



Great Lakes Coastal Symposium

Braddock Bay | Rochester, NY | October 7-9, 2024

PROCEEDINGS

3rd Biennial

GREAT LAKES COASTAL SYMPOSIUM

October 7-9, 2024

Convened by:

Great Lakes Coastal Assembly

Hosted by:

*New York State Department of Environmental
Conservation, Audubon Great Lakes,
and SUNY-Brockport*



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Great Lakes Coastal Assembly

The Great Lakes Coastal Assembly is a binational, voluntary partnership of over 25 federal, state, provincial, and interstate agencies, tribes, NGOs, and universities working together to achieve healthy Great Lakes coasts and communities.



- Assembly Co-Chairs: Cherie Hagen, Wisconsin Department of Natural Resources and Janice Kerns, Ohio Department of Natural Resources – Old Woman Creek National Estuarine Research Reserve
- Assembly Coordinator: Liz Berg, U.S. Fish and Wildlife Service

Please visit our website to learn more: greatlakescoastalassembly.org

2024 Great Lakes Coastal Symposium

About the Symposium

In 2024, the Great Lakes Coastal Assembly (Assembly), in partnership with New York State Department of Environmental Conservation, Audubon Great Lakes, and SUNY-Brockport, proudly hosted the third Great Lakes Coastal Symposium (Symposium), an event for coastal stakeholders including managers, restoration practitioners, scientists, educators and university students. The Symposium is a biennial event that features keynote speakers, concurrent sessions, workshops, networking opportunities, and field trips tailored to the event location and theme.

The 2024 Great Lakes Coastal Symposium was held from October 7-9 at the Hyatt Regency in downtown Rochester, New York with a focus on the Braddock Bay Wildlife Management Area and Lake Ontario.

The theme was Great Lakes, Greater Resilience: Conserving Coasts and Sustaining Communities.

Collaboration with the Great Lakes Commission

The Great Lakes Commission (GLC) held their 2024 Annual Meeting in Rochester, New York from October 9-10. The Assembly collaborated with GLC to offer field trips and an evening reception where participants in the Assembly's Symposium and GLC's Annual Meeting networked and jointly explored local conservation efforts and network.

Rochester Embayment Area of Concern De-listing

On Tuesday October 8th, after decades of environmental cleanup and restoration, DEC, US EPA, and Monroe County held a press event to announce the delisting of the Rochester Embayment Area of Concern. As a result, the Rochester Embayment was officially removed from the binational list of "Areas of Concern" (AOC) and is no longer considered one of the Great Lakes' most environmentally degraded areas.

In 1987, the United States and Canada identified 43 AOCs around the Great Lakes affected by historical contamination. Decades of industrial and urban pollution in the Rochester Embayment watershed degraded water and sediment quality resulting in the loss of fish and wildlife habitat and populations, excessive algal growth, beach closings, and multiple other impairments to beneficial uses of the waterbody. Thanks to a collaborative effort from all levels of government, the embayment has

undergone a remarkable recovery. It is the seventh of the U.S. sites to be delisted and the second in New York.

Following the delisting announcement Tuesday morning, many of the Rochester Embayment AOC Remedial Advisory Committee (RAC) members, government officials, and other local partners joined Symposium attendees on the field trip to Braddock Bay and participated in the Symposium evening reception where RAC members received special recognition.

Symposium by the Numbers

| Registration Type | Number of Participants |
|----------------------------------------|------------------------|
| Full Conference Professional | 189 |
| Full Conference Student | 14 |
| Great Lakes Commission Attendee | 36 |
| TOTAL REGISTRANTS | 239 |

| Organization Type | Number of Unique Organizations |
|-------------------------------------------|--------------------------------|
| Education | 13 |
| Government | 30 |
| U.S. Federal Government | 5 |
| CA Federal Government | 2 |
| IL | 3 |
| IN | 3 |
| MI | 1 |
| Monroe County (NY) | 1 |
| NY | 4 |
| OH | 2 |
| PA | 2 |
| St. Regis Mohawk Tribe | 1 |
| WI | 1 |
| Ontario | 2 |
| Toronto and Region Conservation Authority | 1 |
| Nova Scotia | 1 |
| Halton Region Conservation Authority | 1 |
| Non-Profit | 23 |
| Commercial | 19 |
| Individual | 3 |
| TOTAL UNIQUE ORGANIZATIONS | 88 |

| Scholarships | Number | Value |
|--------------------------------------------------------------|--------|------------|
| Student Scholarships & Travel Stipends Offered | 5 | \$1,500.00 |
| Indigenous Scholarships & Travel Stipends Offered | 2 | \$600.00 |


Proceedings

Purpose

The proceedings provide a summary of keynote presentations, concurrent sessions, workshops, field trips, and bird walks offered at the 2024 Great Lakes Coastal Symposium. They also include a summary of the Great Lakes Coastal Resilience Workgroup meeting and findings from the Great Lakes Coastal Resilience Survey. This collection of abstracts and discussion highlights aims to disseminate the innovative ideas and projects showcased at the event.

Keynotes

Opening Remarks

| Speaker | Biography |
|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Timothy Walsh, P.E., MPA  | <p>Tim Walsh has served as the Regional Director for the New York State Department of Environmental Conservation Region 8, which includes the southern shore of Lake Ontario and stretches to the Pennsylvania border and includes Rochester and the Finger Lakes Region, since 2020. Tim's experience with DEC started in the Stony Brook Office on Long Island, and over the course of his career has also worked in DEC's Central Office and in the Region 8 Avon Office. Tim's experience includes responding to spills of petroleum, chemicals and other hazardous materials and managing the Division of Environmental Remediation's three Bulk Storage Programs in Region 8, including the Chemical and Petroleum Bulk Storage, Programs as well as the Major Oil Storage Facility Program. In addition, Tim has served as Chief of the Western Flood Protection and Dam Safety Hub Section (Western Flood HUB) implementing the four programs of the Division of Water's Bureau of Flood Protection and Dam Safety in DEC's Regions 6, 7, 8 and 9, which include the Coastal Erosion, Flood Protection, Dam Safety, and Floodplain Management programs and has served as the Regional Emergency Response Coordinator. Tim served as the technical lead for the REDI initiative for DEC for Monroe County. Tim is a licensed Professional Engineer in New York State. Tim earned a Bachelor of Science in Chemical Engineering from Clarkson University, and a Master of Public Administration from the State University of New York's College at Brockport.</p> |

Coastal Resilience Panel

| Panelists | Biography |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Greg Mayne, Environment and Climate Change Canada | <p>Greg is the Habitat and Species Unit Manager with Environment and Climate Change Canada's Great Lakes Ecosystem Management Section. He holds degrees in natural resource management, biology, and environmental science and toxicology. His career includes roles as a fisheries technician, a rainforest conservation biologist, and a wildlife toxicologist. Greg has co-led several initiatives to advance Great Lakes ecosystem management, such as</p> |





Area of Concern recovery strategies, Lake Huron Action Plans, binational and regional Biodiversity Conservation Strategies, and the Lake Huron-Georgian Bay Initiative for Community Action. Recently, he coordinated a study that assessed coastal wetland vulnerability to climate change trends and impacts, developed solutions for climate adaptation, and spearheaded the Canadian Great Lakes Baseline Coastal Habitat Survey. Currently, he integrates science, modelling, and action to promote coastal wetland restoration and adaptation to climate change as part of a new Canadian Great Lakes Freshwater Ecosystem Initiative.

**John Sommerville,
Natural Resources
Canada**




John Sommerville is a Science Planning Officer with Natural Resources Canada's (NRCan) Climate Change Impacts and Adaptation Division. He is the Atlantic region and infrastructure lead for NRCan's new Climate-Resilient Coastal Communities Program (CRCC). The CRCC program funds integrated regional-scale climate change adaptation projects on Canada's three marine coasts – Atlantic, Pacific, and North – and in the Great Lakes-St. Lawrence region. John supports Canada's Climate Change Adaptation Platform's Coastal Management Working Group and contributes to nature-based adaptation initiatives across the Platform. Most recently, John has served as an advisor for a Commission for Environmental Cooperation-led project focused on Nature-based Solutions to Address Flooding in Coastal Cities.

**Michael Padilla,
U.S. Army Corps of
Engineers**



Mr. Padilla began his career with the Corps in 1989 as a civil engineering student trainee in the Chicago District's Civil Design Section while completing studies at the University of Illinois at Chicago. Upon his graduation in June 1991, he began the Army's two-year Engineering Intern program. In 1993, he accepted a permanent position as a civil engineer in the Chicago District's Design Branch Civil Section. In 2000, Mr. Padilla accepted a project management position with Seattle District Programs and Project Management Branch. There he served as project manager for several significant Ecosystem Restoration and Hydropower construction projects. In 2008, he became Seattle District's Chief of Civil Projects Section, serving for two years before returning to Chicago District's Project Management Division where he currently serves. In 2008, Mr. Padilla served as a program manager in Afghanistan, managing the Roads, Counter Narcotics, Border Management, Support for Others, and USAID programs. In 2013, Mr. Padilla completed a developmental assignment as Chief of Chicago District's Programs and Project Management Branch. In October 2020, Mr. Padilla completed a one-year developmental assignment as the Chief of Programs Section of Project Management Branch at the Chicago District. Also in 2020, he completed the Westminster and Bubbly Creek feasibility studies, resulting in Chief's Reports and Congressional Authorization for the projects. In February 2021, Mr. Padilla was nominated for USACE Project Manager of the Year by the Corps' Lakes and Rivers Division. In January 2023, Mr. Padilla was selected as the Project Manager for the Great Lakes Coastal Resiliency Mega-Study at the GS-14 level. A native

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| | <p>of Illinois, Mr. Padilla received his Bachelor of Science in civil engineering from the University of Illinois at Chicago in 1991. Mr. Padilla is a certified Project Management Professional (PMP).</p> |
| <p>Samantha Miller, Great Lakes Commission</p>  | <p>Samantha is the GLC’s climate resilience project manager. In this role, she works with partners to carry out resilience goals as defined by the 2023-2027 GLC Strategic Plan and Action Plan for a Resilient Great Lakes Basin. Prior to the GLC, she worked with Ohio Environmental Council, where she directed the organization’s grants program. Other work includes a mixture of grant, program, and project work with non-profits, academic institutions, and political subdivisions, including Western Reserve Land Conservancy and Ohio Interfaith Power and Light.</p> <p>Her professional work is largely driven by exploring connections between environment and people, particularly through an environmental justice lens. She holds degrees from the University of Michigan and Calvin University. Samantha makes her home in Cleveland, Ohio, and is proud to live in the Lake Erie watershed.</p> |

Moderator: Jim Luke, U.S. Army Corps of Engineers

Description: Climate change is altering the Great Lakes region. Coastal disasters are becoming more frequent and more costly; slow-burn hazards like erosion and episodic flooding are also increasingly ubiquitous in the face of heavier precipitation, more rapidly fluctuating water levels, and stronger storms. Coastal resilience – an approach that holistically considers the natural, physical, cultural, and built environments along with the living beings that rely on them – has gained traction globally as the preferred way to address climate change and protect human and ecological communities.

Livelihoods and lifeways are at stake as climate continues to change in the region; ecosystems, communities, recreational amenities, public and private property, and cultural resources are all affected. Multiple players across the region – including at Canadian and U.S. federal agencies, Tribal nations, states and provinces, and non-government organizations – have been proactively involved in coastal resilience initiatives to better understand and plan for future climate change impacts on coastal areas. Increased investment in habitat restoration, shoreline management, and sediment remediation projects from sources like the Bipartisan Infrastructure Law (U.S.), Inflation Reduction Act (U.S.), Great Lakes Restoration Initiative (U.S.), and Climate-Resilient Coastal Communities Program (CAN) is helping grow our understanding of the impacts of and actions needed to address climate change, and how to make future investments more durable to varying conditions.

This plenary Coastal Resilience Panel consisted of agency personnel that have been leading large-scale Great Lakes resilience studies and efforts. The panelists provided updates on these efforts and their agency’s perspectives on coastal resilience and adaptability of restoration projects. The panel set the tone of the overall resilience theme for the Great Lakes Coastal Symposium and provided a foundational introduction to crucial dialogue that continued throughout the conference.


Discussion Highlights:

Panelists discussed efforts to engage environmental justice and disadvantaged communities. Examples of engagement included participatory science, targeted outreach to build awareness, and hosting place-based meetings with communities to identify shared values, goals, and local benefits. Efforts that provide multiple avenues to engage and engage communities early are best.

Panelists emphasized the importance of including Indigenous perspective in Great Lakes coastal resiliency efforts. They noted that the capacity of Tribes, First Nations, and Métis can be a limiting factor and stressed the need for relationship-building. Co-identifying cultural indicators of coastal resilience and measures of progress was suggested as one solution to bridging the gap.

This session ended with panelists sharing challenges and opportunities for coastal resilience in the Great Lakes. Examples of challenges included securing adequate funding, establishing clear and cohesive definitions, and improving coordination among partners. Opportunities for Great Lakes coastal resilience are driven by growing interest and passion supported by scientific research, and strengthened through the sharing of successes. To succeed, panelists emphasized that every level of government, Indigenous communities, and the public need to be involved.

