IAGLR
LAKES Letter

In this issue, we take a look at legal frameworks and our relationship to water.

CONTENTS

1 Updates on IAGLR initiatives
2 Association News
IAGLR 2023 survey highlights
Conferencing better
4 Member News
Welcome new members
Kudos
Member profile: Jordanna Bergman
In memoriam: Michael Fraker
6 Talking Rivers: Rights and Responsibilities
8 Watershed science and the public trust doctrine
10 Canada's strengthened freshwater agenda and historic Great Lakes investment
12 A look at Great Lakes Restoration Initiative funding
13 Sacket v. EPA ruling puts half of U.S. wetlands at risk
15 Ontario moves backward on land and water protections in the Great Lakes basin
16 Report review: Turning the Tide: A Call to Collective Action
17 Community News
Global water action agendas
Will the Anthropocene epoch be defined in a freeze core from Crawford Lake, Canada?
Help shape a basinwide, coordinated 10-Year science plan for the Great Lakes
Great Lakes AquaHacking Challenge 2023–2024
20 Get involved with IAGLR
JGLR Call for Papers on coastal processes
Seeking microplastics authors
Apply for a scholarship
IAGLR 2024 Call for Sessions

Update on IAGLR initiatives

by Jérôme Marty, IAGLR Executive Director

With summer almost behind us, I'm taking this opportunity to share with you about our current initiatives.

In July, our team met in Windsor and Ann Arbor in preparation for the 2024 Conference on Great Lakes Research. The location in the Detroit–Windsor area is ideal to dive into the *Shared Lakes: One Water, One Health* theme given the rich academic research and diverse, multicultural communities on both sides of the Detroit River, or *Waawiyaataanong Ziibi* in Anishnaabemowin. The event will offer opportunities to visit restored sites on both sides of the border and to learn about the recently announced Ojibway National Urban Park in Windsor. We also are hearing about the increasing limitations for government employes to attend conferences in person. For them and others who find in-person attendance a challenge, we are working on offering a full hybrid conference to accommodates both in-person and virtual viewing and presenting. Stay tuned for the Call for Sessions in September!

We are grateful for all the feedback received via our survey after the last conference, as well as the thoughtful discussion at the event about how to "conference better." You'll find a summary of key findings from both in the pages that follow. One of the survey results that stayed with me is the call for broader diversity and inclusion not only in relation to our conference but in all facets of IAGLR, from our leadership composition and membership to our programs. We are hoping to provide opportunities for underrepresented communities to join the 2024 conference by making the conference more affordable and by creating a program that will resonate with a diverse audience. The local planning committee is hard at work in making that happen. The local team includes Site Chair Mike McKay, Program Co-chairs Catherine Febria and Carol Miller, both champions in the sphere of divesity, inclusion, and equity, and 15 other experts from diverse backgrounds rounding out the program committee. We are in good hands!

This month, we published our first annual report. Publishing such a document provided the opportunity to reflect on 2022, a year of transition for the society. The report was also produced to communicate with sponsors and donors, which was also part of my activities this summer, meeting with all three Great Lakes governance commissions, several agencies, and foundations.

This fall, you'll gain access to our membership portal. We're currently beta testing the portal with a small group of members to work out any last kinks, and then plan to open to the full membership. This will be a great reason to renew your membership in October so that you can take advantage of the new IAGLR Member Directory. It will feature a robust search based on research interests, location, and more. We're excited to provide this opportunity to support networking among our members and seed the connections that foster the collaborative research of tomorrow.

I wish you a good and safe end of summer, and I am looking forward to connecting again in the fall. In the meantime, enjoy this issue of *Lakes Letter*, where we explore legal frameworks and our relationship to water. Happy reading!

HIGHLIGHTS

IAGLR 2023 Conference survey

We invited IAGLR 2023 conference attendees to share their thoughts about the event in a follow-up survey. Their responses will help inform our planning for future conferences.

WHO RESPONDED?

Out of 807 attendees invited, 33% responded. A majority were white (73%), women (52%), and from Canada (57%) or the U.S. (37%). Over half were from academic institutions (51%), while 29% were from government organizations. Most respondents presented research (71%), and almost one quarter attended virtually (23%). It was the first IAGLR conference for over half of respondents (54%), and 21% were students.

HOW DID WE DO?

86% rated the conference as "excellent" or "good"

97% indicated the conference was beneficial to their career

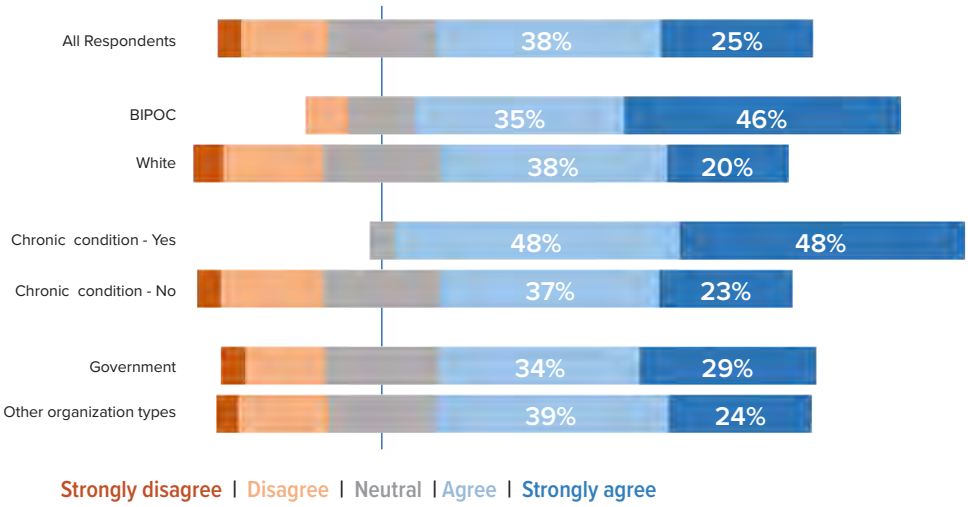
91% agreed they gained knowledge in their area of expertise & 86% indicated they gained knowledge in areas outside their expertise

91% indicated they felt welcome

A HYBRID FUTURE?

This was the first year our annual conference offered a hybrid format, with both in-person and virtual registration. Sessions were livestreamed and recordings made available after the conference to all registrants. The intent was to support those who couldn't travel to the conference, including government employees facing travel restrictions.

When asked whether we should continue to offer a hybrid format, even with increased registration costs, 63% of respondents indicated they "agree" or "strongly agree." As shown in the chart below, respondents with chronic conditions were most likely to "strongly agree," followed by BIPOC participants, and government employees.



Each bar in the chart above is positioned so that the "neutral" portion (i.e., those who "neither agree nor disagree") is centered on the vertical axis. The proportion of negative responses is indicated on the left (orange), and positive on the right (blue).

Conferencing better: Insights from IAGLR 2023

by Alexander T. Duncan, Centre for Indigenous Fisheries (UBC), IAGLR Canadian Student Board Member

On May 11, 2023, a roundtable and group discussion was held to note opportunities, barriers, and experiences with conferencing within the realm of aquatic sciences. Included at the end of session 15 titled *Valuing Indigenous Ways of Knowing, Being, Doing, and Connecting in an Era of Climate Change, Crisis, and Uncertainty*, the discussion was led by session co-chairs, Clint Jacobs, Elizabeth Nyboer, Andrea Reid, Catherine Febria, and Alexander Duncan *(pictured, left to right)*. A majority of the near 50 attendees included those who observed and participated in the session, likely not representative of the conference as a whole given the session's large representation of individuals engaged in work with or as Indigenous Peoples.

The goal was to promote dialogue among IAGLR conference attendees about how academic, research-oriented conferences can better engage and elevate Indigenous frameworks and perspectives. The motivation for this discussion stemmed from the session co-chairs' firsthand experiences, both positive and negative, while striving to enhance the inclusion and safety of Indigenous Peoples in aquatic or environmentally focused conferences. Discussions among Indigenous and non-Indigenous conference goers about what has and has not worked can be a first step to address inequalities and increase inclusivity and well-being for all attendees.

