky anonymous reviewer, the vast majority of reviewers provide thoughtful and constructive feedback. They are not cavalierly giving a thumbs-up or thumbs-down signal; rather, they are graciously sharing their time and expertise through a genuine desire to help authors improve their papers. Each year, when the JGLR [Editor's Awards](#) recognize one reviewer and one associate editor for their “outstanding support of the journal's review process,” it's hard to pick just one! The JGLR has always been mindful of the importance of being civil and constructive when providing feedback to authors; looking ahead at ways to further improve, we are among those more explicitly considering [how to improve peer review by acknowledging its imperfections](#).

These considerations include discussing what the JGLR can do to better support authors whose first language is not English, ensuring that editors and reviewers better reflect the demographics of our disciplines, and discussing the pros and cons of double-blind peer review to address potential biases based on authors' country of origin, gender, seniority, or affiliation. As Steven Cooke discusses in creating a collective future for peer review, peer-reviewed journals are more than just vehicles for publishing research; they are communities where colleagues across career stages provide feedback on each other's work. Furthermore, with more outlets for outreach and engagement than ever before (e.g., social media posts, magazines such as this one, and blogs and other opportunities for post-publication commenting), there are many options to enhance interaction among authors and readers. For the JGLR, the ability for authors, readers, reviewers, and editors to meet in person at the annual IAGLR meeting—and celebrate the winners of the various journal and student presentation awards—also greatly enhances this sense of community.

As we enter the second half-century of the JGLR, I welcome feedback from IAGLR members and JGLR authors, reviewers, and readers. I will be holding a “Workshop on Publishing in Peer-Reviewed Journals” at IAGLR 2025, designed especially for students and other early-career researchers, but I encourage anyone to talk with me during the conference. We're always eager to attract new JGLR authors and reviewers (especially early-career scholars), consider areas of interest for special sections, and discuss other hopes for the journal.

Margaret Docker is the lead editor of the *Journal of Great Lakes Research*. She is a professor in the Department of Biological Sciences at the University of Manitoba in Winnipeg.



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Reintroducing species

A tool to stem the loss of freshwater biodiversity

BY OLIVIA GALLOWAY & TREVOR PITCHER



Graduate student Olivia Galloway with a soft-release enclosure last October during the U.S. Fish and Wildlife Service's fall restocking of the Maumee River. Juvenile lake sturgeon were placed in the enclosure first, allowing them to acclimate before being fully released.

FRESHWATER ECOSYSTEMS possess high levels of biodiversity and are critical for livelihoods, recreation, and the economy, but are under substantial stress. A report in the journal *Nature* last month indicated a quarter of the world's freshwater fauna (covering 23,496 species of decapod crustaceans, fishes, and odonates) are threatened with extinction. These threats included (among others) pollution, dams, invasive species, and overharvesting. This alarming threat to freshwater biodiversity has led many groups around the world to test new and innovative ideas to stem the loss of freshwater biodiversity. In the Great Lakes basin, the Freshwater Restoration Ecology Centre (FREC)—housed within the Great Lakes Institute for Environmental Research at the University of Windsor—has been established to test whether reintroduction biology can be an effective tool to stem the loss of biodiversity, including among freshwater fish species.

Transport is an unavoidable stressor in reintroduction programs, as fish are typically loaded at high densities, transported long distances, and immediately released.

Reintroduction is the deliberate release of a species into the wild from captivity or other areas where the organism is capable of survival. The goal of reintroduction efforts is to establish a self-sustaining population to an area where it has been extirpated, or to augment an existing population. Reintroduction involves a number of different steps including (but not limited to) sourcing a population for donor individuals, identifying suitable habitat, captive breeding, waves of animal releases back in the wild and post-release monitoring.

Recently, a lot of attention has been given to several of these steps, especially captive breeding efforts, but one area that has been neglected is the ability of researchers to effectively transport animals to their eventual release site. Transport is an unavoidable stressor in reintroduction programs, as fish are typically loaded at high densities, transported long distances, and immediately released. Captive-reared fish can also become phenotypically mismatched to the natural environment where they are being reintroduced due to artificial selection pressures in captivity. In combination, transport stress and a mismatched captive phenotype can lead to poor post-release survival and success.

Researchers at FREC have evaluated transport stress on several species, including reidside dace and Atlantic salmon. Currently, graduate student Olivia Galloway, with her supervisor Trevor Pitcher and team at FREC, in collaboration with the U.S. Fish and Wildlife Service, are investigating strategies to mitigate this phenotypic mismatch and transport stress for lake sturgeon reared for reintroduction efforts in the Great Lakes.

One strategy to minimize the stress incurred during transport and provide

a smoother transition to the natural environment for captive-reared lake sturgeon is to conduct a “soft” release. Compared to a traditional direct release after transport (which has been shown to be stressful for fish), a soft release involves placing the fish into an enclosure in the water at the release site to acclimate to the novel environment prior to release. A soft release can lower stress levels, promote more wild-like behaviors, and improve post-release survival in fish.