Muskrats and Tennis Balls: Resilience and Water Management on Lake Ontario

| Speaker | Biography |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jim Howe, The Nature Conservancy  | Jim Howe is a senior policy advisor with The Nature Conservancy's North America Policy & Government Relations team, where he works on sustainable management of freshwater infrastructure across the U.S. Jim serves as team lead for TNC on the Sustainable Rivers Program, a partnership between TNC and the U.S. Army Corps of Engineers. Prior to this role, Jim served as chapter director for TNC in Central & Western New York, a region that includes the Great Lakes and Finger Lakes. Jim is co-author of the book "Balancing Nature and Commerce in Gateway Communities" (Island Press), a how-to guide designed to help communities maintain their quality of life in the face of growth and development pressures. He is a graduate of Cornell University's Department of Natural Resources and holds a master's degree in public policy from the University of Michigan. |

Abstract: In 2016, the U.S. and Canada adopted a new water management plan for Lake Ontario and the St Lawrence River. Designed in part to overcome decades of environmental impacts from the previous water management plan, Plan 2014 takes steps to promote more natural variability of water levels, thereby improving the health of coastal wetlands, shorelines, and ecosystems. It was hailed as one of the largest ecosystem restoration projects in North America, influencing more than 64,000 acres of wetlands and 700 miles of shoreline. Unfortunately, the adoption of the plan was followed by record water levels in the Great Lakes,

which led to calls by some stakeholders to revise the plan. Learn more about what's happening now with Plan 2014.


Discussion Highlights:

- **Monitoring:** The high-water cycle made it difficult to monitor whether predictions from Plan 2014 were correct. However, wetlands are responding.
- **Community Engagement:** The International Joint Commission (IJC) conducted 50-60 public hearings and partners are hopeful that they commit to more engagement as Plan 2014 undergoes further review.
- **Building Trust:** It's important to build trust with property owners; finding champions is one way to connect with the community.

Closing Thoughts: Variability is key. This is an extremely complex system – The IJC's ability to mitigate extreme water levels is limited and it's difficult for the public and elected officials to navigate this complexity. It's important to acknowledge tradeoffs – Indigenous communities and ecosystems have been losing since water level management. How can we shift the conversations from water level management to coastal resilience?

Evening Reception




| Speaker | Biography |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p data-bbox="203 1276 414 1459">Sean Mahar, New York State Department of Environmental Conservation</p>  | <p data-bbox="456 1276 1421 1787">Sean Mahar, a graduate of Siena College, is the Interim Commissioner for the New York State Department of Environmental Conservation where he works to manage an agency of over 3,000 employees engaged in all areas of environmental protection and management of the natural resources of the state of New York. Prior to becoming the Interim Commissioner, Sean was the Executive Deputy Commissioner where he worked to oversee internal and external agency operations, and guided implementation of key agency priorities. Sean previously served as Chief of Staff, and the Assistant Commissioner of Public Affairs for the Agency. Before joining DEC, Sean was the Director of Government Relations and Communications for Audubon New York where he led efforts to advance state and federal conservation policies and build support for wildlife conservation initiatives in the state, including climate change adaptation strategies. Sean was also an adjunct professor at Siena College teaching Environmental Policy and Management. He currently lives in Niskayuna, NY with his wife Jessica and daughter Stefanie.</p> |

Summary: New York State Department of Environmental Conservation’s Interim Commissioner Sean Mahar provided an overview of the work that’s been accomplished in New York’s Great Lakes under “Team DEC” and their many partners. New York’s investments have included funding from the New York State Environmental Protection Fund and the Clean Air, Clean Water and Green Jobs Environmental Bond Act. These investments have yielded environmental benefits, economic returns, and improved quality of life in New York. Highlights from the work to benefit over 700 miles of New York’s Great Lakes shoreline include:

- Delisting Rochester Embayment as an Area of Concern in 2024, the second AOC to be delisted since Oswego River in 2006.
- Securing over \$300M in funding from the Great Lakes Restoration Initiative for projects in New York’s Great Lakes.
- The State of the State announcement to support establishing 25M trees throughout the state through 2030.
- The Lake Ontario Resiliency and Economic Development Initiative which designed projects of the future and promoted nature-based solutions.
- Updates to the States Freshwater Regulations to be enacted in January of 2025.
- Updates to the Coastal Erosion Hazard Area maps to help protect homeowners and maximize ecosystem-based restoration.

Mahar concluded by saying that while he could continue discussing open space conservation, fisheries management, and other topics, his main message was to urge everyone to protect and manage our Great Lakes natural resources. He expressed his deep respect for the Great Lakes and for all those dedicated to their preservation.

Dish with One Spoon Thinking to Unite the Great Lakes Watershed

| Speaker | Biography |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p data-bbox="201 1213 378 1360">Dr. Shannon Seneca, University of Buffalo</p>  | <p data-bbox="449 1213 1422 1600">Dr. Shannon Seneca is an environmental engineer focused on healing the human relationship with the natural world. In 2023, Dr. Seneca joined the Indigenous Studies Department at the University at Buffalo as a Research Assistant Professor. She spent the prior two years working at the Center for Indigenous Cancer Research at Roswell Park Comprehensive Cancer Center after spending many years with the Seneca Nation Health System as the Environmental Health Director. Dr. Seneca’s research is focused on the health and well-being of Indigenous peoples through the advancement of Indigenous knowledge systems and ways of knowing. Most of her work examines fate and transport of contaminants in our environment and the subsequent analysis of exposure and health risk.</p> |

Abstract: The Waters connect us all through time and space. The Waters do not know boundaries set by man. Our Mother Earth is out of balance and the urgency in which we react is dependent on our relationship with each other and the natural world. Many Indigenous people have prophecies that speak of times that we are currently experiencing, and the overall

message is always surrounding being of Good Mind and maintaining our reciprocal responsibilities with our Mother Earth. We can respect each other's cultures, customs, and beliefs and share the bounty of what the Great Lakes offers ALL BEINGS through the guidance of the Dish with One Spoon thinking. The wampum that signified a treaty amongst many Indigenous Nations pre-contact provides the framework necessary to accomplish big changes for the good of many.


Discussion Highlights:

Understanding Cultures: There was a question about shifting from celebrating Columbus Day to Indigenous People's Day to reconcile relationships with Indigenous peoples. Dr. Seneca responded that this is a step, that there is history and mistrust between Indigenous peoples and European settlers that needs to be reconciled, and that communities need to understand cultures and come together. If we don't get these messages across and work together, we will fail, even if we live in a good way.

Returning Silver: Polishing the Great Chain is a traditional teaching that shows how we are connected by a silver chain and need to take care of and uplift one another. There was a question about how this teaching relates to the silver contamination in Cattaraugus Creek. Dr. Seneca responded that silver is a contaminant from the West Valley Demonstration project that needs to be returned to where it came from.

Closing Thoughts: Tribal Sovereignty means we need to include Indigenous perspectives at the outset and acknowledge and recognize traditional native lands. Consultation is needed to help ensure we are improving and protecting the environment for the next seven generations. The Rochester Embayment Area of Concern work could have better integrated these perspectives.

Braddock Bay's Revival: A Case Study in Multi-Habitat, Climate Resilient Restoration of the Great Lakes

| Speaker | Biography |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Dr. Rachel Schultz, SUNY Brockport</p>  | <p>Rachel E. Schultz, Ph.D., is an Associate Professor of Wetland Science at SUNY Brockport whose current research focuses on Great Lakes coastal wetlands. On Lake Ontario, Dr. Schultz has led post-restoration monitoring at Braddock Bay since 2020 and has investigated the impacts of wetland restoration techniques on factors like methane emissions and plant diversity. As co-PI on the Great Lakes Coastal Wetland Monitoring Program, she assesses wetland health across the region. Dr. Schultz also serves on the Ecosystem Technical Team of the Great Lakes Adaptive Management Committee of the International Joint Commission, where she contributes expertise to guide decision-making around water levels and flows. She has previously chaired the Women in Wetlands section of the Society of Wetland Scientists, advocating for the advancement of women in the field. Dr. Schultz has held faculty appointments at SUNY Plattsburgh and the University of Wisconsin-Stevens Point and holds a B.S. in Environmental Studies from Northland College, a Masters in Ecology from the Technical University of Munich and a Ph.D. from The Ohio State University. Her research has been featured in media outlets like the Chicago Tribune, and she has served as a consultant for educational programs such as the BBC's "Green Planet" and</p> |

"Plants are Cool, too." Learn more about Dr. Schultz's work at <https://schultzre.weebly.com/>.

Abstract: Dr. Schultz will detail the ongoing restoration efforts at Braddock Bay, a crucial coastal wetland on Lake Ontario including the implementation of a multi-habitat approach designed to improve habitat and plant diversity while increasing resilience to climate change impacts.

Discussion Highlights:

Revival of Braddock Bay: Monitoring of Braddock Bay by SUNY Brockport and partners has shown increases in native species cover, fish species richness, and shorebird species – including a visit by the Federally Endangered Great Lakes Piping Plover – due to channeling and potholing of the coastal wetland and restoration of the protective bay-mouth barrier bar.

Closing Thoughts: Additional recommendations for future actions include watershed management to reduce phosphorus loading, muskrat habitat restoration, and meeting people where they are to engage and communicate.

Organized Sessions

Rock – It’s Not Just for Revetments Anymore: Using Rock in Restoration Along Great Lakes Coasts

Organizer: Anna Harrison, NOAA

Description: This session highlighted how rock has been used for restoration in the past, as well as new and innovative uses for rock in coastal restoration projects. Rock can be a useful tool for habitat creation and to protect Great Lakes shorelines from storm surges and fluctuating water levels. Invited speakers showcased several shoreline habitat restoration projects funded through the NOAA Restoration Center that use rock to protect and create habitat.

Table 1. Speakers, presentation titles, abstracts, and summary of question and answers from Organized Session: Rock – It’s Not Just for Revetments Anymore: Using Rock in Restoration Along Great Lakes Coasts.

| Speaker | Presentation Title and Abstract | Question and Answer |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Anna Harrison, NOAA | Rock – It’s Not Just for Revetments Anymore: Using Rock in Restoration Along Great Lakes Coasts Rock can be a useful tool for habitat creation and to protect Great Lakes shorelines from storm surges and fluctuating water levels. Here we will highlight how rock has been used for restoration in the past, as well as new and innovative uses for rock in restoration. We will also showcase | Use of Native Stone: Project teams typically aim to source stone from nearby locations to minimize transportation costs. Re-use of Materials: While reusing concrete is generally avoided due to structural concerns, there are efforts to reuse rock materials in projects, such as creating topographical variations. |

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| | several restoration projects funded through the NOAA Restoration Center. | |
| Jim Luke, U.S. Army Corps of Engineers | <p>Great Lakes Reef Restoration Workgroup and Projects</p> <p>Climate change, changes in Great Lakes water levels, shoreline armoring, invasive species and many other factors have had significant impacts on the resilience of nearshore habitats and species. This talk will focus on the Great Lakes Reef Restoration Working Group, the purpose of the group, who participates, and goals. In addition, a brief overview on several reef restoration projects will be highlighted in a short presentation.</p> | <p><u>Hazard Mitigation for Water Activities</u>: Reefs are typically constructed 12-20 feet below the water's surface to avoid hazards for recreational navigation, and some are marked with buoys for additional safety.</p> <p><u>Initiating Reef Projects</u>: Getting started with reef projects and collaborating with the U.S. Army Corps of Engineers is largely opportunity-driven; interested groups are encouraged to reach out to Jim to talk more.</p> |
| Jill Estrada, Great Lakes Commission | <p>The Brandenburg Park Shoreline Restoration Project: An Innovative Solution to a Failing Seawall</p> <p>The Township of Chesterfield, Michigan had a tough decision to make regarding a failing seawall along one of their public parks. The choice was to replace the seawall with another or find an alternative solution. In partnership with the Great Lakes Commission and NOAA, an alternative solution was designed to naturalize the shoreline and install offshore habitat shoals for protection. Implementation of this project has resulted in 740 feet of softened shoreline and 3.2 acres of restored nearshore habitat.</p> | <p><u>Importance of Aesthetic Design and Safety</u>: Aesthetic considerations were important in the \$3.9 million project due to its location in a popular public park and concerns regarding safety.</p> <p><u>Monitoring Duration</u>: Monitoring of the project will take place for 1-2 years, with the Michigan Department of Natural Resources continuing fish sampling and sharing data with the Great Lakes Commission.</p> <p><u>Response to Storm Events</u>: Preliminary anecdotal evidence suggests that the site has significantly reduced wave energy, indicating potential benefits in alleviating storm surge issues.</p> |
| Terry Heatlie, NOAA | <p>Restoring Aquatic Habitat in the Detroit River at Sugar Island</p> <p>Historically, rock substrate was available in the Detroit River as</p> | <p><u>Project Lifetime</u>: While the exact timeline for the projects is uncertain, they are designed to withstand varying water levels</p> |

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| | <p>spawning and feeding habitat for Great Lakes fish and other aquatic organisms. This presentation will briefly describe the loss of habitat in the Detroit River and how the use of rock and other habitat restoration techniques can provide habitat as well as provide resilient protection from erosion and the impacts of a changing climate.</p> | <p>and extreme storm conditions anticipated in the future.</p> |
| <p>Mark McGovern, Ralph Wilson Park Conservancy</p> | <p>Ralph Wilson Park, Area of Concern Habitat Restoration and Shoreline Resiliency</p> <p>Ralph Wilson Park is a 100+ acre park located on the shore of Lake Erie in downtown Buffalo. Rooted in a multi-year community visioning process, the generational transformation of the park is world-class in its approach to resiliency, sustainability and equity. Located at the confluence of the Niagara River and Lake Erie, the park's hardened cement sea wall endures the full brunt of 180 miles of momentum gained as winds and storms cross shallow Lake Erie. Designed by Michael Van Valkenburgh Associates, in partnership with the City of Buffalo and multiple stakeholders, the renovation's scope includes extensive habitat enhancement, removal of the cement seawall and replacement with a resilient mix of armored stone and native plantings. This presentation will focus on the use of armored stone as a means to increase shoreline resiliency/lessen storm impact and flooding in the renovated park. We will also highlight habitat restoration efforts created to enhance fish spawning opportunities and wildlife habitat.</p> | <p><u>Planning and Outreach Timeline:</u></p> <p>Prior to project planning, there was an 8-month period dedicated to outreach and planning activities, including visits to other sites, although the specific budget for this phase is not known.</p> |

Nature-Based Solutions

Organizer: Rachael Franks-Taylor, NOAA

Description: Invited speakers shared information about their experiences with natural and nature-based solutions in the Great Lakes. The vision for the session was to focus on specific elements of natural and nature-based project implementation, including site selection, community engagement, design challenges, assembling funding and financing, and monitoring effectiveness. After all speakers presented their work, the session opened up for panel Q+A and bi-directional exchange with the session participants.