After introducing the discussion and sharing some experiences, the co-chairs used an interactive feedback tool (Mentimeter) to gauge the level of experience at conferences and to determine the degree to which those conferences centered Indigenous Peoples and perspectives. Attendees frequently experienced more superficial (but nonetheless important) recognitions (e.g., land acknowledgements before talks) with diminishing numbers experiencing deeper forms of engagement (e.g., Indigenous-led sessions, engagement with local Indigenous communities). Following some general remarks and discussion, attendees were asked to identify priorities for future conferences within the theme of "conferencing better." In this discussion, IAGLR was identified as a society that has taken the responsibility of accommodating and making changes to better include historically (and often contemporarily) excluded groups and enhancing the conference experience for all IAGLR members. Some examples include the support of Indigenous attendees (e.g., free Indigenous registration online and in-person), ability to have online capabilities for sessions, and focusing on Indigenous contexts (e.g., conference opening, plenaries, session 15). The box above lists some of the key priorities raised.

As a society and community of researchers, we will continue to hold these discussions and adaptively consider how we engage in conferences. This is a step in the right direction, and I am grateful to IAGLR for hosting these discussions and being open to change.

Miigwetch.

Recordings of session 15 are available online (Part 1 & Part 2). The discussion about improving conference experience starts at the 1:37:15 mark of part 2.

PRIORITIES FOR "CONFERENCING BETTER"

- More opportunities for engagement beyond topical sessions including open dialogue and discussion—similar to traditions of the Indigenous Peoples who call the region home
- Increased focus on interdisciplinary sessions to engage more people
- Inclusion of local Indigenous groups in the planning and execution of conference
- Greater focus on including youth and local community
- Mentor/mentee system to help new researchers/practitioners/academics
- Adequate funding and support for the items listed above

Welcome New Members

The following members joined IAGLR between May and July 2023. We're glad you're here!

Adam Cornwell
Michael Courier
Erik Cristan
Allen Curry
Heather Dettman
Megan DiCocco
Oliver Dumville
Berk Duruturk
Emily Hamilton
Arthur Hirsch
Eric Huber
Megan Kocher
Alexander Koeberle
Yuli Liu
Noribeth Mariscal
Lauren Marshall
Grant Milne
Rebecca Nicodemus
Isaac Noyes
Dale Pebesma
Andrea Reid
Paul Roebber
Claire Schon
Allison Snider
Phoebe Soldi
Yang Song
Lisa Sonnenburg
Courtney Taylor
Ralph Tingley
Simion Tolnai
Kristen Towne
Peter Welles
Nicholas Yeager
Kamil Zaniewski

KUDOS

Congratulations to the following IAGLR members!

JIM BENCE for being named professor emeritus upon retiring after 29 years in the Department of Fisheries and Wildlife at Michigan State University.

JENNIFER BOEHME (GLOS) recently started a new role as CEO of the Great Lakes Observing System. GLOS is a regional association in NOAA's Integrated Ocean Observing System and provides data services that support science, policy, management, and industry in the U.S. and Canada.

MARY-CLAIRE BUELL for being appointed as assistant professor at Trent University. She is cross appointed with Trent School of Environment and Department of Forensic Science. In this new position she will continue working in the Great Lakes on research that examines the connections between contaminants and environmental justice through transdisciplinary approaches bringing together environmental toxicology and community knowledges.

DAVID CANNON (Cooperative Institute for Great Lakes Research) for being promoted to assistant research scientist in hydrodynamics.

PARIS COLLINGSWORTH was recently promoted to associate research professor in the Department of Forestry and Natural Resources at Purdue University.

AYUMI FUJISAKI-MANOME (Cooperative Institute for Great Lakes Research) for being promoted to associate research scientist.

BARRY LESHT on his anticipated retirement from General Dynamics Information Technology. In the 44 years that he has worked in the Great Lakes, Lesht served as IAGLR secretary, treasurer, and associate editor of the *Journal of Great Lakes Research*. He also was honored with IAGLR's Anderson-Everett Award for his service to the association.

FRANCINE MCCARTHY and **SOREN BROTHERS** (Brock University) for their work on Crawford Lake, Canada, which was recently selected from 12 potential sites around the globe as the Global boundary Stratotype Section and Point (GSSP) candidate site to mark the start of the Antropocene, a proposed new epoch that recognizes the planetary transformation processes unleashed by industrialized humanity. For more, see story on page 17.

SILVIA SANTA MARIA NEWELL, a microbial ecologist and nutrient biogeochemist, on being named the new director of Michigan Sea Grant, effective June 1.

NOEL URBAN (Michigan Technological University) is principal investigator on a project titled "Torch Lake Outreach and Research" that recently received funding from the Michigan Department of Environment, Great Lakes, and Energy.

MEMBER PROFILE

Jordanna Bergman

Ph.D. Candidate, Carleton University

About my work

For my dissertation, I am investigating the ecological connectivity of a freshwater historic waterway, the Rideau Canal Waterway, as experienced by both native and invasive fishes. This system is a 202-km navigable route that, like many other waterways globally, encompasses the difficult challenge of managing anthropogenic barriers (e.g., navigation locks, water-control dams) to simultaneously provide connectivity to native species while minimizing invasions. Our goal is to determine the seasonal, species-specific, and ecohydraulic drivers of fish movements within the waterway itself and across barriers, and use results from my research to support conservation actions and management strategies.

Inspiration for this work

My love for the outdoors fueled a passion to protect and conserve our natural world, and encouraged my desire to pursue a career in conservation research. My previous research experiences focused mostly on the marine environment; upon learning about the drastic biodiversity declines occurring in freshwater ecosystems, I turned my attention towards conserving and restoring our world's precious freshwaters for my Ph.D. I've been referred to as a "freshwater convert" and have loved this field.

Something else about myself

I'm an avid backpacker and so appreciate chances to "escape" our concrete societies. Spending time in the backcountry is wonderfully rejuvenating for me and reminds me that these beautiful wild places are what inspired me to become a conservationist

in the first place. If I'm not working, or planning a backpacking trip, I'm probably thinking about food—cooking is a favorite second hobby!

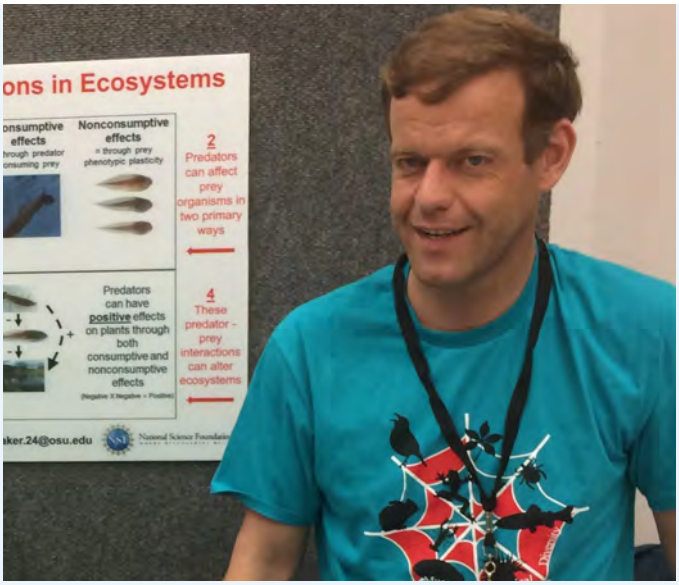
IN MEMORIAM

Michael Fraker

(1978–2023)