Following a 10-hour transport event, Galloway and her team conducted a soft release of juvenile lake sturgeon destined for reintroduction into the Maumee River in Toledo, Ohio. The researchers are studying the effects of a direct versus soft release on the stress physiology of the juvenile sturgeon via blood sampling. Following transport, one group of fish was blood sampled and then directly released into the river. To conduct the soft release, researchers placed two cages in the water at the release site, added the fish, and allowed them to acclimate to their new environment. At 24 hours following the end of transport, one cage of fish was sampled and then

released. At 48 hours following the end of transport, the second cage of fish was sampled and then released. The team is analyzing results and plans to publish findings in an upcoming paper.

“The next steps for this project would be to replicate it and measure some other metrics in addition to blood physiology,” Galloway says. “For example, measuring their metabolic rate, or tracking their movements to get indicators of survival following soft release would be the dream!”

As conservation reintroductions are becoming increasingly necessary to aid in the recovery of aquatic species at risk, such as the lake sturgeon, streamlining and examining these practices is crucial for maintaining their long-term success.

Olivia Galloway, MSc Student, Department of Integrative Biology, University of Windsor and Trevor Pitcher, Professor, Department of Integrative Biology and Great Lakes Institute for Environmental Research, University of Windsor.



Juvenile lake sturgeon. Photo credit: Shayenna Nolan, University of Windsor Ph.D. candidate.



Biodiversity after a *Phragmites* invasion

A case study of success through close collaboration

BY JERSEY ALLYSON FONTZ & REBECCA ROONEY

A **PERVASIVE PROBLEM** plaguing both plant and animal biodiversity in wetland ecosystems across many areas of the Great Lakes is the growth and spread of invasive species such as European common reed (*Phragmites australis* subspecies *australis*). *Phragmites australis* can grow up to 4 to 6 meters, comparable to the height of the average male giraffe. Two thirds of its entire biomass is actually located below ground. *P. australis* has also been identified as a direct threat to 25% of Ontario's species at risk and has been classified as Canada's Worst Invasive Plant since the early 2000s. To the benefit of ecosystems all over the province, efforts are underway to control its spread and suppress its growth. To contribute to important science-based guidance for these efforts in southern Ontario, students in the [Waterloo Wetland Lab](#) (WWL), spearheaded by Rebecca Rooney at the University of Waterloo, have worked alongside both governmental and non-governmental groups to fill in critical knowledge gaps.

Phragmites australis reduces biodiversity by growing tall and densely, blocking out and overcrowding native species.



Left, summer technician Kim Bartlett measuring light conditions in one of the long-term monitoring plots filled with wild rice (*Zizania* spp.) eight years post-*Phragmites australis* treatment. Center, Ph.D. candidate Jersey Allyson Fontz in the midst of wild rice (*Zizania* spp.) growing eight years post-*P. australis* treatment. Right, a field of watershield (*Brasenia schreberi*) flourishing seven years after *P. australis* treatment. All photos in Rondeau Provincial Park.

Contributing to long-term monitoring

Mechanical treatment options were largely unsuccessful at suppressing *P. australis* growth in wetlands in Canada through the 2000s and 2010s, but chemical control options were limited to areas without standing water by federal regulations, leaving *P. australis* to grow unchecked in Ontario's open water marshes. In 2016, a pilot project was approved to test the efficacy and safety of the herbicide formula Roundup Custom, which contains the active ingredient glyphosate. This trial took place under an Emergency Use Registration motivated by the documented effects the invasion was having in two important coastal wetlands on the north shore of Lake Erie: the Long Point World Biosphere Reserve and Rondeau Provincial Park. In the years since, the project has successfully treated 1,500 hectares of *P. australis* through an impressive coalition involving Environment and Climate Change Canada's Canadian Wildlife Service, the Ontario Ministry of Natural Resources, the Nature Conservancy of Canada, and many other partners. The WWL contributed to monitoring the effects of the herbicide application on the wetland environment, its efficacy in suppressing invasive *P. australis*, and the recovery of the native plant community following treatment.

Early results were promising in that the helicopter- and ground-based applications of herbicide achieved a persistent 95% reduction in the stem density of invasive *P. australis*. Additionally, the glyphosate applied never reached concentrations of toxicological concern to aquatic biota and quickly dissipated from the water and sediment in the treated marshes. These data were crucial in building the evidence base that led to an expansion of treatment efforts across the province of Ontario.

However, the initial outcome for native plants was less optimistic. WWL researchers observed reductions in plant community diversity, evenness, and floristic quality in the years immediately following treatment. More alarming, they found the treated marshes were consistently overrun by what they termed "secondary invasions." Megan Jordan, a former graduate student in the WWL, explains secondary invasions as "the phenomenon where other non-native plants like

We have so much more to learn after the first couple of years if we want to understand the ultimate outcome for the plants and for the marsh community.