Discussion Highlights:

Trade-offs in Nature-Based Solutions (NBS): NBS are not universally applicable; their effectiveness can be limited by increasing energy levels in specific environments. Effective messaging is crucial for gaining public support.

Seawall Longevity: The installation of seawalls often leads to immediate erosion challenges, highlighting trade-offs between resource use and coastal dynamics, as seen in examples like Old Woman Creek, which have limited lifespans.

Location-Specific Conversations: NBS solutions are not viable in all locations, particularly for residents living on barrier beaches, where the suitability of these solutions can vary significantly.

Future of NBS: The speakers anticipate a focus on dynamic revetments and engineered solutions that integrate natural features and ecosystem values over the next 20 years.

Community Perception: Communities are becoming more receptive to NBS after engaging in site visits and reviewing initial designs.

Challenges of NBS: While NBS provide some assistance, they do not address all issues, particularly the lack of funding or mechanisms for managed retreat, which can complicate discussions about coastal management.

Table 2. Speakers, presentation titles, and abstracts from Organized Session: Nature-Based Solutions.

| Speaker | Presentation Title and Abstract |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Brian Majka, GEI Consultants and David Clark, New York State Department of Environmental Conservation</p> | <p>Development of a Web-Based Decision Support Tool for Natural and Nature-Based Features on New York’s Great Lakes Shorelines</p> <p>The use of natural and nature-based features (NNBF) for erosion control and flood management along coastal shorelines is growing nationwide. However, as an emerging practice, there are limited tools available to guide landowners and practitioners in the selection of NNBF techniques. The State of New York is currently developing a web-based decision support tool (DST) to better inform the selection of NNBF practices with the intent to increase resiliency in coastal communities. The DST is semi-quantitative, combining engineering practices with ecological considerations in a tool that will be functional and easy to use for both non-professional landowners and professional designers and</p> |

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| | <p>practitioners. This presentation will review NNBF practices on Great Lakes Shorelines and will review the tool, which is currently under development.</p> |
| <p>Zoë Goodrow Kuntze and Bridget Brown, Great Lakes St. Lawrence Cities Initiative</p> | <p>Enhancing Great Lakes Coastal Resilience Through Local Capacity-Building and Nature-Based Solutions</p> <p>The Great Lakes shorelines have seen increased damages in recent years from flooding and erosion due to historically high lake levels, severe storms, and climate change. Cities are on the frontlines facing these issues and the most vulnerable communities often have even fewer resources to address them. This presentation will provide an overview of two programs that provide direct technical support to municipalities in the Great Lakes region. The two programs are the Initiative for Resilient Great Lakes Coasts, sponsored by the National Oceanic and Atmospheric Administration and the Great Lakes and St. Lawrence Cities Initiative, and funded through the Great Lakes Restoration Initiative, and the Great Lakes and St. Lawrence Cities Initiative's Resilient Coastal Projects Initiative, funded in large part through the National Fish and Wildlife Foundation. Both programs engage with a cohort of communities to advance their coastal resilience projects and build local capacity for incorporating nature-based solutions into coastal hazard mitigation. This talk will share the program models and municipal engagement approach, and include a discussion of some of the challenges and opportunities identified thus far as this work continues. The program leads and partners will present engineered designs of innovative nature-based solutions with multiple co-benefits.</p> |
| <p>Brenden Cousino, LimnoTech</p> | <p>Engineering and Design for Nature-Based Solutions</p> <p>Historically, shoreline armoring and permanent structures were the way to protect public and private property from coastal hazards, but these approaches are expensive and have unintended consequences for adjacent shorelines and the ecosystems. As communities and private landowners warm up to the idea of nature-based solutions to reduce risk, it's important to match suitable approaches to the problems they're trying to solve. Engineers have the technical know-how to help landowners navigate their options and weigh the pros and cons of each. This may extend to conversations with funders, contractors, and permittees to provide information and create ease around these newer solutions to the Great Lakes' amplified coastal hazards. Hear from one such engineering expert on how he engages with communities to design solutions that meet their needs.</p> |
| <p>Brian Majka, GEI Consultants</p> | <p>The Importance of Monitoring Shoreline Nature-Based Approaches – Examples from Ecological Restoration Projects in the Muskegon Lake Area of Concern</p> <p>From 2006-2022, over 30 habitat restoration projects were completed in support of the delisting of the Muskegon Lake Area of Concern. This included approximately 27,735 linear feet of shoreline restoration and 94.8 acres of emergent wetland restoration around Muskegon Lake, a</p> |

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| | <p>lacustrine estuary directly connected to Lake Michigan. In 2019, the West Michigan Shoreline Regional Development Commission and Muskegon Lake Watershed Partnership received funding from NOAA to monitor 19 of the restoration projects to assess the development of each site. This presentation will describe the monitoring methodology, results, and lessons learned from this effort.</p> |
| <p>Rewa Phansalkar, Cornell University</p> | <p>Flood Resilience on the Lake Ontario Shoreline: Barriers to Implementing Non-Structural Strategies</p> <p>Climate-induced flooding along the shoreline of Lake Ontario caused significant damage to infrastructure and property in 2017 and 2019. As climate change continues to impact lake levels in unforeseen and uncertain ways, the region faces a threat from increased erosion, flooding, and low water levels. It is critical to establish dynamic adaptation strategies that make communities better prepared to face the impacts of climate change. Even with many on-going state-level initiatives such as the Resiliency and Economic Development Initiative (REDI), Coastal Lakeshore Economy and Resiliency Initiative (CLEAR) and the Great Lakes Action Agenda (GLAA) pushing for nature-based shorelines, ecosystem-based shoreline management and resilient land use practices, structural solutions such as engineered shorelines remain the most popular mitigation strategy for shoreline communities and property owners. This project uses detailed interviews with adaptation professionals, county and regional planners and natural resource managers along the shoreline to identify pertinent barriers to the adoption of non-structural solutions for coastal adaptation. Using a barrier-analysis approach developed by Moser and Ekstrom (2009) - we outline barriers at various stages of the adaptation process, from strategy selection to implementation. We find that informational and resource constraints, misaligned incentives, and institutional and legal hurdles prevent a widespread adoption of non-structural adaptation strategies and suggest ways to overcome these barriers through alternative approaches to traditional adaptation governance mechanisms.</p> |

Supporting Sediment Transport

Organizer: Stevie Adams, The Nature Conservancy

Description: During this session, five experts discussed their latest research and insights to help the audience understand longshore sediment transport (past, present and future), how alternative sediment and coastal management approaches can be more strategic and adaptive, what options planning and policies offer, and which legal doctrines authorize and constrain state and local actions.

Discussion Highlights:

When Great Lakes shorelines function naturally, they offer vital ecosystem benefits, such as protection from storms, fluctuating water levels, and erosion—benefits that are increasingly important due to climate change. Longshore sediment transport involves the movement of sand, gravel, and cobble along the shoreline, driven by currents, wind, and waves. This process replenishes protective features like beaches, barrier bars, and dunes, which are essential for coastal habitats, wetlands, flood protection, and community resilience. However, shoreline hardening is the main approach currently used by landowners and coastal managers to combat erosion, which reduces sediment flow, alters hydrodynamics, and can exacerbate erosion for neighboring properties. Property owners facing increased erosion due to upstream hardening often feel compelled to harden their own shorelines or risk losing their investments.

Session presenters and participants discussed how partners may come together to address this complex and challenging problem and what questions still need to be answered before resilient Great Lakes shorelines can be counted on. Topics included managed retreat, willingness of property owners to invest more to remain in their locations, the role of nature-based solutions, and implications of federal policy on these issues.

Table 3. Speakers, presentation titles, and abstracts from Organized Session: Supporting Sediment Transport.

| Speaker | Presentation Title and Abstract |
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| <p>Pete Zuzek, Zuzek Inc.</p> | <p>Great Lakes Littoral Cells: Overview and Implications for Coastal Management, Adaptation, and Ecological Restoration</p> <p>A littoral cell is a conceptual sediment compartment that defines the supply, longshore transport, and deposition of sand and gravel along the coast in the Great Lakes. Within a littoral cell, there is typically an updrift supply area that features a long-term erosion trend, a net direction of longshore sediment transport (LST), and historically a downdrift depositional area that features a positive sediment budget and accretion trend. Understanding the sediment dynamics in littoral cells and the role of these natural physical processes have on protecting coastal ecosystems, beaches, and infrastructure is critical to developing equitable and sustainable long-term adaptation strategies to natural hazards and climate change. The presentation will provide examples of littoral cell boundaries and sub-cell boundaries, which occur when artificial barriers are constructed that reduce the natural flow of sediments in the nearshore. New sources of sediment from shore erosion and riverine systems will be reviewed, including anthropogenic influence. The role of lake levels and storms in re-distributing sediment in the cells will be highlighted, along with potential impacts of climate change. Finally, characteristics of depositional sinks in littoral cells and examples will be highlighted.</p> |
| <p>Ethan Theuerkauf,</p> | <p>Probabilistic Predictions of Beach Recovery to Inform Great Lakes Coastal Resilience Planning</p> |

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| <p>Michigan State University</p> | <p>Coastal erosion and the impacts associated with it such as infrastructure damage and habitat loss are ubiquitous issues throughout the Great Lakes region. During periods of high lake level, these issues are at the forefront of management concerns within coastal communities. While decades of coastal change research have been conducted throughout the Great Lakes region and our scientific understanding of the driving processes of coastal erosion continues to grow, we generally lack the ability to accurately predict future coastal changes. This stems primarily from the challenge in predicting future lake levels, which are inherently tied to weather patterns that cannot be reliably forecasted beyond 6 months. While an understanding of the predictive limitations helps to set realistic expectations for coastal managers, it does not provide meaningful planning assistance which is requisite for working towards coastal resilience. To address this, our recent research has focused on developing simple methods for predicting the likelihood of beach recovery following high lake levels at coastal sites along the Great Lakes. The foundation of our approach is to utilize publicly available datasets, such as NOAA lake level data and the USACE Wave Information Studies hindcast wave data, and simple to collect beach and nearshore morphology data that can be generated either by research teams or community scientists. With these data, we utilize fundamental morphodynamic relationships to predict the active zone of coastal sediment transport under past and present wave and water level conditions. The likelihood of sediment transport can then be estimated for varying morphodynamics conditions (e.g., erosive, accretionary) and compared to present morphology to infer whether beach recovery is probable for a site. Case studies along the eastern coast of Lake Michigan were used to develop and evaluate this approach and revealed that moderately erosive conditions that preferentially pull sand lakeward are the most dominant morphodynamic condition. Accretionary conditions that lead to beach recovery occur less frequently (generally less than 25% of the time) and only operate on a narrow portion of the nearshore, within 100 m of the shoreline. These results mechanistically explain why shoreline armoring leads to the loss of beach area and minimizes beach recovery as armoring drives sand lakeward of the zone where accretionary waves operate. This approach provides coastal managers with a probabilistic tool for predicting future coastal change and is currently being scaled up and operationalized throughout the State of Michigan.</p> |
| <p>Sean Burkholder, University of Pennsylvania and PROOF Projects</p> | <p>Sensitive Structures: Contextual Responses to Sediment Management This presentation will cover some recent examples of work around the Great Lakes that prioritizes more sensitive and contextual approaches to sediment management that aim to work with coastal forms and processes to protect, enhance, and leverage the ecological and cultural values that make coastal landscapes valuable. These approaches address the tendency for coastal management decisions to “improve” toward the</p> |