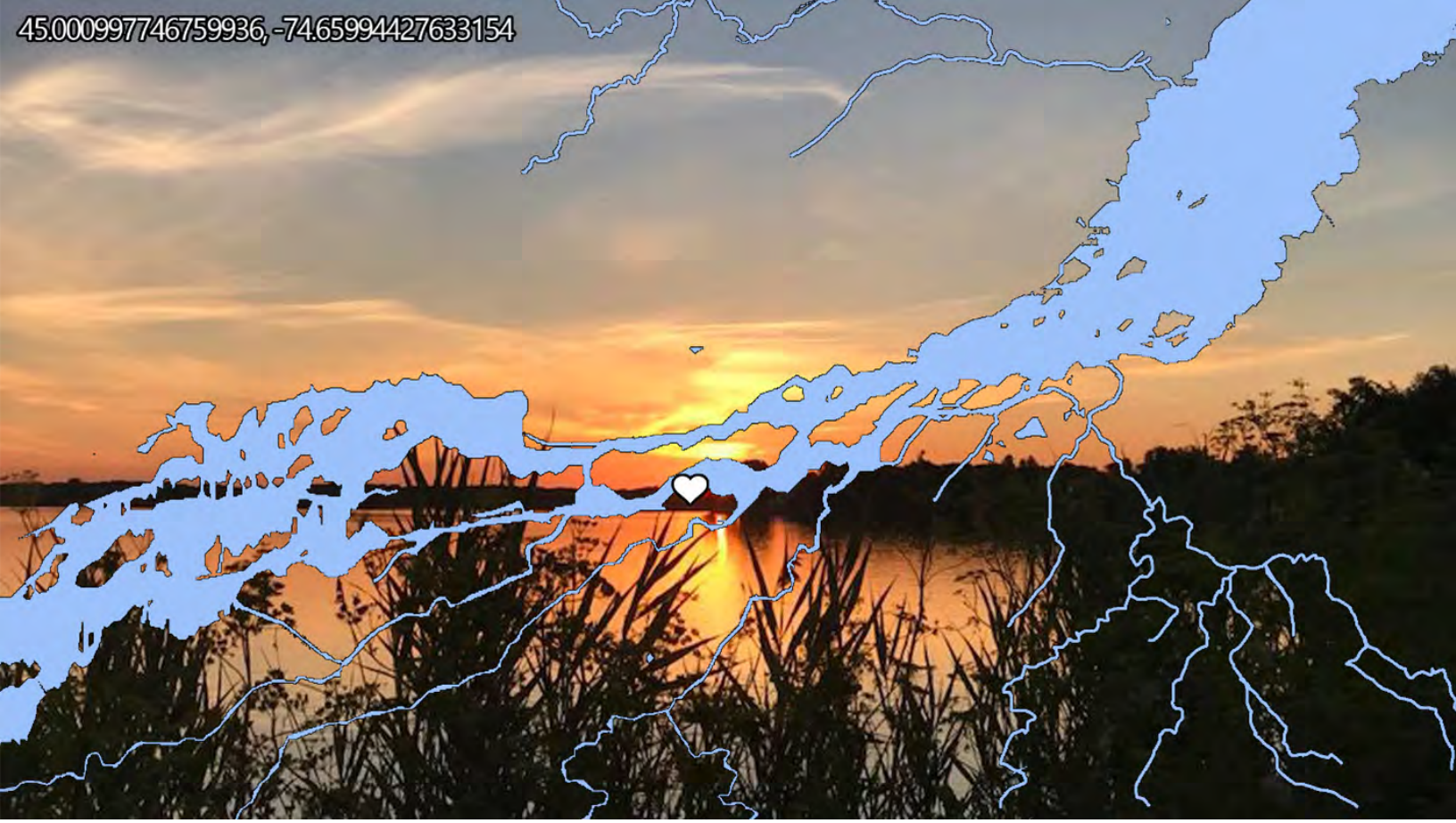
In April, the Great Lakes community lost a committed researcher and friend, Michael Fraker. His expertise in ecological modelling increased implementation of ecosystem-based management across the Great Lakes. He earned his Ph.D. in Ecology and Environmental Biology from the University of Michigan in 2007 and completed postdoctoral research at the University of Michigan, Oklahoma State University, and The Ohio State University.

Mike could be counted on as an insightful collaborator who never stopped learning innovative techniques. In 2019, he joined the Cooperative Institute for Great Lakes Research and transitioned to Michigan Sea Grant in 2021 as research program manager. Throughout his career, he led diverse projects from sustainable fishery management to coastal climate change adaptation while prodigiously publishing 35+ articles. He inspired budding student researchers in each



of his professional appointments and will be remembered as an indispensable, kind mentor. His gentle nature and thoughtfulness will be dearly missed.

Contributed by Brenna Friday, Donna Kashian, and Stuart Ludsin.



Akwesasne Kena:kere by Abraham Francis, 2023.

Talking Rivers
Rights and Responsibilities

by Abraham Francis, Blake Lavia, and Tzintzun Aguilar-Izzo

KANIATAROWANÉNHNE (the St. Lawrence River) connects the Great Lakes and the Atlantic Ocean, influencing water and weather systems globally (Marty et al., 2010). Kaniatarowanénhne flows through the center of Akwesasne, a *Kanienkehaka* (part of the Haudenosaunee Confederacy) community, which is dismembered by imposed settler-state geopolitics (Québec, Ontario, and New York). *Akwesasronon* (Akwesasne community members) share a long-interconnected history of relationality with these waters, full of reciprocal roles and responsibilities. Akwesasronon are responsible for caretaking and protecting these waters—a difficult responsibility when their voices have been ignored—resulting in environmental violence on the people and River.

The discourse surrounding "Rights of Nature" as an Earth-centered approach for our legal systems is global and full of successes and failures. While inspired by Indigenous worldviews, the "rights" concept conflicts with Haudenosaunee ideology. The Haudenosaunee have interwoven knowledge systems and kinship networks with all of creation that inform their values, teachings, knowledge, practices, and identity. The *Ohenton Karihwatehkwen* ("Words Before All Else") articulates this relationality amongst creation by acknowledging their reciprocal roles and responsibilities. Kaniatarowanénhne is responsible for quenching the thirst of creation and acts as medicine to cleanse. Additionally, the River is considered family and already has agency and, by extension, "rights."

Throughout history, colonial powers worked to dehumanize beings—both human and more-than-human. Beings with agency become objects for commodification and dispossession in the colonial mind. The "rights" and "personhood" concepts follow in line with this dominant discourse and have been used to exclude both human and more-than-human communities from the protection afforded by being considered a "person."

The act of granting rights to the more-than-human world is an attempt to reverse this trend and to emancipate the natural world from being considered property. However, what right

do humans have to bestow rights on relatives? What right do we have to bind them in another settler-colonial framework? We have a responsibility to care for our relatives in times of need, as they have cared for us throughout time.

The first more-than-human beings to have their personhood honored and their rights protected by the current settler-colonial legal system were the ecosystems of Tamaqua, Pennsylvania. Tamaqua banned the dumping of toxic sewage sludge as a violation of the rights of "borough residents, natural communities, and ecosystems" (Ordinance No. 612, 2006, p. 6). Since then, recognition of the Rights of Nature has spread worldwide to countries like Ecuador, Aotearoa (New Zealand), Panama, Bangladesh, Uganda, Spain, and India.

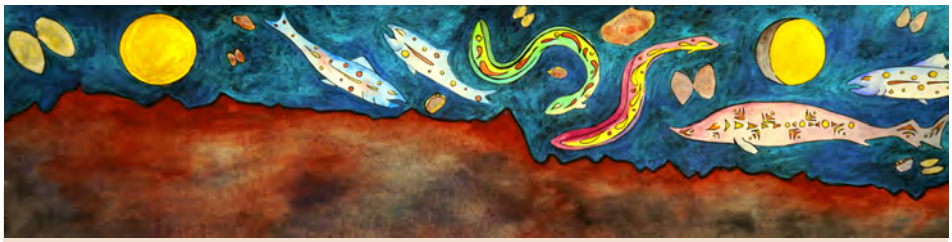
The movement has also spread across Turtle Island (i.e., North America), with many local communities and Tribal Nations recognizing Nature's inherent rights. In 2023, a lawsuit filed by the Sauk-Suiattle Indian Tribe championing the "rights of Salmon" was settled, with the city of Seattle agreeing to create fish passage around three hydroelectric dams on the Skagit River (Surma, 2023). In 2022, a New York state assemblymaker introduced the Great Lakes Bill of Rights (Wozniak, 2023). On April 24, 2023, the Assembly of First Nations Québec-Labrador unanimously adopted a resolution to confer legal personhood to Kaniatarowanénhne (Méndez, 2023).

In 2021, members of Talking Rivers started a conversation amongst Indigenous and settler communities in northern New York to build a declaration acknowledging the rights of the Kaniatarowanénhne Watershed, focused on the confluence of rivers from the Adirondacks to Akwesasne. The conversation led to the drafting of the Great Rivers Bill of Rights and Responsibilities, which acknowledges the inherent rights of the River, but also includes the responsibilities of the human members of the watersheds. The document carries some central ideas:

1. the waters have the right to community, emphasizing the cultural connectivity between human and more-than-human relations;
2. the waters have the right to be seen and heard, which focuses on monitoring for changes; and
3. the waters have the right to be cared for, which comes in the form of protective mechanisms (i.e., legislation) and restoration efforts.

We are part of these waters, as they are part of us. We are striving to dream a hopeful future into being that recognizes and protects the agency of all of creation around these waters.