European frog-bit (*Hydrocharis morsus-ranae*) and Eurasian milfoil (*Myriophyllum spicatum*) effectively replace *P. australis* in the ecosystem."

Long-term monitoring after invasive plant suppression activities is not common because of resource constraints and term-limited funding, leaving key uncertainties around the ultimate consequences of treatment for wetlands. Most studies into treatment efficacy only report on plant community changes for one to three years after the treatment. Fortunately, the Emergency Use Registration pilot project committed to a minimum of five years of post-treatment monitoring, as the secondary invasions were not the end of the story.

Within three years of the herbicide application, the WWL found native plant species began replacing those secondary invasions and the plant community diversity and evenness began to recover. This occurred without active revegetation interventions like seeding or planting, but as a part of natural succession in the marshes. By the fifth year after treatment, 78% of the monitoring plots were dominated by native plants and during the seventh and eighth year of monitoring, the plots in treated areas were floristically indistinguishable from reference plots in areas where *P. australis* had never invaded.

"A major outcome of our monitoring is that it highlights how important it is to support long-term monitoring," notes Jersey Allyson Fontz, a Ph.D. candidate in the WWL who led parts of this work. "We have so much more to learn after the first couple of years if we want to understand the ultimate outcome for the plants and for the marsh community."



Left, species at risk, such as swamp rose-mallow (*Hibiscus moscheutos*), can grow alongside *Phragmites australis*, meaning that the use of broad-spectrum herbicides is not always a viable form of treatment. Center, aerial image of drone-based herbicide-treated (left) and untreated (right) *P. australis* patches at Baie du Doré wetland, photo by Omer Rahooja, Ontario Power Generation, 2023. Right, Ph.D. candidate Claire Schon preparing moth eggs to be released into a dense stand of *Phragmites australis* near Wellington, Ontario.

Testing established techniques in novel ways

While helicopter-application of herbicide is extremely effective at suppressing *P. australis* in extensive monocultures, when *P. australis* occurs in smaller patches interspersed with native plants, this large-scale herbicide application causes collateral damage to neighboring plants because of drift of the pesticide and the large swath width of the helicopters. This can even impact species at risk such as swamp rose-mallow (*Hibiscus moscheutos*) that grows nearby *P. australis*.

The Invasive Phragmites Control Center (IPCC), led by Janice Gilbert, is pioneering a more precise herbicide application method with a newly approved imazapyr-based herbicide using drones. This approach has the potential to improve target accuracy by spraying herbicide only on the target invasive species while avoiding surrounding vegetation. Using drones can also minimize disturbance to the marsh associated with moving heavy ground equipment through. In addition, notes former WWL graduate student Grace Lew-Kowal who worked alongside the IPCC, “herbicide applied by spray drone was at least, if not more, effective at suppressing *P. australis* as helicopter or ground-based application methods with a 99% reduction in live *P. australis* stems.” Furthermore, with the use of drones, herbicide drift was 96% lower compared to helicopter spraying. This technology for applying herbicide precisely may ultimately enable treatment of *P. australis* in areas that are too difficult or dangerous to access over the ground but where helicopter application would cause too much damage to native plants.

Biocontrol as a new technique

Broad-spectrum herbicides are by far the most common *P. australis* treatment method used, but as discussed above, their effect on such a wide range of plants leads to collateral damage for desirable native plants. Moreover, some communities raise concerns about repeated exposure to herbicides. Biocontrol—the use of target-specific live organisms to manage, not eradicate, an invasive species—can offer a gentler alternative. It can also offer cost savings, as the biocontrol organisms can develop self-supporting populations that do not require the same level of resource investment and personnel time that herbicide treatment necessitates. In 2019, the Canadian government approved two European moth species for release as biocontrol agents on

invasive *P. australis*, thanks to more than 20 years of research by the *P. australis* biocontrol program, led by scientists with the University of Toronto, Agriculture and Agri-Food Canada, CABI in Switzerland, and Ducks Unlimited Canada, among others. The stem-boring caterpillars of these moths feed and mature inside the tall stems of invasive *P. australis*, harming the plants. Working with this team, WWL researchers were able to measure the effects of these two moth species—*Archanara neurica* and *Lenisa geminipuncta*—on *P. australis* performance at experimental release sites across southern Ontario. Claire Schon, the Ph.D. candidate in the WWL in charge of contributing to the biocontrol work says, “early results from our research are promising. For example, at one site, there was a 26% overall reduction in *P. australis* canopy height and only 1% of the *P. australis* stems bore flowers in just two years after the moth releases.” The moth populations are also able to grow and persist through time at release sites as the WWL team even documented their ability to spread and colonize new patches of invasive *P. australis* as much as 400 meters away. These results provide hope that long-term and sustainable management of *P. australis* through biocontrol is a viable option.