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| | <p>most efficient and transferrable possible outcomes as opposed to the most strategic and contextually sensitive. Coastal management features and initiatives should instead be understood as an extension of the cultural attitudes of a particular place in response to a set of coastal conditions or challenges specific to that place. Otherwise, coastal management, understood as a universal and transferrable collection of efficiency-motivated strategies, threatens to sacrifice the local conditions that make places special to residents and visitors. This one-size-fits-all motivation also closely aligns with the prevalent funding mechanisms that prioritize large capital projects designed and scaled to address a worst-case modeled scenario. While often providing the protection planned, these strategies are large, expensive, and often lack monitoring or adaptation funding needed to both demonstrate efficacy or respond to unplanned conditions. By way of example, this presentation will look at a collection of projects that have attempted to prioritize more strategic and adaptive practices of coastal management, particularly in relationship to existing coastal processes such as sediment transport, and including practices understood as “natural and nature-based approaches”. Additionally, it hopes to set the stage for a larger conversation about the challenges to such approaches and how they can be addressed. Underpinning all of this is a simple assumption that coastal landscapes are not just important things, but what makes them important is the relationships these places engender. Coastal management is not something done to protect something else, but instead is part of the important thing itself and would benefit from acknowledging its place as a cultural and ecological project – a project that has the ability to reinforce and celebrate what we all love about coastal landscapes and what makes them different from one another.</p> |
| <p>Mary Khoury, The Nature Conservancy</p> | <p>Going Beyond the Polarity of “Beach or Beach House” to Achieve Climate Resilient Great Lakes Coasts</p> <p>Given what we now understand about the dynamism of Great Lakes coasts, we ask: “How could the policies governing management of these coasts empower communities to think and act in a way that maintains the ecological health of the coastal zone?” Through a comprehensive review of federal, state and local policies governing coastal management in the Great Lakes States, we have evaluated the matrix of protections across states. While this review has revealed gaps in protections, contradictory intents, inherent conflicts between the public trust and private property rights, and tensions between state and local rule, we also have discovered model policies. This presentation will briefly summarize the matrix of policies that govern shoreline protections, dredging and coastal placement, coastal wetlands and beach nourishment highlighting model policies and opportunities for their expansion as urgency grows to increase climate resiliency for people and nature.</p> |

**Richard Norton,
University of
Michigan**

Planning, Policy, and Legal Challenges in Managing Great Lakes Coastal Shorelands

Because of a confluence of development pressures and irrepressible physical dynamics, growing numbers of Great Lakes shoreland properties and structures, built on shifting sandy shores, are at heightened risk of loss from coastal storm surge, inundation, erosion, and shoreline recession—a phenomenon akin to sea level rise on ocean coasts. In response, property owners often install (or seek to install) extensive hardened shoreline armoring structures like seawalls and revetments to arrest those erosional processes. Those structures, however, substantially impair, if not ultimately destroy, natural coastal beaches and other shoreland resources, as well as accelerate erosion of neighboring shoreland properties. The clash of imperatives to protect shoreland properties versus conserving coastal resources signifies a wicked dilemma that Great Lakes coastal states and communities cannot avoid: armor or withdraw? More precisely, should a state or locality allow the continued armoring of Great Lakes shorelines in an attempt to fix in place shoreland properties, at great and ongoing private and public expense, and ultimately risk the loss of public trust resources? Or alternatively should it allow—and should it compel shoreland property owners to allow—natural processes to proceed, even though doing so will result in the natural conversion of privately owned shorelands into state-owned submerged bottomlands sooner than would otherwise occur? In many places, states and communities cannot hope to simultaneously protect both the beach and the beach house along naturally receding Great Lakes shorelines; they must choose which interest to prioritize first, recognizing the cost of doing so by losing the other. Given that conundrum, this presentation will provide a survey overview of the institutional arrangements that shape federal, state, and local management of Great Lakes coastal shorelands; key planning methods and policy options that states and localities can employ to reconcile competing demands between development pressures, public and private investments, property rights, and natural systems; and legal doctrines that authorize and constrain state and local actions, including especially the public trust doctrine. The presentation will also briefly identify and consider litigation that will likely arise given growing pressures to armor and—potentially—enhanced natural shoreline protection efforts that states and localities might undertake in response, along with the potential adjudication of those claims.

Landscape Conservation Planning and Prioritization

Organizer: Liz Berg, U.S. Fish and Wildlife Service

Description: There are many ongoing conservation planning and prioritization efforts across the Great Lakes that encompass various geographic scales, ecological scopes, and levels of stakeholder engagement. During this session, invited speakers showcased a variety of

conservation plans, prioritization efforts, and the data, tools and partnerships that support them. After all speakers presented their work, the session opened up for a panel discussion and exchange with session participants.

Discussion Highlights:

Process Over Outcomes: Opportunities and urgency can drive the timeline of landscape level planning and prioritization projects. However, prioritizing the process and moving at the speed of partners is crucial (e.g., including scheduling tasks when team members are not in the field). Effective communication to and among partners is vital for sharing knowledge and data.

Demonstration Projects: These projects are valuable for showcasing methods and approaches that may be applied to accomplish goals of landscape level planning and prioritization efforts.

Rapid Prototyping: This approach allows for quick testing and iteration of ideas in project development.

Importance of Monitoring: Required monitoring is essential for enhancing learning and understanding project impacts.

Table 4. Speakers, presentation titles, and abstracts from Organized Session: Landscape Conservation Planning and Prioritization.

| Speaker | Presentation Title and Abstract |
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| <p>Doug Pearsall, The Nature Conservancy</p> | <p>Prioritizing What, for Whom, and to What End? A Synopsis of 25 Years of Great Lakes Coastal Conservation Planning</p> <p>To address concerns over the conversion and degradation of Great Lakes coastal ecosystems, researchers and conservation professionals have developed maps, data and tools to guide protection, restoration and policy decisions. Early basin-wide prioritizations include the Great Lakes Ecoregional Plan, Biodiversity Investment Areas, and the Great Lakes Biodiversity Conservation Strategies, which varied in scope with respect to conservation targets or features and the breadth of strategies intended to be informed. Some prioritizations focused on smaller areas within the Great Lakes – such as the Green Bay Landscape Conservation Design and the Western Lake Erie Coastal Conservation Vision – to address urgent or severe threats particular to those areas. Over time, prioritizations have evolved to incorporate climate change, address ecosystem services and benefits to people. Additional prioritization efforts are underway or being planned and will continue this growth to incorporate ecological process and ecosystem functions. To provide context and potentially inform current and future prioritization initiatives, we will present a synopsis of past and ongoing initiatives, comparing them with respect to their geographic and strategic scope, breadth of consideration of biodiversity, human well-being, and other parameters, and the extent to which they integrate terrestrial and aquatic ecosystems. We will also introduce a prioritization effort by The Nature Conservancy, intended to increase</p> |

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| | cross-boundary collaboration and impact of TNC’s nascent Great Lakes Coastal Resilience team, focused on the US coastal and nearshore areas. |
| <p>Emily Fell, New York State Department of Environmental Conservation and Anthony Eallonardo, Ramboll</p> | <p>The Sterling-Wolcott Integrated Watershed Action Plan: Implementing the Great Lakes Action Agenda (GLCAA)</p> <p>NYSDEC's Great Lakes Program is leading a pilot effort to develop ecosystem-based management (EBM) plans for two watersheds of regional interest, Cattaraugus Creek and Sterling-Wolcott Creek watersheds. These watersheds were identified as regional priorities for EBM by GLAA sub basin work groups, and will be proving grounds for demonstrating a collaborative, EBM approach at the watershed scale. The Integrated Watershed Action Plans (IWAPs) are based on NOAA's Integrated Ecosystem Assessment framework for applying EBM and actions identified will directly support NY's Great Lakes Action Agenda. This framework includes identifying watershed goals, identifying and evaluating indicators of ecosystem conditions, identifying and characterizing ecosystem risks, as well as working with stakeholders to identify management strategies and projects that align with the needs of the watershed and overarching framework of the GLAA. Over 100 different existing data sets were compiled to evaluate the current status of ecosystem services as well as direct and indirect drivers of change. Across the two IWAPs, several dozen actions of watershed-scale impact were identified. The Sterling-Wolcott watershed is centrally located on the southern shoreline of Lake Ontario and is exemplary of many ecological services and management issues encountered on Great Lakes shorelines. While this IWAP explores ecological processes and management risks along the shoreline, it also considers key linkages between the coast and interior portions of the watershed. For example, significant coastal fish and wildlife habitats are protected by coastal barrier systems however these systems require additional study as several have been breached during 2017 and 2019 flood events and important sediment sources are being lost. Overall, wetlands comprise approximately 14% of the Sterling-Wolcott watershed, however, hydric soils cover approximately 43% of the watershed area, which suggests that there is a significant opportunity for wetland restoration and improved habitat connectivity between inland and coastal systems. Forests comprise 41% of the Sterling-Wolcott watershed and play a key role in regulating water quality and quantity flowing to the coastal systems, however forest regeneration in the watershed is poor which is concerning for long term forest resilience. Conservation planning and implementation through New York’s Agricultural Environmental Management program (Tiers 3A, 3B, 3C and 5B) tends to be below 10% on agricultural lands comprising the Sterling-Wolcott watershed, which means that there is a significant opportunity for expanded actions to protect the quality of water flowing to the coastal system. Historical agricultural expansion has been a key part of the cumulative factors (including development and lake</p> |

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| | <p>level regulation) that have led to the expansion of invasive cattail within the coastal wetlands, which further underscores the important linkages between interior and coastal watershed processes. This presentation will explore the process of developing the Sterling-Wolcott IWAP, the ecosystem indicator and risk analyses, as well as recommended projects emerging from this effort.</p> |
| <p>Samantha Nellis, Huron Pines and Danielle Fegan, U.S. Fish and Wildlife Service</p> | <p>Obtawaing Biosphere Region: Fostering Relationships and Advancing Sustainability at the Heart of the Great Lakes</p> <p>The Obtawaing Biosphere Region is a UNESCO recognized geographic area of globally significant ecological and cultural landscapes. Centrally located in Northern Michigan within the North American Laurentian Great Lakes Basin, it lies at the convergence of two peninsulas and three Great Lakes highlighting the importance of water-land environmental interfaces. The OBR is a non-regulatory, non-governmental consortium of organizations that provides a forum for collaboration and service to people and communities in our region. A current focus of our network is focused on the 1,700 miles of shoreline included in the region. Partners are developing tools and planning resources in order to apply best practices and local knowledge through a bioregional approach.</p> |
| <p>Gini Breidenbach, Minnesota Land Trust</p> | <p>Lake Superior Headwaters Sustainability Partnership: Visioning for the Future</p> <p>The Lake Superior Headwaters Sustainability Partnership (Partnership) is a collaborative of over 30 bi-state and tribal partners working together on landscape level conservation. The Partnership is centered around the St. Louis River estuary, the largest freshwater estuary in North America and tributary to Lake Superior, the most pristine of the Great Lakes. The planning region is 1,081 square miles in area, spanning the Minnesota and Wisconsin state lines and including a portion of the Fond du Lac Band of Lake Superior Chippewa Reservation. Situated between the urban areas of Duluth, MN, and Superior, WI the estuary itself is home to the country’s busiest and largest bulk inland port. Boasting unique wetland and wildlife habitats, the setting is often described as a wilderness in the heart of an urban area. The principles of sustainability, climate resiliency, and equity guide the Partnership’s approach to managing natural resources by including economic development and community health and well-being considerations. Since a large portion of the Partnership region is urbanized, considering natural resources conservation within the context of community health and economic development is imperative. A diverse group of partners in the region have established goals and objectives for 12 Priority Concerns for the region identified through a thorough stakeholder engagement process. These landscape level goals and objectives will guide prioritization of projects undertaken by partners such that landscape scale sustainability, climate resiliency, and equity are advanced. The Partnership is currently working to develop detailed, actionable landscape stewardship visions for large planning areas to guide</p> |