Abraham Francis serves on the Voice of Rivers Advisory Committee; he is an inaugural recipient of the IAGLR Large Lake Champion Award. Blake Lavia and Tzintzun Aguilar-Izzo serve on the Talking Rivers Board of Directors.



Eel Guardians of the Great River. Illustration by Tzintzun Aguilar-Izzo.

TIAWERÓN:KO

This is a story of failed responsibility and uncertain consequences when the "rights" of our relatives are ignored.

We connect the River's story to the *Tiawerón:ko* (American eel), another essential relative to the Haudenosaunee and Kaniatarowanénhne. They have the role of connectors, traveling from their birthplace, the Sargasso Sea, up into the heart of Turtle Island. They voyage up the length of Kaniatarowanénhne, searching for their ancestral homes (Prosek, 2010). They spend most of their lives along the shores and tributaries of Lake Ontario before following the moon back to the salty waters of their birth to cycle again (Cresci et al., 2019). The beautiful lifecycle of Tiawerón:ko shows local and global connectivity. Their Haudenosaunee biocultural expression comes in harvesting and preparation for food or medicine and is part of the Haudenosaunee clan system, which speaks to familial roles and responsibilities amongst the people (College, 1993). Tiawerón:ko dramatic decline was documented at the Moses-Saunders Dam fish ladder, from millions in 1980 to virtually zero in 2000. The loss of this relative has implications for the ecosystem and the various Indigenous Communities' cultural integrity and continuity along their pathway that see them as kin.

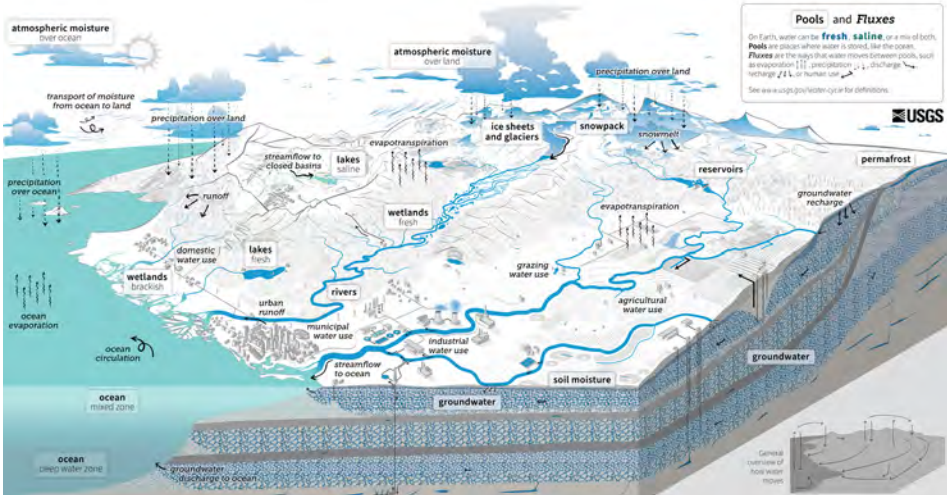
SUSTAINING LAKES AND RIVERS IN THE 21ST CENTURY

Watershed science and the public trust doctrine

by JIM OLSON

FOUNDER AND SENIOR LEGAL ADVISOR, FOR LOVE OF WATER (FLOW); OF COUNSEL, OLSON, BZDOK & HOWARD P.C.

IN THE THIRD DECADE of the 21st century, the global water crisis has become existential—a crisis that has and will challenge the limits of science, law, and public policy to sustain watersheds. Even without the devastating effects from climate change, the health of watersheds and lakes are at a tipping point. This article suggests that (1) watershed and hydrogeological and meteorological science have advanced to the point that it is possible to understand and model the causal relationship of natural forces and human activity that connects the arcs of the water cycle to lakes and their tributary streams and groundwater; and (2) the legal framework and principles of public trust law (the public trust doctrine) offer a pathway to protect and sustain watersheds and meet the challenge of this watershed crisis.



The Water Cycle, courtesy U.S.G.S. Water Science School. View the interactive diagram online.

Watershed science

The hydrosphere and watersheds constitute a single hydrogeological system and include, for example, precipitation, runoff, percolating groundwater, seeps, springs, wetlands, root and plant uptake, evapotranspiration, and evaporation. Add to that the "rivers in the sky." Water in watersheds defines life—natural and human—and along with climate defines human health, community, culture, development, and economy. Protecting the integrity of the quantity and quality of water sustains lakes, rivers, ecosystems, watersheds, and quality of life: Whatever happens in one arc of the water cycle affects the other arcs of the water cycle.

Science and technology have made major advances through monitoring, collection of data, calculations, and modeling to determine the causes of impacts on lakes, streams, and groundwater from human activities and natural forces within a watershed. When held to high standards, these advances provide a better picture for human conduct to conform better to reality. The old adage "out of sight, out of mind" is pointless.

Putting an end to harmful algal blooms: The story of Michigan's Platte Lake

Will Swiecki enjoyed his childhood summers on the clear waters of Platte Lake in northwest Michigan. When he returned to the lake in the mid-1970s at 27, he was shocked that he could not see his hand under the murky green water. Childhood memories motivated him to do something. He met with officials from the Michigan Department of Natural Resources (DNR) and collected information. When meetings with officials failed to address the problem, he hired a lawyer and Ray Canale, a water quality engineering professor at the University of Michigan. Canale soon questioned the DNR's evaluation of impacts from an upstream fish hatchery because of the high-phosphorus fish food, lax waste treatment, and the absence of any probability coefficient. It appeared that the fish hatchery was the culprit.

When the DNR balked, Swiecki and conservationists engaged the Platte Lake Improvement Association (PLIA). In the early 1980s, PLIA filed a citizen lawsuit based on the Michigan Environmental Protection Act, which prohibits pollution or impairment of water and other natural resources and the public trust rights of citizens (MEPA 324.1703[2]). The trial judge ruled in favor of the PLIA and ordered the DNR to reduce its phosphorous discharges. In 2000, after a decade of court supervision, the DNR and PLIA agreed to a consent judgement that required monitoring to assure the effectiveness of efforts to reduce phosphorous discharge. Equally significant, it established an extensive monitoring system at 18 locations in the watershed. The local Benzie Conservation District agreed to collect and manage the data, including flows, levels, phosphorus, and other parameters.

After the collection of 20 years of data, the court entered a new consent judgement that formalized the watershed-

wide monitoring system and set the TMDL of phosphorus for Platte Lake at 8 ppb. In 2022, the parties and the conservation district worked with Canale, who built an innovative computer model that would evaluate and identify sources of impacts to the lake from human water and land activities and natural forces within watershed to ensure that the 8 ppb maximum daily load is not exceeded. The approach also incorporated the dynamic swings in weather as the result of climate change. *(For a more complete story about Platte Lake, see "Remedies for Harmful Algae Blooms are Available in Law and Practice" by Keith Schneider, Circle of Blue.)*

The public trust watershed framework

The public trust doctrine has been recognized in every U.S. state and Canadian province (referred to as the right to navigation and fishing) for almost 100 years. Public trust principles have spread to many other countries. The doctrine states that navigable waters and their submerged lands and ecosystems are held by government in public trust for the protection from impairment of public rights of navigation, fishing, boating, swimming, drinking water, bathing, and sustenance. Government as trustee has a solemn duty to assure that its decisions uphold this non-impairment of public trust resources and public rights in perpetuity. The doctrine limits upgradient activities and uses that impair the public trust in downstream lakes. In this way, water uses, pollution, and diversions, and other impacts on water and the environment within a watershed can be limited based on the public trust law non-impairment standard for lakes and tributary water courses.

Watershed and public trust principles for the 21st century

In 2014, the International Joint Commission (IJC) pinpointed high nutrient loads as the trigger for creating oxygen-depleted "dead zones" and cytotoxins in Lake Erie. It recommended a 40 percent reduction in phosphorus and encouraged governments to use the principles of the public trust doctrine to restore Lake Erie. But efforts to establish a TMDL faced resistance from EPA, and subsequently Ohio and EPA delayed declaring the open waters of Lake Erie "impaired" to avoid triggering the establishment of the TMDL under the nonpoint discharge provisions of the Clean Water Act (CWA). More recently, both EPA and Ohio have declared these open waters "impaired," but no TMDL has been recommended or adopted. Moreover, the CWA was not designed for systemic harm to watersheds and the environment, including climate change. Even if a TMDL is adopted, compliance is voluntary.

Platte Lake. Photo by J. Carl Ganter, Circle of Blue (circleofblue.org).