Hope for the future of invasive species research

Invasive species do not recognize borders or jurisdictional boundaries. Collective action has emerged as a successful partnership model whereby landowners, multiple stakeholders, government agencies, and community groups work collaboratively to coordinate invasive species management, rather than through a series of isolated activities. The collective-action approach benefits from increased efficiency, greater community buy-in, and shared experience. These advances in management techniques and the enhanced understanding of plant community recovery are outcomes of this collective action model and underscore the benefits of broad collaboration in invasive species management. As Rooney notes, “collaboration should be at the forefront of scientific research beyond invasion biology because it is through enduring research partnerships that we make progress to conserve biodiversity.”

Jersey Allyson Fontz is a Ph.D. candidate and Rebecca Rooney is an associate professor, both at the University of Waterloo.

Science elicits hope, joy depending on the audience

Effective communication understands the difference

BY TODD NEWMAN



HOW DO SCIENTISTS AND NONSCIENTISTS think and feel about the word *science*? For the past several years, my research has focused on understanding the emotions that people associate with science. Through a number of surveys of the general public as well as of scientists, we asked respondents, “Which word best describes what you feel when you hear the word science?” A key discovery from this work is that the U.S. public overwhelmingly associates science with hope. In nearly every survey conducted, 45-60% of respondents indicate hope, while every other emotion (e.g., caution, fear, curiosity) is a distant second. This finding holds even after controlling for demographic and ideological factors. Scientists, however, overwhelmingly view science through a lens of joy and excitement, emotions rarely expressed in general population samples.

These findings reveal an assumption that many scientists take for granted: that nonscientists share the same unspoken starting point about what science represents. For most Americans, science isn’t a goal in and of itself; it’s a tool to accomplish a positive outcome or change in society, such as restoring ecosystems or facilitating access to clean water. But not all scientific research focuses on applied scientific questions, nor is research always at a stage where an application is even known. It is within this context that we decided to look more closely at the results of the scientist survey and see if and how joy and excitement vary depending on one’s scientific discipline. We found that those in research fields that address more basic scientific research questions (e.g., physics or astronomy) were more likely to indicate joy and excitement (and less likely to indicate hope) than those in disciplines that address more applied research questions (e.g., social sciences or engineering). In other words, we found an inverse relationship between hope and joy and excitement depending on the type of research one conducts.

Understanding these nuances is essential for ensuring that science at every stage of the research process resonates

meaningfully with the public. And it is only within the last several years that the scientific community started to pay attention to the unique challenges of communicating basic science. Scientists can struggle to connect with diverse publics if they don’t share common ground. This is particularly important when engaging with so called “hard to reach” audiences who may be skeptical or less receptive to scientific messages and their implications. These findings should not be taken as the need to promise that your science will lead to a specific outcome or that basic science should not be communicated with nonscientist audiences. What it does say is the need to understand nonscientist audiences and build on common ground. This may be harder for some scientists than others depending on the extent to which nonscientist audiences are integral to the work that they do. Understanding that hope is a lens through which nonscientist perceive science is one step toward that goal.

Todd Newman is an assistant professor in the Department of Life Sciences Communication at University of Wisconsin-Madison.



Lake Erie and Aquatic Research Network

Collaboration leads to hope

BY OLIVIA SCHLOEGEL & KATIE DECHANT

A **UNIQUE HOPE COMES FROM SCIENCE ROOTED IN DIALOGUE** among researchers and management professionals. People participating in this work not only feel a collective sense of “why” it matters, but they see firsthand how and where their work makes a tangible difference.

Lake Erie and Aquatic Research Network (LEARN) promotes collaboration among institutions and disciplines in the Lake Erie region. Since 2020, its flagship initiative, the H2Ohio Wetland Monitoring Program, has received approximately US\$2 million per year from the Ohio Department of Natural Resources (ODNR). The program monitors wetlands that are recently restored, created, or enhanced through statewide water quality investments. Researchers have developed a novel framework for sampling and data management, created original protocols and workflows, and delivered nutrient reduction estimates for multiple wetland restoration types.

Pictured above, H2Ohio Wetland Monitoring Program researchers walk with the project partners at the Walnut Creek wetland in Franklin County, Ohio, in July 2024.

People participating in this work not only feel a collective sense of “why” it matters, but they see firsthand how and where their work makes a tangible difference.

This model, however, was not the initial approach. ODNR staff first sought expert opinion from LEARN’s biogeochemists and ecologists about wetland project proposals. Together, they quickly realized this “advisory” mechanism for linking scientific knowledge and agency decisions had a misalignment in information provided in proposals compared to what scientists needed for a useful assessment. Further, there were limited baseline data and scientific consensus on wetland water quality services—particularly on which features best promote nutrient retention in a way that could inform proposal design or review. A new approach emerged: a multi-university, science-based monitoring program to assess as-built wetland projects.

“Ultimately, we seek to create new knowledge about which types of restorations are most effective toward watershed nutrient reduction goals,” explains Lauren Kinsman-Costello, the monitoring program’s research lead.