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| | <p>conservation efforts in the Partnership region. Benefits of this process include: furthering landscape level conservation priorities established by the bi-state and Tribal Nations planning framework of the Partnership; supporting coastal climate resilience and sustainability for local communities with an intentional, inclusive approach; and broadening participation by underserved communities in the region through implementation of environmental justice principles and values and sustained meaningful community engagement. Over time, this approach will result in implementation of community-supported habitat conservation and restoration projects that are climate resilient and aligned with a broadly accepted regional vision. Further, the approach aims to deepen and diversify involvement of communities benefiting from the work.</p> |
| <p>Lacey Hill and Mitchell Baalman, U.S. Fish and Wildlife Service</p> | <p>The Wisconsin Lake Superior Collaborative’s Headwaters to Coast Initiative</p> <p>A landscape conservation design (LCD) is a partner-driven approach to achieve a sustainable, resilient landscape that meets the ecological and social needs of current and future generations (lccnetwork.org). In 2023, the USFWS began drafting an LCD for the Wisconsin Lake Superior basin to be more strategic and inclusive in their conservation delivery. This would become the Headwaters to Coast Initiative, a blueprint for continued collaborative conservation. This initiative was later adopted by the Wisconsin Lake Superior Collaborative, a long-standing partnership group in the region, who are now helping to lead the effort and ensure that all partners, including the local community, and engaged. The initiative was kicked-off by gathering partners from all local organizations, governments, and agencies to discuss and develop six shared conservation priorities that serve as the foundation for the blueprint. For this presentation, we will discuss our process for launching this initiative, the progress the initiative has made, and our plans and milestones.</p> |
| <p>Anders Holder, Richard Kavanagh, and Greg Mayne, Environment and Climate Change Canada</p> | <p>Identification of Ecologically Significant Areas and Areas Under Pressure Along the Canadian Great Lakes Coastal Margin</p> <p>The Canadian portion of the Great Lakes coastal ecosystem, spanning over 8,500 km and encompassing more than 1 million hectares, has experienced significant habitat loss since European settlement. Over 70 percent of wetlands, 80 percent of forests, and 98 percent of grasslands have been lost across the region. Conserving, protecting, and restoring the remaining habitat is important to the health of the Great Lakes, and to the people, communities, and economies that depend on them. To better understand the current extent, diversity, and condition of coastal habitats, Environment and Climate Change Canada completed a first ever Canadian Great Lakes Baseline Coastal Habitat Survey. The Survey leveraged a newly developed Great Lakes Shoreline Ecosystem classification and inventory to establish a benchmark of existing habitat and to measure and report on habitat changes over time. The survey</p> |

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| | <p>results were then used to characterize and rank coastal ecological significance and coastal pressure, and to identify conservation needs and opportunities. This information helps resource management agencies and conservation practitioners determine where to strategically focus their efforts and resources to maintain and enhance the resilience of native species, natural systems, and processes.</p> |
| <p>Benjamin Frey, U.S. Fish and Wildlife Service</p> | <p>Saginaw Bay to Western Lake Erie Coastal Wetland Conservation Blueprint</p> <p>This project focuses on the restoration and conservation of coastal wetlands in the Great Lakes region, specifically spanning from Saginaw Bay, Michigan, to Western Lake Erie, Ohio. The importance of these wetlands lies in their multifaceted ecological functions, such as nutrient capture, carbon sequestration, erosion protection, and support for diverse species. Over time, many wetlands in these areas were drained for urbanization or agricultural purposes, compromising their natural habitat. The Great Lakes Restoration Initiative has collected extensive data on these wetlands and developed decision support tools for coastal wetland managers. This Conservation Blueprint, initiated in 2016, aimed to identify conservation targets and indicators for these wetlands. Phase I, completed in 2 years, led to the development of coastal wetland indicators to track changes in wetland conditions. In 2022, Phase II was launched, focusing on refining indicators, creating maps & mapping tools, and developing an Implementation Plan. Phase III aims to ensure that the final products align with diverse stakeholder interests, fostering broad investment in shared priorities, and strategic collaboration. The specific goals for Phase III include completing a comprehensive Implementation Plan, developing a web-based platform with final maps and interactive tools, and establishing a strategy for the long-term sustainability of the Blueprint partnership. This final phase seeks to enhance coastal wetland conservation efforts and promote effective, collaborative conservation practices across the Saginaw Bay to Western Lake Erie basin.</p> |
| <p>Janice Kerns, Ohio Department of Natural Resources – Old Woman Creek National Estuarine Research Reserve</p> | <p>The H2Ohio Wetland Restoration and Wetland Monitoring Programs: Managing Wetland Restoration for Water Quality</p> <p>The H2Ohio Initiative is as a comprehensive, data-driven approach to reduce harmful algal blooms, enhance water quality, and improve water infrastructure in Ohio. H2Ohio functions as an integrated, collaborative water-quality partnership among state agencies, non-profit conservation organizations, the research community, and others. H2Ohio focuses specifically on incentivizing agricultural best management practices, upgrading water infrastructure and, under the auspices of the Ohio Department of Natural Resources (ODNR), restoring and enhancing wetland and related habitat to improve surface water quality. Since 2019, ODNR and their project partners have initiated over 180 grant-funded natural infrastructure projects, partnered on more than 190 private lands wetland and riparian restoration projects, setting in motion</p> |

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| | <p>approximately 16,500 acres of wetland and associated habitat restoration. The ODNR prioritizes restoring wetland ecosystem function as a relatively low-cost mechanism to reduce surface water nutrient loading and eutrophication over the long term while also generating numerous beneficial add-on effects, such as the creation of habitat for endangered species and providing increased recreational opportunities. The ODNR H2Ohio Program has partnered with the Lake Erie and Aquatic Research Network’s H2Ohio Wetland Monitoring Program to measure the impact of H2Ohio restoration projects on nutrient loading. This monitoring program increasingly enables ODNR, its partners and others to make the better project selection and restoration design choices to optimize water quality benefit.</p> |
| <p>Olivia Schloegel, H2Ohio Wetland Monitoring Program</p> | <p>Cultivating Science-Policy-Practitioner Partnerships in Wetland Restoration</p> <p>Setting a goal to understand nutrient reduction in restored wetlands provides an opportunity to promote inter-institution dialogue around scientific assessment and management realities. The H2Ohio Wetland Monitoring Program mobilizes university researchers across Ohio to investigate the effectiveness of state agency-funded wetland projects. Sustained working relationships with wetland practitioners capture relevant metrics around wetland design and management decisions. The Program’s annual workshop connects >30 academic scientists and technical staff with agency and management partners for a series of structured activities and informal networking. Likewise, researchers exchange knowledge with land managers through a combination of standardized prompts and unstructured field visits, the latter of which catch insights not always detected in written form. Dialogue in each space grounds the Program’s purpose in acquiring actionable data, without sacrificing independent scientific research. The Program maintains workflows for inter-institution communication across the life cycle of a wetland project (i.e., design, construction, present use) and integrates management-related metrics into monitoring design (i.e., sampling locations near water level control structures, avoiding sensitive features upon land manager request). The first two years of the Program offer emergent themes to frame next steps in the broader space of “science-informed management”; considering how to balance expectations of urgently requested information with the scientific reality of monitoring ecological change. Ultimately, investment in wetland practitioner partnerships can strengthen understanding of wetland nutrient services in human-altered landscapes and human-managed ecosystems.</p> |

Concurrent Sessions



Communities Track

Table 5. Speakers, presentation titles, and abstracts from the Communities Track.

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| <p>Abraham Francis, Clarkson University</p> | <p>Decolonial Approach to Shoreline Caretaking Kaniatarowanenneh (St. Lawrence River) holds immense significance for Akwesasronon (Akwesasne Community Members), shaping their history and identity. Over time, however, the river and community faced environmental challenges from the development of the seaway and hydropower dam. The developments attracted heavy industry to area for cheap energy and shipping access, causing environmental contaminants (PCB, mercury, etc.) and adversely affecting the health and culture of Akwesasronon. This environmental violence generated a fearful relationship between the community and river, eroding cultural knowledge, language, teachings, and practices. This fear, combined with a forced assimilationist history, distanced the people from the environment, disrupting the fulfillment of reciprocal roles defined by the Ohenton Karihwaterhkwen (Words Before All Else). Akwesasne struggles with shoreline erosion, prompting Akwesasronon shoreline owners to harden their shorelines. A shoreline assessment was developed and framed in the Ohenton Karihwaterhkwen to be applied to interested shoreline owners. Semi-structured interviews conducted will help gauge owners' understanding of shorelines and cultural knowledge. Integrating quantitative and qualitative information will inform shoreline restoration plans, fostering naturalized shorelines that evoke communal and individual responsibilities to creation – an act of decolonization. Embracing a decolonial approach, the project draws from Linda Tuhiwai Smith's critique of research and aligns with Tuck and Yang's affirmation that decolonization is not a metaphor. The hypothesis is that strengthening Akwesasronon relationship with creation through their biocultural context improves shoreline health and cultural knowledge reclamation.</p> |
| <p>Neil Patterson, SUNY ESF Center for Native Peoples and the Environment</p> | <p>Traditional Knowledges Conservation and restoration practitioners are asked to consider the role of Indigenous Knowledges in environmental policies and decision-making. We examine the responsibilities of Haudenosaunee and settler societies in this new endeavor within the context of Great Lakes.</p> |

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| <p>Katherine Bunting-Howarth, NY Sea Grant</p> | <p>Receiving Community Considerations in the Path of Climate-Driven Migration</p> <p>Climate change impacts coastal communities through flooding, storm surge, extreme weather (including drought), and sea level rise. These hazards may lead communities to relocate away from the coasts. Conversely, researchers have identified some areas of the United States, such as the Great Lakes, as receiving areas of these potential climate migrants due to the unique attributes of their communities. Despite reference to the link between climate change and human mobility (displacement, migration, planned relocation), there is a dearth of knowledge on how shifts in population patterns intersect with underlying socioeconomic, cultural, political, and environmental processes. Other factors still appear to be more controlling in the decision to move. Resources often enable or constrain the ability of communities to relocate. Programs to empower communities to make decisions on relocation are lacking. New York Sea Grant (NYSG) and other Sea Grant programs received funding from the National Science Foundation to develop a Research Coordination Network. The project named People on the Move in a Changing Climate (PEMOCC) will provide the scientific infrastructure that is required to conduct place-based, use-inspired collaborative research on climate-induced human mobility, and regionally tailored educational and engagement strategies. In June 2022, NYSG hosted and co-facilitated a PEMOCC workshop for the Great Lakes region in Buffalo, NY. Fifty participants from across the Basin states attended. The goals were to feature the current state of knowledge on climate-induced human mobility, provide local/regional case studies, and address the unique needs of underserved and underrepresented coastal communities. A follow-up meeting will be held in Corvallis, Oregon in September of 2024. This talk will review the findings of both workshop and engage the audience to think about steps to address the findings in order to increase resilience.</p> |
| <p>Ike Shriberg, University of Michigan</p> | <p>Resourcing Michigan’s Coastal Decision Makers: An Assessment of Needs</p> <p>While the physical complexity of Michigan’s coastal dynamics has increased due to climate change and other factors, most notably because of more rapid variability in Great Lakes water levels as well as increased precipitation and storm intensity, the ability of local resource managers to respond efficiently and effectively has not kept pace. Therefore, decisions that have long-term impacts on shoreline are often made under duress without the ability and capacity to critically assess impacts and sustainability. During the most recent high water period (e.g., 2019/2020), many local decision makers began approving or directly implementing measures relating to stormwater management and shoreline armoring. However, these decisions were often made without complete or accurate information since many communities face barriers in assessing risk and costs, choosing appropriate projects, obtaining funding, implementing plans, and collaborating with other coastal communities as well as state and federal agencies. Currently, the unprecedented level of federal investment is combining with water levels hovering near historic averages to create a critical window for action to build capacity and knowledge while undertaking innovative projects. Under these conditions, we assessed the opportunities, barriers and needs for Michigan’s coastal managers to adopt collaborative and effective resilience practices.</p> |

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| | <p>Specifically, Michigan Sea Grant (MISG) sought to better understand how to engage with communities and to identify and support specific needs. First, we interviewed individuals from the Great Lakes Sea Grant Network (GLSGN) to learn how their programs conducted outreach and worked in communities as well as what were best practices or barriers. We then organized a workshop for over 50 coastal resilience managers and experts to identify significant barriers to coastal resilience planning and to outline potential solutions, emphasizing nature-based approaches. The proposed presentation would relay the results in terms of barriers and needs as well as the strategy and tactics to meet these needs, including the launch of a new online resource hub and several communities of practice.</p> |
| <p>Daniel Suarez, Audubon Great Lakes</p> | <p>The Little Calumet River Conservation Collaborative: Restoration, Community Engagement, and Hydrologic Connectivity in Northwest Indiana In 2016 the Little Calumet River Conservation Collaborative began planning for habitat restoration, stewardship, and community engagement across a 10-mile stretch of the West Branch of the Little Calumet River in Northwest Indiana. Using a robust spatial prioritization and secretive marsh bird monitoring as an indicator for overall wetland health, the Collaborative identified over 1,400 acres of priority habitat to be restored, contributing to local efforts to build a more climate-resilient Calumet region. Relationships were then carefully built with City of Gary officials and the Little Calumet River Basin Development Commission, two of the major landowners across the floodplain basin. Since 2019, the Collaborative has been conducting on-the-ground restoration across 400 acres. In 2023, water control structures were installed at two of these sites, allowing for strategic water level management to minimize invasive plant species and allow for the recovery of marsh vegetative communities. Community engagement, especially in Gary, Indiana, has been prioritized and will soon reach new depths thanks to two federal grants to conduct engineering and design across 1,100 new acres, including potential remeandering of the Little Calumet River. Input from local residents will help guide and be incorporated into the site’s restoration plans to center the needs of the surrounding underserved communities. This presentation will aim to detail the complexities and need for community-centered conservation, especially in Environmental Justice communities like Gary, Indiana and many others across the Great Lakes basin.</p> |
| <p>Emily Fell, NYS Department of Environmental Conservation/Water Resources Institute</p> | <p>Day in the Life of Lake Ontario St. Lawrence River Overview and Outcomes The Day in the Life of Lake Ontario- St. Lawrence River project, with funding from the US EPA Great Lakes National Program Office, by training teachers and educators, providing equipment and stipends to teachers, and coordinating student summit events in support of New York’s Great Lakes Ecosystem Education Exchange and New York’s Great Lakes Action Agenda. The development of lesson plans, activity instructions and classroom resources integrated the 9 objectives of the Lake Ontario Lake wide Action and Management Plan, which include safe drinking water, being free nutrients that promote nuisance algae, being free from harmful pollutants, safe swimming beaches, allowing for fish and wildlife consumption, providing healthy habitats for native species, being free from invasive species, being free from harmful groundwater contamination, and being free from other negative effects, such as climate change. Teachers and educators also learned about</p> |