Why wait for federal or state and provincial legislatures to do something? The harmful algal blooms in the western end of Lake Erie are the result of phosphorus and other nutrient releases—roughly 80 percent from agriculture production and 20 percent from municipal and other waste discharges. It is not much of a leap to apply the watershed approach in the Platte Lake story and public trust principles to other watersheds to address any number of problems, including the "dead zones," nutrient pollution, PFAs, toxic chemicals, and sediment loading. The common law of public trust is a constitutional and property law principle that is insulated from political efforts to weaken it. In 2016, the IJC in its 15-year report recommended the public trust doctrine as the "backstop" principle for protecting the waters of the Great Lakes.

The integration of watershed science and the non-impairment standard in public trust law provides the basis for assuring the protection of our lakes and waterways. While lawsuits are necessary, why not start at the end of the Platte Lake story and replicate the watershed scientific and legal framework as a constructive model for governance and protection for our world's lakes and rivers, large and small? There is no reason to wait.

Jim Olson is an inaugural recipient of the IAGLR Large Lake Champion Award.

The public trust doctrine

The public trust doctrine holds that certain natural resources like navigable waters are preserved in perpetuity for the benefit of the public to use and enjoy. Public trust principles have legal roots in Justinian laws of ancient Rome and have been a part of our democracy for centuries dating back to the Magna Carta in 1215. The Great Lakes were placed in public trust with the signing of the Northwest Territory Treaty in 1787, vesting these principles as a condition of statehood in Great Lakes states. The U.S. Supreme Court affirmed the public trust in 1892, and it is a part of common law, court rulings, and constitutional law in the Great Lakes states and provinces. (Read more about the public trust at the For Love of Water website.)

Lake Superior. Photo credit: Yinan Chen, Pixabay.

Canada's strengthened freshwater agenda and historic Great Lakes investment

by CARLA TORCHIA
MANAGER, GREAT LAKES NATIONAL PROGRAM OFFICE, ENVIRONMENT AND CLIMATE CHANGE CANADA

CANADA IS HOME to 20 percent of the world's freshwater reserves. Preserving and restoring these resources is fundamental to the health and well-being of our environment, communities, and economy. However, the challenges facing water quality and ecosystem health are becoming more complex, particularly with the ongoing impacts of climate change, and considering the multi-jurisdictional nature of water management in the country. Now more than ever, it is essential that we work together to keep our waters clean and well managed for current and future generations.

Since 2019, successive Speeches from the Throne and Mandate Letters from the prime minister to the minister of Environment and Climate Change Canada (ECCC) have committed to strengthening and expanding the Freshwater Action Plan, including Great Lakes programming, creating a Canada Water Agency, and modernizing the Canada Water Act. A lot of work has happened over the years to advance this freshwater agenda, such as detailed engagement with multisectoral partners and the public on priorities for future Great Lakes programming, as well as on Canada's most pressing freshwater challenges and the role the Canada Water Agency could play to help sustainably and collaboratively manage freshwater across the country.

On the heels of the 50th anniversary since the signing of the Canada–U.S. Great Lakes Water Quality Agreement (GLWQA), the Great Lakes scored a big win. On March 24, 2023, a new historic Canadian federal investment of C$420 million was announced by Prime Minister Justin Trudeau during his visit with U.S. President Joe Biden, as part of both countries' renewed commitment to preserving and restoring these iconic waters and enhancing the resilience of the communities and people that depend on them. This funding represents a five-fold increase in new Canadian investments for the Great Lakes and is part of the March 2023 budget announcement of C$650 million over 10 years, starting in 2023–24, to support monitoring, assessment, and restoration work in the Great Lakes, Lake Winnipeg, Lake of the Woods, St. Lawrence River, Fraser River, Saint John River, Mackenzie River, and Lake Simcoe.

With this enhanced funding, Canada is targeting ambitious environmental results, such as completing the cleanup of 12 of the 14 remaining Canadian Areas of Concern by 2030 and all 14 within 15 years, as well as

meeting Canada's nutrient pollution reduction targets for Lake Erie within 15 years. Great Lakes funding will continue to accelerate science and action to address other challenges threatening Great Lakes water quality and ecosystem health and deliver on Canada's commitments under the GLWQA.

Further details regarding the next phase of Canada's freshwater ecosystem initiatives for the Great Lakes as well as the other named water bodies of national significance (i.e., Lake Winnipeg, Lake of the Woods, St. Lawrence River, Fraser River, Saint John River, Mackenzie River, and Lake Simcoe) will be available in the coming months.

Budget 2023 also announced new resources to support the broader freshwater agenda, including C$85 million over five years for the creation of the Canada Water Agency, as well as C$22.6 million over three years to support enhanced coordination of freshwater management across federal departments, among other jurisdictions and with Indigenous partners. In May 2023, Prime Minister Trudeau officially announced the creation of the agency, which will improve freshwater management in Canada by providing leadership, effective collaboration federally, and improved coordination and collaboration with provinces, territories, and Indigenous Peoples to proactively address national and regional transboundary freshwater challenges and opportunities.

As an interim step, the agency has been established as a new branch within ECCC; however, legislation will be introduced down the road to establish a stand-alone agency with headquarters located in Winnipeg, Manitoba, and regional offices across the country. In the meantime, the Canada Water Agency will advance its efforts to implement the Freshwater Action Plan as well as work with provinces, territories, Indigenous Peoples, local authorities, scientists, and other partners to find the best ways to keep our water safe, clean, and well managed for everyone.

With this enhanced funding, Canada is targeting ambitious environmental results

With the changing reality of freshwater in Canada, including the ongoing impacts of climate change, one of the first orders of business will be to begin the work of modernizing the Canada Water Act. Recognizing the significance of freshwater to Indigenous Peoples and in the spirit of reconciliation, it will be critical that the agency work collaboratively with Indigenous partners to ensure updates to the act reflect the importance of Indigenous rights as well as the key role Indigenous Peoples have played for millennia as the original stewards of lands and waters.

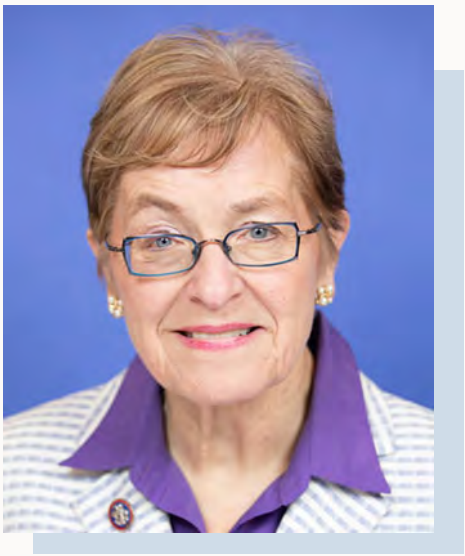
The Canada Water Agency is an excellent opportunity for constructive dialogue and collaborative action between the federal government and the many partners involved in freshwater management across the country.

Lake Ontario. Photo credit: David Mark, Pixabay.

FEDERAL FUNDING PERSPECTIVE

A look at the Great Lakes Restoration Initiative

by **MARCY KAPTUR**
MEMBER OF CONGRESS; CO-CHAIR, HOUSE GREAT LAKES TASK FORCE



SINCE 2016, THE GREAT LAKES RESTORATION INITIATIVE (GLRI) has invested more than US$3 billion across nearly 7,000 projects to rebuild habitat, mitigate nutrient pollution, and manage invasive species for the benefit of all the communities—human, plant, and animal—that call the Great Lakes watershed home. Although it is a challenging year for federal appropriations, the GLRI benefits from strong bipartisan, bicameral support: the House and Senate Committees on Appropriations have recommended US$368 million and US$378 million, respectively, in fiscal year 2024 to fund the program.

Robust year-over-year funding for the GLRI is critical to fulfill the program's commitment to science-based restoration. Using the scientific process as a central feature of restoration creates room for creativity and asks for patience. Afterall, ecosystem recovery from chemical contamination, nutrient pollution, and degraded habitat takes time. Baseline studies help orient us and facilitate planning pathways towards recovery. Follow-up studies show us that native fishes return when in-stream habitats are improved and neighborhoods build opportunities for outdoor recreation and community revitalization. Creativity in science asks thoughtful questions about community needs and uses innovative methods and technologies to investigate solutions.