The rapid initiation and development of the program, coupled with continuous data collection and interpretation, have driven efficiency and necessitated open lines of communication between the groups involved. Practices to ensure alignment of priorities include regular meetings between LEARN and ODNR leaders, public webinars to share progress, and yearly in-person planning workshops. The program has fostered trust and can adapt nimbly to new information, due to its funding approach and investment in facilitated spaces.

The monitoring program’s funding structure—primarily through a state contract with LEARN and supported by additional state and federal grants—bolsters stability and promotes synergy. It bridges gaps between the timing of agency grants and university hiring cycles and allows researchers to pursue both their specific lab goals and contribute to the program’s broader objectives. Of the 12 current principal investigators, most are entering their third biennium contract, leadership retention that illustrates the program’s impact.

Full-time staff are essential for the program’s large-scale, long-term monitoring needs, which is a shift from the traditional academic applied aquatic research that typically relies on short-term projects and graduate student research. For every investment in full-time field staff, there is the return of fostering several more relationships with ODNR agency staff, project site designers or managers, and affiliate researchers. Through these connections, the program has walked alongside many managers in many wetlands, built alignment in vocabulary across roles, fostered appreciation

for decision-making constraints, and refined communication of uncertainty between different groups. It’s creating institutional knowledge and providing direct experience in the “people” skills to do jobs at the interface of science and management.

Program leaders facilitate adaptive monitoring by fostering ongoing dialogue across different levels of personnel and stakeholders, using a mix of team science strategies and drawing on project management techniques from other sectors. This dialogue leads to iterative practical improvements—such as changing sampling designs for clearer connection to wetland features (i.e., berms, hollows, pools)—which enhance data interpretation. The yearly workshop provides a platform to review and integrate feedback on communication products across perspectives. It’s impactful because the program can use real communication products from recently collected data, not hypothetical scenarios, to get feedback about management priorities and decision-maker values and uncertainties.

And researchers listen to on-the-ground realities that can inform monitoring. Facilitated spaces and communication deliverables mean a group of researchers who have to make decisions such as assessing optimal spatial resolution of sampling locations can be disrupted (in a good way) by an agency-driven push for results. And a science-based monitoring program means the agency can better ensure sound investment in wetland projects. The intent behind the initial approach remains; a state agency needs to know if the wetlands are “working.” But now managers and researchers can answer those questions with a common vocabulary, improved understanding of each other’s realities, and infrastructure for impactful communication and collaboration.

As we face our freshwater future, investment in monitoring and response infrastructure is an urgent scientific and social need. There is a group of people in Ohio showing us how hope emerges from meaningful science that comes from not just the connection of, but the coordination among researchers and management professionals. The unique relationships facilitated by LEARN unify teams, propel plans into action, and are an empowering vision of hope in collaboration.

Olivia Schloegel is research coordinator for the H2Ohio Wetland Monitoring Program. Katie DeChant is a sophomore at Kent State University majoring in biochemistry.

Sniffing for oil under ice

Dogs could aid in winter oil spill response

BY SUMEEP BATH



Poppy is a 6-year-old Springer Spaniel from Wales and an ace at sniffing out oil under ice. She loves playing with tennis balls and receiving attention. She'd likely approve of being this issue's cover girl. Photo courtesy of IISD Experimental Lakes Area.

S **CIENTISTS IN CANADA** have recently discovered that dogs can sniff out oil spills buried in freshwater lakes under ice, with a 100% success rate. Last month in an experiment at IISD Experimental Lakes Area (IISD-ELA) in northwestern Ontario, sniffer dogs were able to definitively detect the location of various types of oil under lake ice, better than even our most sensitive scientific instruments. This suggests the incredibly exciting potential use of dogs in the aftermath of an oil spill, where time is of the essence to respond and mitigate the impact on the environment.

Specially trained detection dogs known as Oil Detection Canines (ODCs) were able to detect the location of two types of oil under lake ice in six out of six instances in a double-blind study that resulted in no false negative results.

Even our most sensitive scientific instruments and manual methods cannot come close to the 100% success rate of our canine friends.

The experiment was carried out on Lake 260, the site of many previous oil spills experiments. Researchers sawed three transects into the ice, with each consisting of nine holes measuring 1 square meter in size. Researchers let the holes freeze, with 2–3 inches of ice forming overnight. The next day, they drilled pilot holes at an angle to insert a pipe below the level of the newly formed ice, which allowed them to pump oil into three randomly selected holes. The types of oil used were a dyed diesel, ultra-low sulfur fuel oil and a syncrude condensate (typically mixed with oil sands bitumen to thin it for easier pumping through pipelines).

Five days later, a 6-year-old Springer Spaniel named Poppy came and worked her magic running across the transects in a zigzag pattern signalled by her trainer, Paul Bunker, owner of Chiron K9. Neither of them knew which holes contained oil and which ones were dummy (reference) holes. When Poppy detected oil, she “alerted” her trainer by sitting down. Bunker would raise his arm, and researchers would inform him if the alert was indeed where oil was deposited beneath the ice. If Poppy was correct (and she always was), Bunker rewarded her with a little bit of play with her favorite toy, a red KONG Wubba.