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| | <p>research being conducted under the Cooperative Science and Monitoring Initiative to understand lake wide conditions. Environmental education outcomes of this 2 year project included: engaging 12 teachers and 25 education partners in a one-day training workshop, providing 10 teachers with equipment bins that they can use with classes beyond the project funding, and engaging 684 students in hands on learning about the Lake Ontario- St. Lawrence River ecosystem to build sense of place and promote stewardship. Monitoring data collected by students at 6 sites under an EPA and DEC approved Quality Assurance Project plan was also completed and made available on the DEC Education website. Based on the success of this 2-year project, recommendations include continuing to coordinate with DITL of LOSLR teachers and partners trained in 2022 and 23 to support student summit events and applying the DITL model to support programming in the Oswego River/Finger Lakes watershed in partnership with DEC, OPRHP, and other interested partners. Website: https://dec.ny.gov/get-involved/education/teacher-information/day-in-the-life-lake-ontario-st-lawrence-river</p> |
| <p>Lexie Davis, NYS Department of Environmental Conservation</p> | <p>The Baseline Conditions Characterization: A comprehensive overview of NY Great Lakes Sub-Basin environmental conditions</p> <p>The Great Lakes Action Agenda calls for an evaluation of long-term outcomes pertaining to aquatic toxicity, nutrient, pathogen, and sediment loading, invasive species, ecosystem resilience, and sustainable communities. To evaluate change related to these indicators, an understanding of the current environmental conditions is required for later comparison. The Baseline Conditions Characterization consolidates disparate open-source data to provide a unified analysis of current environmental conditions related to the Great Lakes Action Agenda outcomes at a sub-basin scale. This information aims to tell a full watershed story and will be displayed via a Story Map, which will inform future evaluations and reports of key environmental indicators of sustainable ecosystems. As part of this project, ecosystem and coastal resilience are being evaluated to determine trends in hardened shorelines, undeveloped land within floodplains, and coastal wetland and riparian forest habitats. This presentation will outline the methods of the Baseline Conditions Characterization and explore the trends related to the coastal resiliency of Lake Ontario.</p> |

Conserving Coasts Track

Table 6. Speakers, presentation titles, and abstracts from the Conserving Coasts Track.

| Speaker | Presentation Title and Abstract |
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| <p>Michael Monfils, Michigan Natural Features Inventory</p> | <p>A framework to facilitate habitat conservation for marsh birds in the Midwest and Great Lakes regions</p> <p>Secretive marsh birds, such as grebes, rails, and bitterns, have received increased attention from the conservation community in recent decades due to declining populations, resulting in several species being identified as endangered and threatened at state levels and species of greatest conservation need in state wildlife action plans. Despite increased concern for these species, conservation activities targeting secretive marsh birds has been limited in the</p> |

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| | <p>Midwest and Great Lakes regions. To meet objectives for these species identified in regional and state conservation plans, greater communication, coordination, and collaboration among partners is needed to overcome barriers hindering marsh bird habitat conservation. With support from the Upper Mississippi / Great Lakes Joint Venture, a group of partners began work in early 2023 to create a framework that would provide the information and tools needed to deliver increased conservation activity for marsh birds. We will describe the process used to develop the framework and give an overview of the resulting vision, mission, goals, objectives, and strategies. We will also provide details on our plans for implementation, highlight current activities, and describe opportunities for people to get involved.</p> |
| <p>Sarah Saunders, National Audubon Society</p> | <p>Wetland conservation sustains marshbird populations in an urbanized landscape</p> <p>Hemi-marsh wetland habitat in the Calumet region of Illinois and Indiana provides benefits to marsh birds, other wildlife, and people. Through partnerships, Audubon Great Lakes has established marshbird and vegetation monitoring at over 40 sites across the region to track marshbird species' use of wetlands that have been restored and maintained over the last several years. We estimated trends in occupancy of 12 marshbird species during 2017 - 2023 and found that, on average, occupancy has remained stable in the Calumet region. Specifically, occupancy trends for 8 species were stable, Swamp Sparrow exhibited a significant positive trend, and 3 species exhibited non-significant negative trends (American Coot, Black-crowned Night-heron, Pied-billed Grebe). Several sites across the region had consistently high average marshbird occupancy during the 7-year period, demonstrating the importance of maintaining high-quality hemi-marsh habitat to sustain breeding marshbird populations in a highly urbanized landscape. For a subset of sites, we also estimated species-habitat relationships using a variety of site-specific characteristics (e.g. percent native vegetation, wetland type, muskrat presence). These results can be used to inform best management practices for wetland restorations aimed at recovering specific marshbird species or groups of species in the Upper Midwest.</p> |
| <p>Andrew Hinckle, Audubon Great Lakes & Matthew Wagner, Ducks Unlimited</p> | <p>Holistic Marsh Habitat Restoration at Lakeview Wildlife Management Area</p> <p>From 2022 to 2024 Audubon, Ducks Unlimited, and NYSDEC partnered to restore/improve hemi-marsh habitat quality at Lakeview WMA. The goal of the effort was to improve habitat for spawning fish, waterfowl and secretive marsh birds. Funding for the work came from GLRI via NOAA, through a Regional Partnership with the Great Lakes Commission.</p> |
| <p>Erin Giese, UW-Green Bay Cofrin Center for Biodiversity & Joe Torres, UW-Green Bay and Oneida Nation</p> | <p>Oneida Bird Monitoring Program: Connecting Community Science, Oneida Knowledge, and Management</p> <p>Since 2021, UW-Green Bay's Cofrin Center for Biodiversity, Northeastern Wisconsin Bird Alliance, and Audubon Great Lakes formed a deep, collaborative partnership with the Oneida Nation through the successful implementation of a volunteer bird monitoring program at multiple restoration sites on the Oneida Nation Reservation located near Green Bay, Wisconsin. With the help of 100+ volunteers, we have conducted breeding grassland, marsh, and forest bird surveys and spring and fall migratory shorebird and waterfowl surveys at locations spread across five restoration sites, totaling >200 bird species. Program goals include 1) collecting an inventory of bird use on Oneida's</p> |

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| | <p>restoration lands, 2) providing bird-informed land management guidance to the Oneida Nation at their key restoration sites, 3) building a community of birdwatchers, 4) integrating Oneida’s beautiful culture, history, and language throughout the project with the leadership of an Oneida Tribal Elder, and 5) building bridges between the Oneida and non-tribal communities. Our collaborative project has witnessed incredible successes in terms of bird data collected; the integration of Oneida culture, history, and language into the project; a summer nature camp for Oneida youth; number of people engaged; volunteer events within the Oneida community; and land management decisions made. We will provide a brief overview of the bird monitoring program, describe how Oneida’s bird data are informing conservation and management, highlight how we are integrating Oneida knowledge into the project, and share a few “lessons learned.”</p> |
| <p>Thomas Prestby, Audubon Great Lakes</p> | <p>Success and Challenges of the 2024 Great Lakes Piping Plover Season The 2024 Great Lakes Piping Plover breeding season had a mix of successes including the highest number of pairs since listing in 1986, and challenges including predation and unhatched eggs. The population of this Federally Endangered species is monitored by many partners yearly throughout the Great Lakes at known populations. Audubon Great Lakes and US Fish and Wildlife Service coordinate monitoring and outreach for the population in lower Green Bay, Wisconsin that has been present since 2016 after the creation of suitable habitat due to dredged sand. Piping Plovers successfully reproduced at the site in 2024 for the ninth consecutive year, and attempted to breed at a new site roughly two miles away for the second consecutive year. We will discuss the successes and challenges of the 2024 Great Lakes Piping Plover breeding season throughout the Great Lakes, and share case studies from the lower Green Bay population, including outreach and education strategies at a site with heavy boat and beachgoer traffic vs. at a site that is closed to the public, and preview how future restoration projects could increase habitat for this species in lower Green Bay.</p> |
| <p>Leo Chan Gaskins, University of Chicago & Audubon Great Lakes, David H. Smith Fellowship</p> | <p>Harnessing muskrat den impacts to improve wetland diversity and bird conservation Incorporating positive species interactions into ecosystem restoration is key to advancing conservation in a changing world. Identifying animals that can produce these impacts, then developing ways to harness these facilitation effects is critical to integrating this ecological theory into on the ground restoration and conservation efforts. Muskrats (<i>Ondatra zibethicus</i>) are a native Great Lakes ecosystem engineer that alter wetland systems by generating clearings in vegetation to build their dens. I will be presenting my preliminary data showing significantly higher animal use of areas around muskrat dens than control regions, and analyses showing that muskrat den density is an important covariate to explain bird occupancy. Together, these suggest a powerful positive species interaction where muskrat dens facilitate increased biodiversity, particularly of regionally declining marsh birds.</p> |
| <p>Jennifer Fuller, National Audubon Society</p> | <p>The Illinois Coastal Stopover Tool: a one-stop shop for migratory management needs Spring and fall migration are critical and highly vulnerable periods for most North American bird species. Globally, migratory birds are more likely to have declined in population than non-migratory species, and migration itself can be</p> |

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| | <p>disproportionately more deadly than the rest of a bird’s life cycle. To reverse these declines, conserving and restoring critical migratory stopover sites is increasingly important. Among the most important and dangerous stopover regions in North America is the heavily urbanized Chicago metropolitan area, due to its intersection with a major migratory pathway and the Lake Michigan shoreline. In collaboration with local partners, we developed an interactive online mapping tool using ArcGIS Experience Builder to help identify areas with high quality habitats for migratory landbirds, threats, and opportunities for restoration within natural areas along the Illinois Coastal Region, which consists of Illinois’s coastline and river systems adjacent to Lake Michigan. We initially conducted a literature review to inform supporting information, mapping tools, and recommendations. We then created quality and restoration opportunity maps for three habitat types (woodlands, grasslands, and shrublands) by compiling and ranking a set of indicator datasets, including information from land managers in the region. We also reported different threats as individual layers for managers to identify potential localized stressors. Quality and opportunity layers and corresponding rankings were run through Zonation, a decision support software that generates spatial prioritizations, using the Additive Benefit Function (ABF) model. All protected areas in the Illinois Coastal Region were ranked based on these outputs and rankings, which resulted in a list of 8 protected areas in the region with high priority for migratory stopover conservation and management. We also developed overviews for 21 priority species based on local conservation scores, eBird abundance maps, conservation listings, and habitat needs during migration. To help guide land management in the region, we also synthesized the literature review and local expert opinion into landscape-scale, local-scale, and habitat-based recommendations. The Illinois Coastal Stopover Tool will help support the dedicated land managers working to improve habitat and support migratory bird conservation in the region.</p> |
| <p>Matthew Preisser, Michigan Department of Environment, Great Lakes, and Energy & Jessica Collier, U.S. Fish & Wildlife Service</p> | <p>Identifying Islands of the Lake Ontario-St. Lawrence River Region: Priorities for Conservation</p> <p>The Laurentian Great Lakes host the largest collection of freshwater islands in the world with approximately 32,000 islands. Many of these islands hold significant ecological, economic, cultural, and historic significance and serve as an ecological refuge under a changing climate and developmental stressors. Despite the importance of these features, there are few resources to guide conservation actions for Great Lakes Islands. Therefore, the Great Lakes Coastal Assembly’s Island Workgroup is aiming to develop a series of island conservation priorities documents specific to each Great Lake to help direct conservation and restoration actions for Great Lakes islands. This nascent work is beginning with Lake Ontario and using the Islands of Life: A Biodiversity and Conservation Atlas of the Great Lakes Islands and regional expert insight to develop a review of the islands of Lake Ontario-St. Lawrence River region priorities for conservation. The results of this review will help guide priority-setting by agencies and organizations, support grant applications, and bring attention to the inventory and data needs in cataloging and understanding the current state and conservation needs of Great Lakes islands.</p> |
| <p>Erin Redding, New York Natural</p> | <p>Niagara River Greenway Ecological Enhancement Projects, 15 Years of Cumulative Benefits</p> |