Meaningful projects can be found throughout the watershed; each harnesses a vision for our region that uses science-based restoration strategies to rebuild environments for the benefit of all communities. Continued funding accelerates progress towards a future that mitigates the environmental impact of past actions and avoids foisting additional burdens on future generations.

Let us all continue to work toward a shared goal of happy and healthy Great Lakes communities.

Robust year-over-year funding for the GLRI is critical to fulfill the program's commitment to science-based restoration.

Sackett v. *EPA*

Court ruling puts half of U.S. wetlands at risk

by DAVE DEMPSEY
SENIOR ADVISOR, FOR LOVE OF WATER (FLOW)

THE U.S. SUPREME COURT *Sackett v. Environmental Protection Agency* ruling issued on May 25 leaves a vast share of U.S. wetlands unprotected by the Clean Water Act (CWA) and will erode Great Lakes basin wetland benefits. The eight Great Lakes states will have varying degrees of authority to protect wetlands no longer subject to federal oversight.

Wetlands contribute to a number of UN Sustainable Development Goals due to the ecosystem services they provide. They are nurseries for fish and wildlife, pollution filters for lakes, rivers, and groundwater, and storage for floodwaters. They're also a key storehouse for carbon, curbing climate change.

The decision in the case essentially eliminates U.S. Clean Water Act protection of wetlands that do not have a continuous surface connection to navigable waters. Parties that want to dredge and fill wetlands without such a connection, formerly regulated by Section 404 of the CWA, will no longer be required to obtain federal permits.

Federal authority explicitly extends to navigable waters and adjacent wetlands. Although the justices decided unanimously that the wetland at issue in the case was not protected, the court's larger decision hinged on the meaning of "adjacent." By a 5–4 margin, with Justice Samuel Alito writing the opinion, the court ruled that "adjacent" meant directly connected at the surface. Conversely, the four

justices in the minority, by way of an opinion authored by Justice Brett Kavanaugh, argued that the ruling wrongly interpreted "adjacent" as "adjoining," or immediately connected. "Adjacent," they argued, meant in close proximity.

The seemingly small linguistic difference translates to a potentially enormous loss of wetlands across the United States. The environmental group Earthjustice estimated that up to half of the nation's 118 million acres of wetlands will lose federal protection.

The decision substitutes the views of five justices for 50 years of legal interpretation and scientific evidence supporting the hydrological interconnection between wetlands and rivers and streams, even when the link is not visible at the land surface. A 2015 EPA science synthesis report, *Connectivity of Streams and Wetlands to Downstream Waters*, summarizing more than 1,200 peer-reviewed papers, validated the importance of non-floodplain and floodplain wetlands, as well as ephemeral and intermittent streams, to the integrity of rivers and lakes.

By offering its own judgment that wetlands must immediately adjoin rivers and streams, the ruling exposes many wetlands vital to the health of rivers and streams to filling.

What implications does the ruling have for the Great Lakes? For six of the eight Great Lakes states, it means a potentially significant loss of protected wetlands and, ultimately, degraded water quality and reduced natural area for flood protection. There are some exceptions.

In 2001, a U.S. Supreme Court decision removed "isolated" wetlands not associated with another body of water from protection under the Clean Water Act. In response to that loss of protection, the Wisconsin Legislature convened in a special session to unanimously pass a bill extending state protection to those wetlands, requiring landowners to obtain a permit before dredging or filling any wetlands not protected by federal law.

What implications does the ruling have for the Great Lakes? For six of the eight Great Lakes states, it means a potentially significant loss of protected wetlands and, ultimately, degraded water quality and reduced natural area for flood protection.

"Any wetlands declared non-federal, due to that [court] decision or any subsequent decision, would still be covered under Wisconsin law," says Michael Cain, a former Wisconsin Department of Natural Resources attorney. Cain says of the 2001 legislation, "that statute is still in place. As far as this decision, the impact in Wisconsin is somewhat muted because of that statute. The state of Wisconsin will still regulate most of those wetlands."

In Michigan, a 1980 state law incorporates a broader definition of wetlands than the Clean Water Act. Michigan law recognizes the scientific reality that many wetlands critical to the health of rivers and streams are hydrologically connected below the land surface.

The Michigan Department of Environment, Great Lakes and Energy (EGLE) says the Sackett ruling would mean little or no change in Michigan wetland protection. "Michigan is the epicenter of the world's greatest freshwater ecosystem—the Great Lakes—so it is fitting that we have a direct role in protecting the wetlands that nurture and feed those freshwater sources," says James Clift, an EGLE deputy director. "Neither the rules in Michigan, nor our commitment to protecting freshwater resources, has changed in the wake of this ruling."

Over three decades ago, Michigan was the first state, and remains one of only three states, to have received federal authorization to administer the federal wetland permitting program. According to EGLE, Michigan has lost approximately one-third of the original 10.7 million acres of its pre-European-settlement wetlands, but the rate of loss has slowed dramatically since passage of Michigan's 1980 law.

Michigan's experience shows that, in spite of the court's decision, state and local governments still have the power to protect their wetlands. The time is now for scientists and the public to stand up for their local and state wetlands.

Dave Dempsey is the recipient of IAGLR's 2022 John R. (Jack) Vallentyne Award. Photos of northern Michigan wetland by Sheila Fox.

ONTARIO'S BILL 23

Province moves backward on land and water protections in the Great Lakes basin

by ANDREA KIRKWOOD
PROFESSOR OF BIOLOGICAL SCIENCE, ONTARIO TECH UNIVERSITY

GROWING UP IN ONTARIO during the 1970s through to the 1990s, I witnessed a golden age of environmental legislation that benefited the Great Lakes basin. A series of binational air and water pollution laws (e.g., Great Lakes Water Quality Agreement, Canada-U.S. Air Quality Agreement) as well as provincial acts (e.g., Ontario Environmental Protection Act, Ontario Water Resources Act) were created on a model of consensus between all parties. This history of environmental law in Ontario left me with the naïve impression that (generally) through time and effort, progress in environmental regulations was always the net result.

Fast forward to present day, I am dumbfounded by the recent actions of the current Ontario government to gut environmental legislation that took decades to come to fruition. The same party that owned the Walkerton Crisis of 2000—when the community's drinking water supply was contaminated due to improper water treatment following heavy spring rains, resulting in thousands of people sickened and seven dead—seems to have forgotten that integrated source water protection as well as not building on flood plains not only protects the environment, but saves human lives too. As a result, I have had to sheepishly tell my students that the political model of environmental progress of which I was accustomed to had made a U-turn back to the 1950s. This legislative paradigm shift was due to Ontario's Bill 23 (now officially the More Homes Built Faster Act, 2022).

Bill 23 was, by design, a complicated omnibus bill that "streamlined" (read "dismantled") several provincial acts (e.g, Conservation Authorities Act, Provincial Planning Act) under the guise of expediting the building of affordable homes across the Greater Toronto and Hamilton Area. Arguably the most egregious aspect associated with Bill 23 was the targeted removal of thousands of hectares of agricultural and natural lands within the provincially protected Greenbelt.

Public outcry in response to Bill 23 was swift from an array of professional bodies and environmental groups. As it turns out, Bill 23 offers very little in the way of improving housing affordability, but rather paves the way for land speculators and developers to bulldoze their way across once protected watersheds with minimal to no restrictions on where and how to build. As an aquatic ecologist that conducts research on the impacts of land-use on water quality and ecosystem health, I know there are decades-worth of studies showing how urban sprawl pollutes waterways, increases flooding, and

Aerial photo of Duffin's Creek Coastal wetland flowing into Lake Ontario after a storm. Urban development contributes to higher erosion rates and turbid run-off, which can negatively affect watersheds and the Great Lakes they flow into. Photo by Lou Wise courtesy of Toronto and Region Conservation Authority.

destroys critical habitat for threatened and endangered species. Irrespective of public consultation, where thousands of letters and emails were submitted in protest to Bill 23 last fall, the majority Progressive Conservative government in Ontario pushed the controversial piece of legislation through to royal assent anyway.

Now that Bill 23 has passed, there has been a growing coalition of individuals and groups that are working together to stop the implementation of Bill 23. It is early days, but recent media reports indicate that there remain significant road-blocks to unfettered development, including the province's responsibility to consult with Indigenous First Nations regarding development activities in their traditional territories. Even the Canadian federal government has started to get involved in key areas where species at risk habitat is threatened.