“These findings have enormous implications for speeding up how we deal with oil spills and protecting our freshwaters,” says Vince Palace, IISD-ELA head research scientist. “Over the years, we have tried sonar, radar, fluorescence, optical sensors, and old-fashioned, labor-intensive drilling—even the human eye with lights under the ice. But even our most sensitive scientific instruments and manual methods cannot come close to the 100% success rate of our canine friends. Oil Detection Canines are quick—covering up to 400 square meters in 20 minutes—they’re relatively inexpensive to train, and they’re evidently extremely accurate.”

When dealing with the aftermath of an oil spill from a pipeline under ice, response teams can spend much of their precious time determining where exactly the oil has spilled before taking action to clean up—a situation made much worse when working in frozen and harsh conditions.

Using dogs in the initial response, with their proven speed and accuracy, could greatly assist the process of oil spill response and clean-up, resulting in less of an impact on our freshwater ecosystems.

This study is part of a broader research project currently being conducted on freshwater lakes at IISD-ELA to determine the effectiveness of ODCs to detect oil under ice and is being carried out with funding from the United States Coast Guard Great Lakes Oil Spill Center of Expertise and in collaboration with Chiron K9, Owens Coastal Consultants, DF Dickins, and SLRoss.

Sumeep Bath is the editorial and communications manager at IISD Experimental Lakes Area.



Kaosz, a 14-month-old Hungarian Vizsla, is at the IISD Experimental Lakes Area training to become an Oil Detection Canine. Kaosz enjoys bouncing, playing tug, and annoying other dogs. Photo courtesy of IISD Experimental Lakes Area.

The future of Great Lakes research

Developing a collaborative science plan

BY VAL KLUMP & JOHN BRATTON

WHETHER BY CHOICE or by accident, we manage the Great Lakes ecosystem.

Yet some of our tools may be getting a little rusty, and some of our researchers may be getting a little long in the tooth. That recognition sparked the creation of the International Joint Commission (IJC) Science Advisory Board's (SAB) decadal science strategy. Fortunately, as we have come to better understand the negative impacts of some past management practices and worked to restore the ecosystem to a less impaired state, technology and understanding have also advanced. We are now poised on the brink of a potential bounding leap forward in ways that we can study and monitor the lakes and apply the resulting information to make smarter decisions about things like the fishery, infrastructure, water use, and agriculture. We are also now considering more broadly who is best positioned to carry out the work.



Above, a glider with VR2C acoustic receivers being prepared for deployment in RAEON's test tank. This project [tested a mobile platform](#) to track fish movements in the Great Lakes in real time with acoustic telemetry. Photo credit: Cailin Burmaster, AUV Technician.

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Innovations are constantly happening in communications, energy, transportation, computing, and health, to name a few domains. Similarly, innovations are making their way into activities like tracking fish movements in the Great Lakes in real time with acoustic telemetry, measuring water quality parameters under the ice in Lake Michigan from autonomous underwater vehicles, or determining what particular strains of cyanobacteria are present in harmful algal blooms in Lake Superior and whether they are capable of producing toxin and actively doing so. The pace and scale of the adoption of these innovative approaches into routine management decisions has been hampered by inadequate investment for decades, resulting in an aging research fleet and a shortage of skilled scientists who may have been trained in the region but have been lost to jobs elsewhere. Accelerating retirements of experienced researchers also present challenges that new investments in workforce development and staff positions at all levels can help address.

In addition to shoring up the traditional research and monitoring enterprise, the Great Lakes community is starting to see the benefits of investing in engagement with Indigenous Knowledge holders and expanding participatory science networks. Many residents of the Great Lakes have deep knowledge of their local bays and shores based on decades of work and play on and near the water, as well as multiple generations of family and community experience. University and agency researchers are starting to join forces with these place-based experts, listening to and learning from them, while helping to train them on data and sample collection methods that expand the eyes and ears of the traditional researchers. One successful example is the [Lake Erie Volunteer Science Network](#) (LEVSN), which coordinates the work of participatory scientists in Canada and the U.S. to monitor water quality around the shores and harbors of the lake. More investment in groups like LEVSN could yield huge dividends.

The decadal science strategy, in which many of you have already participated, has concluded that both the science and our capacity to conduct it are not currently up to the task of answering the pressing questions faced by resource managers. This is especially the case in light of past and projected changes and the susceptibility of the Great Lakes to things like climate change, risks posed by industrial chemicals, pharmaceuticals, plastics and other emerging contaminants, invasive species, water level fluctuations, alterations in land use, and human migration trends.