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| <p>Heritage Trust & New York State Department of Environmental Conservation</p> | <p>The Niagara River Greenway is a corridor of places, parks, and landscapes that celebrates and interprets the natural, cultural, and recreational values of the Niagara River. The Niagara River Greenway Ecological Standing Committee (GESC) is a non-regulatory group with representatives for the Tonawanda Seneca Nation, Tuscarora Nation, US Fish and Wildlife Service, New York State Department of Environmental Conservation, New York Power Authority, and Niagara Relicensing Environmental Coalition. Since 2009, GESC has distributed over \$16 million from the New York Power Authority’s Greenway Ecological Fund to support sixty ecological enhancement projects implemented by about twenty unique not-for-profit organizations, research institutions, and municipalities. Many of these land protection, habitat restoration, stewardship, and research projects have been relatively small in cost and scale, and may not have been considered competitive for federal grant programs. However, taken together, GESC-supported projects are contributing substantially to the resilience of the Niagara River coastal zone and improving quality of life in local communities. This presentation will explore the cumulative ecological and cultural benefits of Greenway projects, which are easy to see but difficult to quantify. It will also present the GESC as a model for peaceful, consensus-based decision making by local knowledge holders with diverse perspectives.</p> |
| <p>Katelyn Beckemeyer, The Nature Conservancy</p> | <p>Sandusky Bay Ecosystem Restoration Lake Erie’s Sandusky Bay is one of the largest drowned river mouths in the Great Lakes at nearly 64 square miles, and it provides extensive ecological services as well as significant value to local identity and economics. The Bay historically supported widespread, diverse coastal wetlands supporting birds, amphibians, important fish spawning and nursery habitat, and more. Today, these wetlands and their benefits have largely been lost, and the Bay is plagued by high levels of turbidity and algal blooms. In response, the State of Ohio Office of Coastal Management launched the Sandusky Bay Initiative (SBI), an ambitious, landscape-scale effort to restore holistic Bay functions for the benefit of both wildlife and people. This resulted in significant necessary research, fieldwork, and collaboration to understand existing conditions, impairments, and complex physical and biological Bay interactions, which informed models that enabled the team to evaluate intervention strategy effectiveness. Ultimately, The Nature Conservancy, with funding from H2Ohio, has developed a suite of innovative, synergistic projects aimed at reducing internal Bay sediment resuspension to facilitate wetland function reestablishment and maximize nutrient assimilation. A number of the projects have been funded and are underway. This presentation summarizes efforts that guided the comprehensive Bay restoration approach, as well as the innovative projects.</p> |
| <p>Andrea Chreston, Toronto and Region Conservation Authority</p> | <p>Creating Wetlands on Confined Disposal Facilities Confined Disposal Facilities (CDFs) are common in major Great Lakes cities to permanently house contaminated sediment. There are three CDFs in Toronto, located at the Leslie Street Spit. While one remains active, two have been decommissioned and restored to wetland habitat, representing a gain of 16.3 hectares (40.3 acres) of coastal wetland on the central Toronto waterfront and contributing toward the delisting of the Toronto and Region Area of Concern. Sediment capping was completed to physically and biologically isolate the contaminants within the CDFs and the surface was contoured to</p> |

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| | <p>elevations to achieve marsh conditions. Drawing upon habitat designs from the Toronto Waterfront Aquatic Habitat Restoration Strategy, structural habitat features including rocky shoals, aquatic stump fields, and fish cribs, along with native emergent aquatic plants, trees and shrubs were installed to initiate the wetland habitat. Fish and water level control structures were installed to restrict invasive Common Carp into the wetlands, and to manage the wetland water levels independently of Lake Ontario. A major challenge since establishing the wetlands has been invasive plants, particularly Phragmites australis which outcompeted the native emergent aquatic vegetation community that established after construction. Toronto and Region Conservation Authority has successfully managed phragmites in the Cell 1 and Cell 2 wetlands since 2018, using an integrated approach including chemical and mechanical treatment. Through careful timing and management, a 3.33 hectare (8 acre) phragmites monoculture has been drastically reduced, and the native emergent vegetation communities have naturally regenerated. The Cell 1 and Cell 2 wetlands support a variety of wildlife communities including marsh nesting birds, turtles, and fishes, conserving biodiversity on the waterfront.</p> |
| <p>Loren Wobig, Illinois Department of Natural Resources</p> | <p>The Battles at Brandon Road This presentation will highlight the extreme measures taken at the Brandon Road Lock and Dam on the Des Plaines River near Joliet, Illinois to battle the front lines of Invasive Carp to protect the Great Lakes and planning, design, and construction battles it took to win the war.</p> |

Resiliency Track

Table 7. Speakers, presentation titles, and abstracts from the Resiliency Track.

| Speaker | Presentation Title and Abstract |
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| <p>Danielle Dellandrea, Toronto and Region Conservation Authority</p> | <p>Bluffer’s Park Shoreline Erosion Protection Projects Toronto and Region Conservation Authority (TRCA) works toward enhancing our region’s natural environment while protecting our land, water and communities from the impacts of flooding, erosion and increasingly extreme weather. One key component in this process is the design and implementation of remedial erosion control/protection and slope stabilization works to protect human life and property. TRCA’s Erosion Risk Management Program (ERMP) monitors the condition of all TRCA-owned waterfront erosion protection structures on an annual basis, allowing for priority ranking. This helps determine whether detailed study, maintenance or remedial works, or further monitoring are recommended. Various factors that may be vulnerable to climate change implications, such as depth and crest height of a structure, known wave climate in the area, etc., are considered. Several structures in Bluffer’s Park, monitored since 2006, were identified through the ERMP as failing following high lake level events in 2017 and 2019, and a severe wind storm weather event in 2018. These structures protect Bluffer’s Park, which is an artificial landform built in the 1970s at the base of the Scarborough Bluffs, located within the City of Toronto on the north shore of Lake Ontario. The park is owned by TRCA and managed by the City, with TRCA maintaining these structures that protect the park and nearby bluffs. The extreme weather and lake events prompted initiation of the planning process to develop designs,</p> |

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| | <p>acquire permits and approvals, and complete major maintenance. Climate change and opportunities for aquatic habitat enhancement were key components of the design. TRCA's objective was to restore and enhance the original erosion protection capability of these structures, thereby protecting Bluffer's Park from wave energy and continued erosion. Improvements, to increase resiliency and address climate change impacts, included increasing the structure crest height, using larger material, incorporating splash pads behind structures to account for wave overtopping during extreme events, as well as moving trails and public viewing areas to safe distances. Major Maintenance on four (4) structures within the Park was completed between 2018 and 2022. Construction is currently ongoing on a headland structure, scheduled to be complete in 2024, with planning and design underway for another adjacent series of structures. TRCA has undertaken this work to improve resiliency and address climate change factors, and will continue to plan and implement similar projects along the Toronto waterfront within the same framework.</p> |
| <p>Jennifer Ogrodnick, DHI Water & Environment, Inc. & Pete Zuzek, Zuzek Inc.</p> | <p>Lake Ontario South Shore Sediment Budget and Coastal Resilience Assessment</p> <p>On the southern shore of Lake Ontario, the sediment transport processes are complex due to a highly dynamic environment, complex shoreline configuration, and large range of sediment fractions which includes silt/clay to cobbles and boulders. Generally, the nearshore environment is supplied by sediments released through the natural erosion and retreat of the bluffs which are found in long stretches along the shoreline ranging from several hundred meters to kilometers in length. The retreat of these shoreline bluffs can result from a variety of processes that operate at different rates and that respond to different triggering mechanisms. For example, wave erosion at the toe of the bluff is a primary cause of bluff retreat, and brief, intense storms that generate large waves can trigger large amounts of bluff retreat in a matter of a few hours or days. Longer term basin-wide or eustatic increases in lake water level can also increase long-term rates of bluff erosion and recession by exposing bluffs more directly to wave action. Surface erosion at the bluff crest from overland runoff can also contribute to bluff recession. Once eroded from the bluffs the material is naturally sorted by the waves and nearshore hydrodynamics and subsequently these materials are transported both in an alongshore and cross-shore direction. Eroded materials are distributed throughout littoral cells and sub-cells or alternatively permanently lost from the system in offshore environment. Depending on the sediment fraction, the response in the nearshore environment differs. To improve the understanding of coastal processes on the southern shore of Lake Ontario, the New York State Department of Environmental Conservation (DEC) initiated a Project titled: Engineering & Analysis for Coastal Resilience & Ecosystem Restoration Projects. The Project's primary focus is to study the coastal processes to better inform coastal planning to reduce the risk from flooding and erosion while protecting the coastal ecosystem. To support the Project, a detailed understanding of hydrodynamics, waves and sediment transport is required. As such, the Project involves a range of activities such as research and data analysis; field services to investigate physical processes, material properties, and shoreline features; desktop assessments; geographic information system analysis (GIS); and a comprehensive numerical modelling program of coastal processes. The key</p> |

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| | <p>outcomes from the study include wave, hydrodynamic and sediment transport models as well as a detailed sediment budget from Great Sodus Bay to Oswego, which considers fine sediment (silt and clay), sand, and the coarse sediment fractions (pebbles and cobbles) which has not been done in the past due to the lack of data relating to the coarse sediment fractions. This presentation will describe the overall Project and the latest results with a focus on the numerical modelling including waves, hydrodynamics, and sediment transport. In particular, the presentation will discuss the various sediment sources and sinks, the estimated rate of sediment bypassing at the long jetty structures at Sodus Bay and Little Sodus Bay, and how this information feeds into the sediment budget for the reach of shoreline from Great Sodus Bay to Oswego</p> |
| <p>Anthony Eallonardo, Ramboll</p> | <p>The City of Buffalo Coastal Resiliency Study: planning for current and future Lake Erie storm surges</p> <p>Since the City of Buffalo’s inception, it has been impacted by Lake Erie storm surges, including the infamous 1844 event that topped a 14-foot seawall and caused extensive loss of life and property along the City’s waterfront. These surges are caused by powerful winter storms blowing along the long axis of Lake Erie and providing a low atmospheric pressure environment, which together drive water towards the east end of Lake Erie and the City of Buffalo waterfront. Climate change may increase the City of Buffalo’s exposure to storm surges by reducing ice coverage, which would otherwise suppress storm surges, and by increasing Lake Erie water levels, which reduces the freeboard available to accommodate surges when they occur. The City of Buffalo Coastal Resiliency Study (BCRS) is a comprehensive effort to evaluate flood risks and to identify solutions to protect public and private assets. It grew out of the Imagine LaSalle initiative, a community-driven program to develop a resilient design for LaSalle Park (now called Ralph Wilson Park), which often takes the brunt of Lake Erie storm surges. The success of that program; major Lake Erie storm surges in 2019, 2020, 2021 and 2022; as well as concern for climate change underscored the need to broaden that community-driven framework to the City of Buffalo waterfront. The BCRS is supported by a lake-wide hydrodynamic model which informs a high-resolution (4 m) over- bank flood model as well as a sewer backup model. This approach enables evaluation of climate change scenarios on Lake Erie surges while also enabling detailed understanding of flooding outcomes at the neighborhood scale. The BCRS models complement ongoing modeling and coastal assessments by filling a gap in the types and scale of information needed. The modeling is supported by extensive review of historical data and literature, including Lake Erie water levels, meteorological data, the latest climate change research and projections of lake conditions, Buffalo River and Scajaquada Creek discharge data, regional and local bathymetric and topographic surveys, land-use data, infrastructure databases, proposed land development plans, and evidence of historical flooding. Ten simulation scenarios evaluated past and projected flood risk. Extreme water levels were selected based on a joint-probability analysis of measured surge and static lake levels for return periods ranging from 1- to 500-years. Four of the scenarios include climate change considerations for the 2050- and 2080-time horizons. Information gained from modeling will be used to support an asset risk assessment, enabling stakeholder-driven selection of project priority areas and development of shoreline resiliency projects. The</p> |