If you are interested in getting involved or learning more about the implications of Bill 23 to the health of the Great Lakes, please check out these resources:

- Ontario's Bill 23, The Narwhal
- Action Alert: Bill 23 - More Homes Built Faster, 2022, Canada's Environmental Law Association
- What's next as we work together to stop the destruction of farms, forests and wetlands in the Greenbelt and beyond?, Environmental Defence

REPORT REVIEW

To solve the world's water crisis, revalue water as a global commons

by Kyle McKee and Bopi Biddanda

IN *TURNING THE TIDE*, the authors report on the increasingly disastrous global water crisis and prescribe steps for addressing it. Water is a life-sustaining, sociopolitical molecule. From the outset, water has dictated where, how, and if we live. Now, due to our own actions such as pollution and climate warming, our common water resources are threatened. Consequently, resolving the crisis also requires concerted global action.

The report by the Global Commission on the Economics of Water outlines a seven-step call to action as a solution for the world's water crisis. This process includes 1) managing and protecting the water cycle as a global common good; 2) holding availability of safe water as a human right; 3) halting underpricing water while supporting the poor; 4) ceasing excess agriculture and water subsidies, which lead to excessive water consumption; 5) founding local and regional water partnerships that encourage investments in water access, resilience, sanitation, and sustainability; 6) fortifying our water-storage systems, recycle wastewater, and reuse water while mining materials such as lithium; and 7) unifying the fragmented governance of water to support all demographics and implementing trade policies to ensure sustainable water practices. No single step is as impactful as all seven acting in concert.

Turning the Tide: A Call to Collective Action, by Mariana Mazzucato, Ngozi Okonjo-Iweala, Johan Rockström, and Tharman Shanmugaratnam, Global Commission on the Economics of Water. 32 pp. March 2023 (https://turningthetide.watercommission.org).

Water is the ultimate global commons. Reenvisioning water resources as being vital to humanity is integral for resolving the water crisis. Water must be viewed as a human right, and all peoples should have ready access to safe drinking water. Currently, 26% of people do not have reliable access to clean water. With countries divided, there is a failure to formulate geographically interconnected partnerships, leading to a failure to deliver affordable and resilient water services and increased inequality. However, our collective failure offers a solution—collective action. Thus, the problem requires a global partnership to solve. *Turning the Tide* emphasizes the need for transnational unity in our action towards solving the water crisis.

Turning the Tide conveys the message that effective governance of water can shape a sustainable future for our shared water resources even as the world changes around us. The history of humanity is tightly bound to the history of water, a two-way street of water and society constantly shaping one another. To truly turn the tide of the impending water crisis, our social contract with water must be urgently redefined with water sustainability at its core.

Kyle McKee and Bopi Biddanda are at the Annis Water Resources Institute, Grand Valley State University.

Global water action agendas add freshwater; tackle climate change, biodiversity, pollution

by Catherine Masson, Trent University

Freshwater governance is often the missing link in multilateral environmental agreements. That changed last November when the 27th Conference of the Parties to the UN Framework Convention on Climate Change adopted the Sharm El-Sheikh Implementation Plan—the first official recognition of the importance of protecting, conserving, and restoring water systems and water-related ecosystems for climate adaptation and resilience.

In December, the Kunming–Montreal Global Biodiversity Framework was adopted at the 15th Meeting of the Conference of the Parties to the United Nations Convention on Biological Diversity. The Convention is the legal instrument for the conservation of biological diversity, sustainable use, and fair and equitable sharing of genetic resources. This ambitious new framework maps four elemental goals for living in harmony with nature by 2050 and 23 interconnected targets to halt and reverse biodiversity losses by 2030—on a timeline aligning with the UN 2030 Agenda for Sustainable Development and the 17 Sustainable Development Goals.

This past March, the long-anticipated UN 2023 Water Conference convened in New York—46 years after the last UN Water Conference in Mar del Plata, Argentina. The new UN Water Action Agenda explicitly embeds lakes and reservoirs into the Global 2030 Agenda for Sustainable Development.

Together, these three global water action agendas work to address the triple planetary crises of climate change, biodiversity loss, and pollution—a whole-of-government, whole-of-society approach. Stay tuned.

Will the Anthropocene epoch be defined in a freeze core from Crawford Lake, Canada?

by Francine McCarthy, Brock University

Since 2009, the Anthropocene Working Group (AWG) of the Subcommission on Quaternary Stratigraphy (SQS) has been investigating whether our planet had transitioned substantially away from the Holocene state, as suggested by Crutzen and Stoermer (2000). Beginning in 2019, 12 widely geographically distributed geological successions from a variety of depositional settings were investigated as potential Global boundary Stratotype Section and Point (GSSP) or "golden spike" candidates to define the Anthropocene as a new epoch. All sites recorded evidence of a substantial globally synchronous shift in the trajectory of the Earth System during the mid-20th century (Waters et al., 2023) that was mainly attributed to the "Great Acceleration" when economic activity grew at a rapid rate (Steffen et al., 2015). In April 2023, following three rounds of deliberation and voting, it was the varved sediments that accumulate below the chemocline of Crawford Lake that were selected as best representing the departure from Holocene norms.

The lower, dense stratum of this meromictic lake on the Niagara Escarpment in the Lake Ontario watershed is unique in being well-oxygenated due to highly transmissive groundwater flow zones transecting the karstic basin (Llew-Williams, 2022) yet lacking burrowing macrobenthos (with the largest microinvertebrates being stygofaunal ostracods transported into the deep basin with the groundwater); Heyde, 2021). The seasonally laminated sediments, consisting of authigenic calcite crystals precipitated in the epilimnion during the summer (Dickman, 1979) thus remain undisturbed, providing annual resolution during intervals of cultural eutrophication, when primary production causes the pH to increase (Llew-Williams et al., in press) through the Canadian Zone, and more famously, over a 218-year interval between the late 13th and 15th

continued

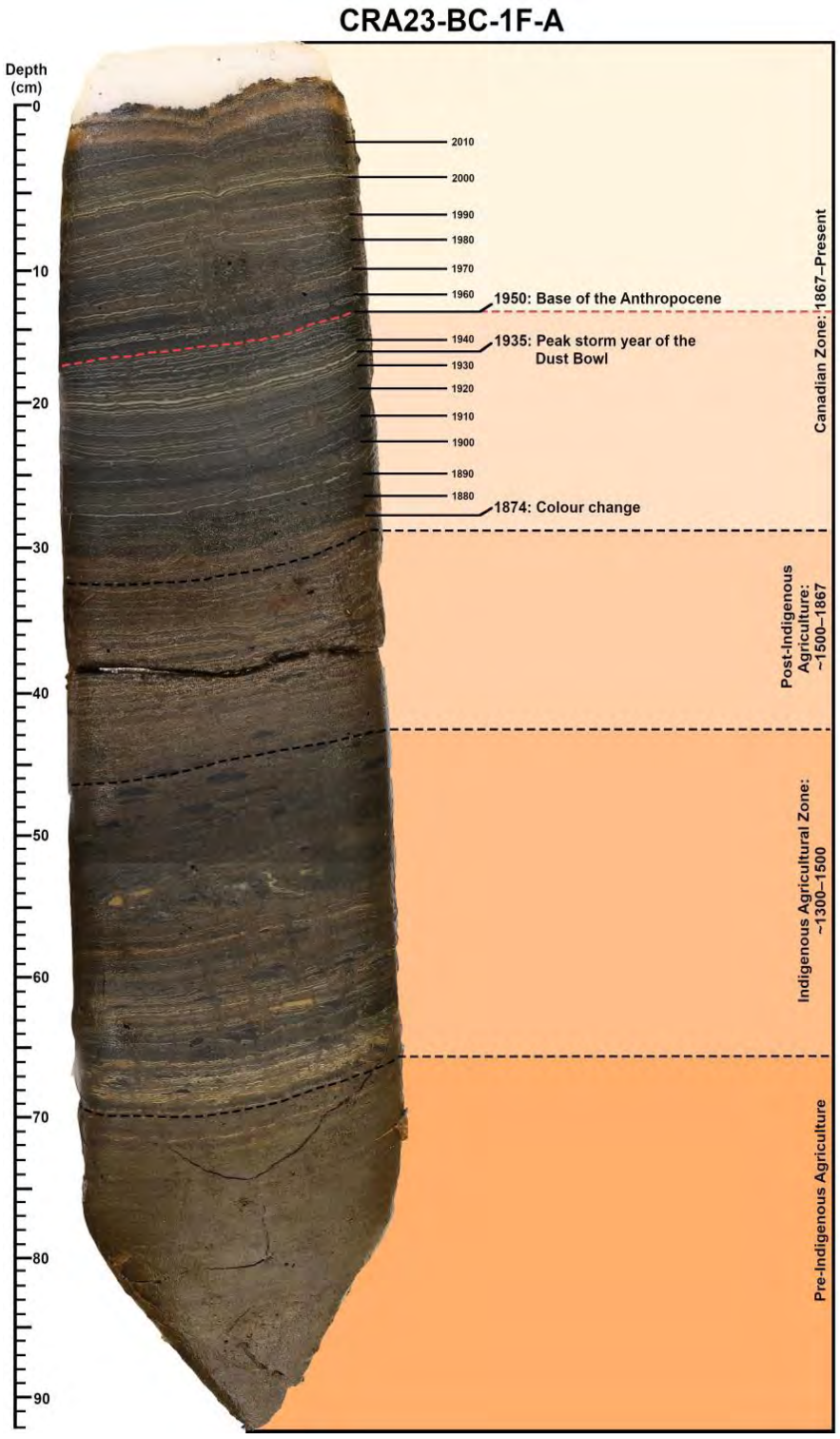
Freeze core CRA22-1FR-3, a longitudinal section of which is now curated at the National Biodiversity Cryobank of Canada, being examined by Nawaf Nasser, Monica Garvie, and Naomi Weinberg immediately following recovery. This is the core proposed by "Team Crawford" as GSSP (Global boundary Stratotype Section and Point) candidate to define the Anthropocene series/epoch. Note cedar boughs around the hole that were part of the healing ceremony performed by Indigenous Team Crawford member M. Garvie. Photo credit: Brenna Bartley.