The SAB's "[Great Lakes Science Strategy for the Next Decade: Summary Report](#)" was published in 2022 and laid out the rationale and scope of this effort. Now we have



Testing deployments of an autonomous underwater vehicle in Lake Michigan, with the ultimate goal of using it under lake ice during winter to collect ecological and water quality data. Photo credit: Gabrielle Farina, NOAA Great Lakes Environmental Research Laboratory.

entered the second phase to design this enterprise and its architecture and develop a plan of implementation. To do that we have engaged a collaborative of over 30 individuals to help. They represent a broad range of stakeholders and rightsholders—multinational representatives, management agencies, academics, nonprofit organizations, and water users supported by IJC staff and contractors. Throughout the 2024 and 2025, this collaborative will have convened five workshops and related engagements to address designing the principal components of a draft plan.

The first of these, held in June 2024, examined possible governance structures, with an eye to ensuring that execution of a plan is inclusive of all perspectives, responsive to a rapidly changing system and its management needs, sustainable beyond just the next decade, and fosters the next generation of a Great Lakes workforce and the IAGLR community.

Most recently, in October 2024, more than 70 participants gathered at a second workshop to analyze key components and costs of an enhanced and comprehensive monitoring, modeling, and forecasting enterprise to support Great Lakes

science and management. Ultimately, we want the ability to predict the future and the future impacts of our actions with confidence. To do that requires a rigorous model of how the system will respond to change. This model must be based on a sound understanding of how the system works and the dynamics which drive it, and it also needs data collected at high enough resolutions in time and space to verify the model's accuracy.

There was broad agreement that the current programs that conduct these activities in the Great Lakes are effective, but that the resolution and accessibility of the data they collect and the products they produce are inadequate to fill key science gaps and guide many important ecosystem management decisions.

The workshop concluded the science plan should include (1) a new basin-wide monitoring and surveillance expansion plan with several options for locations, parameters, and costs; (2) a companion plan that describes in detail the cyberinfrastructure and communication strategy that would optimize use of the new data; and (3) a plan for how new data would be used to support the creation and delivery of advanced modeling and forecasting products to a variety of users.

Interviews were then conducted with select agency leadership in Canada and the U.S. These interviews were intended to determine the level of interest in and support by each agency for elements of the science plan, and the degree of alignment with the near-term and long-term plans of the agencies. The results of those interviews will inform the development of the remaining workshops that will be conducted in 2025 as part of this project, including discussions of the Centers of Excellence concept, workforce development aspects, and preparation of a draft science plan. Elements of that draft will be presented to the IAGLR community at our annual conference in June 2025 in Milwaukee via a special session as an opportunity for IAGLR members and conference attendees to provide feedback through a World Café-style facilitated mini-workshop. We look forward to seeing you there and soliciting your input.

Val Klump is former dean and a professor emeritus of the School of Freshwater Sciences at the University of Wisconsin-Milwaukee. John Bratton is a senior science officer with LimnoTech.



Empowering community members to take an active role in protecting their local waterways is vital to the future of the Great Lakes ecosystem. Pictured is a volunteer with the [Buffalo Niagara Waterkeeper Riverwatch Program](#). Photo courtesy of Buffalo Niagara Waterkeeper.

Why Now?

Widespread change forecast

Driven by the world's third largest economy (US\$6 trillion annually) and a direct consequence of the region's overwhelming competitive advantage of containing the world's largest sustainable source of available freshwater (~20 percent), the Great Lakes region is entering a new era of demographic growth, economic diversification, and accelerating environmental change.

Widespread demand for freshwater

Today 50 million people live in this region, 80% of whom rely on the Great Lakes for drinking water. Yet more than 160 million North Americans will most likely experience a decline in the quality of their environment from more heat and less water by the middle to end of this century, a force that will drive migration, alter agricultural production, and increase demands on natural resources, particularly freshwater.

Distinct from restoration

Over the last decade, major investments (~US\$4 billion) have been made in correcting a long legacy of past ills. Protecting this restoration effort and, more importantly, avoiding the need for future restoration are unquestionably of immense economic value in terms of cost savings, fostering broad cross-sector investment, enhanced property values, and improving the overall quality of life for which our region is increasingly recognized.

Need to get out in front of change

Now more than ever, the Great Lakes region needs a cutting-edge predictive science and surveillance strategy to identify, anticipate, and prepare for the change that is coming, to inform its management and stewardship, and to ensure the prosperity, health, and resilience of the Great Lakes ecosystem, its economy, and its people.

**NOW, more than
ever, is the time to
support science**

**Empower the future
of Great Lakes research
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COMMUNITY NEWS

First World Lake Day this summer

The world's lakes got their own day to celebrate when the United Nations General Assembly passed a resolution in December that designated August 27 as World Lake Day. The resolution calls for protecting and restoring the world's lakes through integrated, intersectoral, collaborative, and coordinated approaches at all levels. The Assembly invites us to observe the day through activities aimed at educating and raising awareness regarding the importance of lakes and efforts to preserve, conserve, restore, and sustainably manage lake and related ecosystems. How will you celebrate?