Crawford Lake continued

centuries, when the increase in nutrient influx from an Indigenous agricultural settlement in the northwest part of the small watershed allowed distinct light-colored calcite laminae to cap dominantly authigenic organic matter. The record of earlier (pre-"Anthropocene") anthropogenic impact in a meter-long succession illustrates the difference between the globally synchronous tipping point in the Earth System proposed to define a new epoch and local/regional impact by humans for millennia.

Key factors in the choice of the varved succession of Crawford Lake are the ease of correlation of "Anthropocene markers" of atmospheric, hydrologic, and biologic change at annual resolution and radionuclide activity clearly recording variations in nuclear weapons fallout since 1945 and peaking at the end of the Cold War ($^{239+240}$Pu is the primary chronostratigraphic marker for the base of the proposed Anthropocene epoch/series, together with the fallout of other "bomb" radionuclides). Other important considerations include ease of access to the lake in a protected conservation area and curation of the freeze core proposed as GSSP in a secure cryogenic facility at the Canadian Museum of Nature and the well-understood hydrology and depositional setting. Given the broad societal significance of the AWG findings that humans have become the primary geological agent, another attractive feature of Crawford Lake is the opportunity for public communication of the evidence for a permanent planetary shift attributable to human agency via the interpretive and educational programs at the Crawford Lake Conservation Area, the nearby Royal Ontario Museum, and the Canadian Museum of Nature.

There is not universal agreement that the Anthropocene should be defined as an epoch, so there is no guarantee that the SQS and its parent body will accept the proposal. Irrespective of the final decision of the stratigraphic commissions, Crawford Lake now stands as a key site to discuss, debate and evaluate the effects of humans on planetary systems.



Interpreted "core card" of freeze core CRA23-BC-1F-A, with red dashes highlighting the base of the proposed Anthropocene epoch at the base of the white lamina deposited in the summer of 1950CE – which is the "present" used by convention in reporting radiocarbon ages since increased production of this radionuclide by anthropogenic radiation make the fraction of 14C useless as a dating tool in "Anthropocene" sediments.

Help shape a basinwide, coordinated 10-Year science plan for the Great Lakes

How can a 10-year plan for Great Lakes science help advance the purpose of the Great Lakes Water Quality Agreement to restore and maintain the chemical, physical, and biological integrity of the Great Lakes? What might the details of such a plan entail? The International Joint Commission's Great Lakes Science Advisory Board requests your input to help answer these vital questions.

Support for fundamental, process-oriented investigation and exploration has not kept pace with the current and future needs for understanding and managing the Laurentian Great Lakes. As a first step in addressing this issue, the Science Advisory Board developed a Great Lakes Science Strategy for the Next Decade (Science Strategy) that defined science needs for understanding changes in the Great Lakes for the protection of the economic, social, and environmental health of the region. Featured in a town hall discussion at IAGLR 2023, the Science Strategy identified gaps in basic information and the understanding required to document and forecast change, mitigate impacts, and restore and preserve the ecosystem. The strategy identified six major investment areas needed to help the region answer the questions "what will the future bring?" and "how will we respond?"

Now the Science Advisory Board is developing this strategy into a detailed, actionable 10-year Great Lakes Science Plan. IAGLR members are invited to participate in a short questionnaire to help the Science Advisory Board create a plan that is transnational in scope and identifies specific science needs and activities, their anticipated costs, and a description of sustainable management and governance arrangements. Please share your thoughts to help define science needs to protect our Great Lakes into the future.

More details about the Science Strategy are available in its summary report or the highlights two-pager.

Share your thoughts

Great Lakes AquaHacking Challenge 2023–2024

The Great Lakes AquaHacking Challenge is a technology innovation competition launching in September 2023 and is a unique opportunity to empower students and young professionals into entrepreneurship and water tech innovation.

Co-hosted by AquaAction and Northwestern Michigan College, this binational initiative is open to post-secondary students and young professionals in Canada and the U.S. We are teaming up with different partners within the Great Lakes region to recruit participants.

What is the AquaHacking Challenge? It's an immersive, hands-on program that engages students and young professionals from across disciplines to apply their skills to develop innovative tech-based solutions for critical freshwater issues. Through the nine months of the Challenge, students will have access to expert mentors and workshops. They will get entrepreneurship training and coaching as they prepare to pitch their solutions in our Shark Tank-style competitions. Finalist teams will compete for $50,000 in seed funding and a spot in a startup incubator.

It is an incredible opportunity to solve pressing water issues and launch a water-tech start-up venture!

Since 2015, AquaAction has run 12 editions of the Challenge from coast to coast in North America, from which 28 youth-led water tech ventures have been established. They are commercializing their technologies, partnering with municipalities and industry, mitigating climate impact, and developing solutions to the freshwater crisis.

CALL TO ACTION: Help get this information to your students. Please, reach out to juliette@aquaaction.org if you're interested in receiving our promotional toolkit to spread the word to your student community. We are open to having in-person info sessions on campus where possible and can coordinate an event with your team upon request.

Lakes Letter is published quarterly by the International Association for Great Lakes Research, a scientific nonprofit organization made up of researchers and practitioners studying the Laurentian Great Lakes, other large lakes of the world, and their watersheds. *Lakes Letter* is edited by IAGLR Communication Director Paula McIntyre with assistance from Alex Duncan and Jessica Ives, members of the *Lakes Letter* editorial team.

JGLR Call for Papers on coastal processes

An upcoming issue of the *Journal of Great Lakes Research* will featured a special section titled "Great Lakes Coastal Processes." Please view the Call for Papers to see about contributing to this issue, open for submission October 1, 2023 – March 31, 2024.

Upcoming *Lakes Letter* issue on microplastics

Have you done compelling research on microplastics in any of the world's large lakes? We're looking for a few feature articles and research briefs for the November issue of *Lakes Letter.* Get in touch with us soon at lakesletter@iaglr.org if you're interested in pitching an article.

Apply for a scholarship

Each year, IAGLR awards the following scholarships to students showing great promise early in their research careers. To apply, view the Regulations and Application Procedures for each scholarship linked below. **Deadline is December 1**.

- Norman S. Baldwin Fishery Science Scholarship (two at $3,000)
- David M. Dolan Scholarship ($3,000)
- IAGLR Scholarship ($2,000)
- IDEA+ Presenter Scholarship ($2,000)
- IDEA+ Research Scholarship ($2,000)

IAGLR 2024 Call for Sessions

Start thinking about submitting a session for IAGLR 2024, scheduled for May 20–24 in Windsor, Ontario. The conference theme is *Shared Lakes: One Water, One Health*. The session submission portal will open in September. Keep an eye out for an announcement within the next few weeks and visit the conference website to learn more.

Photo courtesy of Curt Clayton, Clayton Studio.