Technoscience the focus of new webinar series

In January, the Great Lakes Fishery Commission launched a new webinar series, *Technoscience Thursdays at 2:00* to provide fishery managers and biologists with information on cutting-edge technology, its associated scientific methods, potential applications for fisheries management and assessment, and logistical considerations.

Technoscience is defined as "...how science informs and enables technology, and how technology enables science—all within the context of iterative societal feedbacks" (Cooke et al. 2022). The series kicks off with six monthly webinars to foster two-way dialogue between researchers and decision-makers to help move technology into use. Its goal is to develop a community of practice around technoscience in fisheries management that will persist beyond the original series of webinars, and to identify promising technoscience innovations that might benefit from focused efforts to operationalize their use in fishery management and assessment.



Canada Freshwater Challenge Fund created

Ontario philanthropist John McCutcheon bequeathed CAN\$20 million to seven organizations to create the Canada Freshwater Challenge Fund. This initiative aims to address the growing threats to Canada's freshwater, including climate change, habitat destruction, biodiversity loss, and contamination. Freshwater is essential for all living beings, food systems, and economies, yet it remains a finite and increasingly vulnerable resource.

Announced in November, the bequest will be the largest private donation by an individual to freshwater conservation in Canada's history. The Canada Freshwater Challenge Fund will be distributed across seven organizations: DataStream, the Nature Conservancy of Canada, World Wildlife Fund-Canada, Wildlife Conservation Society Canada, Oak Ridges Moraine Land Trust, Ontario Water Centre / ClearWater Farm, and the International Institute for Sustainable Development Experimental Lakes Area.

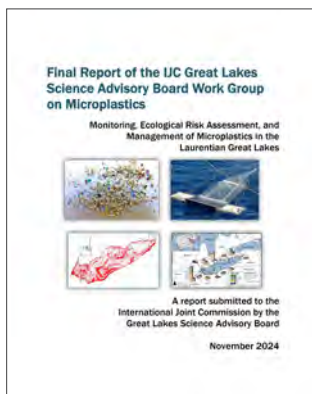
Through different activities and missions, each group protects and cares for freshwater in Canada. Collectively, this support will help these organizations protect and restore wetlands and other freshwater ecosystems, conduct research, improve access to water data, and provide educational opportunities, including development of Northern Ontario's first Centre for Climate Change Learning at the IISD Experimental Lakes Area.

Call for coordinated monitoring of Great Lakes microplastics

Microplastics are present in all five of the Laurentian Great Lakes, but there is no coordinated, basinwide effort to monitor and report on the status of plastic pollution. In a new report, the International Joint Commission's Great Lakes Science Advisory Board summarizes current research on microplastics and their impacts on the Great Lakes ecosystem. The board proposes regional coordination to systematically measure Great Lakes microplastics. This coordinated approach includes addressing three key challenges:

- proposes a common definition of microplastics, based on size and composition and consistent with others used in North America;
- offers standard procedures for collecting samples in open waters, rivers, biota, and sediment; and
- offers an environmental risk assessment and management framework to indicate where and when pollution management actions are needed.

The board recommends that microplastics be adopted as an indicator of ecosystem health and designated as a "Chemical of Mutual Concern" under the Great Lakes Water Quality Agreement.



Great Lakes Blue Tech Challenge

Are you a student or young professional up for an innovation competition? Enrollment is now open for the [Great Lakes Blue Tech Challenge](#). Organizers are looking for viable technical solutions to address issues facing the Great Lakes such as water quality, microplastics, forever chemicals, and marine infrastructure. The competition aims to help cultivate entrepreneurship in the blue economy. Finalists after two pitch rounds this summer will pitch their innovations at the OCEANS 2025 Conference, in Chicago, competing for a \$35,000 prize in October. To take part in the challenge, led by Northwestern Michigan College, [enroll by March 28](#).

HOST AN IAGLR CONFERENCE!

Each spring, we hold our [Conference on Great Lakes Research](#) at a site alternating between Canada and the United States. We're looking for a U.S. location to celebrate our 70th anniversary in 2027 and a Canadian location for 2028. We consider proposals from host institutions based on the following criteria:

- Proposed scientific program
- Conference facilities and logistics
- Location

If you're interested in hosting a future conference, please contact Conference Committee Co-Chair Noel Urban at confchair@iaglr.org.





Join us in Milwaukee, Wisconsin, June 2–6, for IAGLR 2025. Registration opens in March. Save with early-bird rates through April 7. In-person and virtual options are available!

39 Sessions

500+ Presentations

All presentations
recorded and available
after the conference

Field trips & workshops

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documentary viewing

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iaglr.org/iaglr2025

3 PLENARY SPEAKERS



Steve Carpenter

University of Wisconsin–Madison
Resilience of lake ecosystems



Susan Chiblow

International Joint Commission
& University of Guelph

*Water Resiliency in the Great Lakes:
Standing with Indigenous Science*



Ismael Kimirei

Tanzania Fisheries Research Institute
*Fisheries research in the African Great
Lakes: A call to action*