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| | <p>BCRS is supported by a GIS-based online presence, creative use of time-lapse imagery, and virtual reality tools to help stakeholders understand Lake Erie storm surges and their impacts.</p> |
| <p>Jeanne Beiter, Buffalo Niagara Waterkeeper</p> | <p>Ecosystem Assessment towards the Prioritization of Coastal Resiliency Projects in Lake Erie's Eastern Basin Communities</p> <p>Lake Erie Eastern Basin is already experiencing the effects of climate change—trending warmer weather, less ice cover, more erratic weather events, and more frequent and bigger storm events. These conditions lead to increased stormwater runoff, which results in erosion, flooding, damaged infrastructure and more sewage overflow into our lakes and rivers. Toxic algae blooms are on the rise, due in part to excessive run-off of nutrient-rich stormwater, and ecosystems and habitats may be permanently altered. New York State is responding to the Climate Crisis with a series of legislative actions such as the Climate Leadership and Community Protection Act and the Environmental Bond Act to name a few. Buffalo Niagara Waterkeeper is working with local government and community partners to build resiliency to the impacts of climate change, like flooding and erosion, within the WNY and Great Lakes regions. As guardians of New York’s freshwater coast, Buffalo Niagara Waterkeeper works to identify opportunities to enhance community and ecosystem resilience through policy, partnerships, and nature-based solutions. Buffalo Niagara Waterkeeper is working to enhance understanding and public awareness of Western New York’s Lake Erie coastline and nearshore environments and foster stewardship in WNY’s Lake Erie watershed through our project titled, “Ecosystem Assessment towards the Prioritization of Coastal Resiliency Projects in Lake Erie’s Eastern Basin Communities”. Data gathered through this project is contributing to a greater understanding of the state of WNY’s recreational waters to protect human health, inform pollution prevention, and identify potential priority areas for coastal and climate resiliency investments. Through this project, Buffalo Niagara Waterkeeper undertook a detailed literature review of data and research focused on the Eastern Basin of Lake Erie water quality. The literature review has informed opportunities to expand and develop a more robust water quality and ecosystem monitoring program through additional water quality sampling sites, including offshore water sampling via boat. Coupled with this additional water quality data, Buffalo Niagara Waterkeeper implemented a shoreline visual assessment tool (using the NYS Department of State Coastal Visual Assessment Tool as a model) to identify opportunities for increased coastal resilience efforts. Data gathered through our water quality monitoring program and visual shoreline assessments will guide our municipal engagement. Collaboratively, with municipal officials, we will identify potential priority areas for shoreline and coastal resiliency projects based on municipal priorities and identified opportunities to increase resiliency, mitigate flooding, improve water quality and create valuable habitat.</p> |
| <p>John Stille, Toronto and Region Conservation Authority</p> | <p>Waterfront Integrated Restoration Prioritization: A Tool for Improving Aquatic Habitat</p> <p>Under the Remedial Action Plans for the Great Lakes, the Toronto and Region AOC lists the Beneficial Use Impairment (BUI) of Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations as impaired. A Prioritization Tool is needed to guide aquatic habitat restoration along the</p> |

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| | <p>waterfront to achieve delisting targets for Beneficial Use Impairment (BUI) 14 Loss of Fish and Wildlife Habitat and BUI 3 Degradation of Fish and Wildlife Populations and support ongoing restoration efforts post-delisting. Ecosystem restoration planning requires an integrated approach considering many components of the natural system when prioritizing where and what to restore. Toronto and Region Conservation Authority (TRCA) and partners are developing a strategic approach to restoration planning, using the concept of applied science to inform meaningful implementation decisions focusing on priority areas rather than opportunism. TRCA has amassed a wealth of knowledge and data on terrestrial biodiversity, aquatic ecosystems, lake processes and hydrology. Consolidating these data sets to compare discrete areas based on different parameters and thresholds has helped direct future restoration initiatives. The Waterfront Integrated Restoration Prioritization (WIRP) framework uses existing data to reflect different restoration goals, ensuring important habitats and corridor linkages are protected, enhanced or rehabilitated. This is achieved by identifying where impairments to ecological function are located and prioritizing restoration opportunities that could contribute most to improving the existing habitat along the Toronto waterfront. This approach has been used in watershed planning and has proven successful for garnering support and new partnerships which has resulted in measurable improvements to the natural system. This presentation will outline WIRP methodology and demonstrate how it can be used as a tool to successfully achieve different natural resource planning objectives.</p> |
| <p>Mike Smale, Wisconsin DNR</p> | <p>Assessing the sensitivity and resiliency of Lake Superior coastal wetland habitats to climate change</p> <p>Great Lakes coastal wetlands are diverse and dynamic ecosystems that have developed to function under disturbances from both terrestrial and aquatic systems. Climate change is projected to alter these disturbances outside their historical ranges, subjecting coastal wetlands to warmer temperatures, more extreme precipitation events, greater variability in lake levels, and increased wind and wave action. These anticipated changes pose as an uncertain risk to coastal wetland habitats and are therefore challenging for natural resource managers, who must contend with limited resources for wetland management, preservation, and adaptation efforts. Using Lake Superior as a pilot, we are developing a framework to quantify the relative sensitivity of Great Lakes coastal wetland habitats to the anticipated effects of climate change. Data from the Coastal Wetlands Monitoring Program (CWMP) and state databases are used in conjunction with published literature, the Wisconsin Initiative on Climate Change Impacts (WICCI), and expert opinion of regional and state-wide wetland professionals to assign sensitivity scores to each wetland. Here, we present the frameworks developed and share initial sensitivity rankings for vegetation, fish, and bird habitats of coastal wetlands within the Lake Superior basin of Wisconsin. By combining sensitivity and adaptive capacity scores, estimates of wetland resiliency will assist in the prioritization of coastal wetland management efforts and inform site-specific adaptation strategies, which can then be replicated on other Great Lakes systems.</p> |
| <p>Carlin Grundemann, GEI Consultants</p> | <p>Expanding Your Toolbox: Accounting for Climate Change with a Wholistic Approach to Coastal Resilience</p> |

Often when we talk about coastal resilience, we are diving right into solutions that enhance or otherwise protect shorelines from the natural process. On low- and sometimes medium-energy shorelines, nature-based solutions lend themselves to positive environmental enhancements. However, on high-energy shorelines typical of Great Lake's coastline, erosion and wave protection requires greyer infrastructure. Interrupting the natural process with rock or steel isn't always the best solution and can be costly. We also know that climate change is resulting in periods of higher intensity storms and more extreme high and low water levels which puts valuable coastal property and infrastructure at risk. Considering relocation for existing infrastructure and planning for higher water levels in the future are a necessary step in the planning process. It is a difficult shift to make for many communities and homeowners but can result in significant cost savings by being proactive and developing comprehensive alternatives analyses. Adapting the way projects are approached and considering all options takes a mindset shift. We will look at the planning process and execution of a Michigan State Park project where a hybrid solution was developed to save a historic building and protect prime public access to the Lake Michigan shoreline. Successful resilience requires not only innovative design, but a willingness to adapt the human emotional response as well.

Workshops/Panels



Using Spatial Benchmarks in Great Lakes Shallow Nearshore Fish Restoration and Management

Speakers: Anna Harrison, NOAA

Description: Efforts to restore habitat and manage fisheries often have specific outcomes or objectives related to the occurrence, abundance, biomass, or ecology of target species. But, what constitutes a realistic, achievable goal under current environmental conditions, given the dramatic changes to the Great Lakes in recent decades? To highlight attainable biological goals rather than historical baselines, we used an approach that couples contemporary (1990 - present) fish data and spatially referenced habitat to generate predictions of relative habitat suitability for several native fish species. The resulting spatial benchmarks (locations with high habitat suitability) have utility for planning restoration and management actions and evaluating outcomes. To showcase this work, we use the Great Lakes Aquatic Habitat Framework (GLAHF) Explorer and several tools therein for this workshop. GLAHF is a spatially-consistent framework and database developed by regional collaborators to facilitate basin-wide work on the Great Lakes. The GLAHF Explorer is a publicly available web GIS viewer that allows users to explore habitat maps and other spatial outputs such as modeled habitat suitability and ecosystem types.

Discussion Highlights:

Conserving Great Lakes Coastal Wetlands through Binational Collaboration: An Interactive Workshop to Provide Input on the Lake Erie Pilot of the Framework

Speakers: Bob Holsman, D.J. Case & Associates; Matthew Pawlowski, U.S. Environmental Protection Agency; Liz Berg, U.S. Fish and Wildlife Service; Todd Redder, LimnoTech

Description: The Great Lakes Coastal Wetland Framework (Framework) is a binational, lakewide collaborative planning effort to establish baseline extent and condition of coastal wetlands that help partners prioritize where to work in order to achieve healthy Great Lakes and coastal communities. Lake Erie is the first of the Great Lakes to be piloted to demonstrate the Framework. This workshop will provide participants with an opportunity to hear the latest developments of the Framework, including recent progress on a Decision Support Tool. During this interactive session, participants will also be invited to provide input on the desired status for key ecological and human well-being indicators of Lake Erie coastal wetlands.

Discussion Highlights:

Participants broke out into small groups and reflected on the following questions:

Question 1: How have you seen human health and well-being intentionally incorporated into wetland conservation decisions?

- Coastal and Community Resilience: Wetland areas provide important ecosystem services, such as improving stormwater retention and reducing impacts of flood events.
- Acquisition and Permitting: Acquisition of wetland areas for protection, conservation, or recreation and permitting processes that focus on preserving wetland functions help maintain ecosystem services that wetlands provide.
- Cultural Significance: Incorporating plants that hold cultural importance for Indigenous communities supports food sovereignty and traditional practices.
- Public Access and Recreational Opportunities: Wetland areas that are accessible and near communities enhance access and recreation opportunities. Educational programs and controlled access to these areas allow for a balance of safe enjoyment and conservation. Features such as fishing piers, trails, overlooks, kayak launches, and interpretive signage can be considered alongside flood storage and habitat projects to ensure that community needs are met alongside conservation needs.
- Community Engagement: Intentional community engagement fosters successful and community-centered wetland conservation. Gain insights into how people use specific areas and consider who is at the table (now and historically) when decisions are made.

Question 2: What are the most important drivers for where to work and allocate resources in wetland conservation work?

- Capacity: Staff capacity to take on new projects, collaborative partnership in place to enhance resource sharing and expertise, and adequate financial resources.
- Feasibility: Access to land, available data, understanding of threats and stressors, maintenance support, and likely return on investment.
- Defined Priorities: Identified in existing plans, community- or landowner-driven request, urgency, and ties to environmental justice.

- Support: Willing landowners, community support for working in public areas, and favorable regulatory environment.

Question 3: How can the Framework's decision support tool be designed to help me prioritize opportunities for conservation work?

- **Planned Features:** The DST will help end-users determine where to prioritize conservation actions. Participants were excited by the planned features of the tool that will allow them to clip regions of interest for analysis and export data, view possible effects of action through the "gaming" mode, and the inclusion of the U.S. Geological Survey's "restorability index" data.
- **Suggested Features:** Participants would like to see additional data incorporated such as socioeconomic information, land ownership information, proximity to other wetland areas, FEMA repetitive loss and severe loss data, and citizen science data. Participants would also like to see where completed and active projects are located. They would like to be able to define and weight parameters of interest, understand co-benefits and tradeoffs of "gaming" scenarios, make connections to other plans, and visualize biodiversity hotspots and environmental justice opportunities.

Sodus Point's Flood Resilience: A Case Study in Community Strength

Speakers: Mary Austerman, New York Sea Grant; Dave McDowell, Mayor of Village of Sodus Point; Jame Breschard, Barton & Loguidice

Description: The village of Sodus Point, nestled along the southern shores of Lake Ontario, has faced significant flooding challenges that threatened its infrastructure, homes, and community well-being. This panel session discussed the transformative journey of Sodus Point as it identified its vulnerabilities and implemented robust strategies to enhance its flood resilience. Through strategic planning, community engagement, and strong partnerships, Sodus Point has emerged as a leader in coastal resilience.

The session kicked off with an in-depth look at the visioning workshop that catalyzed Sodus Point's resilience initiatives. The workshop brought together residents, business owners, stakeholders, and experts to brainstorm and prioritize actions needed to address the village's flood risks. By fostering a sense of community and shared purpose, this initial step was crucial in laying the groundwork for subsequent efforts.

The panel then explored the vital partnerships that have been instrumental in advancing Sodus Point's resilience projects. From collaborations with state and federal agencies to alliances with academic institutions and non-profit organizations, these partnerships have provided the technical expertise, funding, and resources necessary for the village to implement innovative solutions.

Key initiatives highlighted include the development of improved drainage systems, the construction of protective barriers, and the integration of green infrastructure to mitigate flood impacts. Additionally, the panel discussed the community's ongoing commitment to resilience through continuous education, policy advocacy, and adaptive management practices.

By examining Sodus Point's comprehensive approach, attendees gained valuable insights into processes and strategies that can be applied to similar coastal communities facing the challenges of flooding.

Discussion Highlights:

Use of Sand Dunes and Fences: The sand dunes and adjacent sand fences are intended to replenish beach sand but will shrink over time and require replacement. Their effectiveness has not yet been assessed due to the performance of other preventative measures.

Local Communication: There has been positive feedback and involvement from stakeholders, though some plans continue to cause friction, such as elevating homes along the beach.

Posters



Table 8. Authors, presentation titles, and abstracts from the Poster Session.

| Author | Presentation Title and Abstract |
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| <p>Thomas Prestby, Audubon Great Lakes</p> | <p>Allouez Bay Marsh Bird Habitat Restoration - From Scoping to Implementation The Allouez Bay wetland complex is an Area of Special Natural Resource Interest located in the St. Louis River Estuary. A crucial habitat for native plants and wildlife, these high-quality wetlands are being degraded by non-native species, including invasive cattail (<i>Typha angustifolia</i> and <i>Typha x glauca</i>). The Allouez Bay Marsh Bird Habitat Restoration project aims to manage invasive cattails to protect diverse wetland plant communities and enhance hemi-marsh habitat for marsh birds and other wildlife as part of the first phase of the Restoration Vision for Allouez Bay. Funding for this project was provided by the Great Lakes Restoration Initiative. In collaboration with the Audubon Great Lakes and Wisconsin Department of Natural Resources, GEI provided restoration design documentation and permit preparation in advance of project implementation. The Allouez Bay Marsh Bird Habitat Restoration Team’s plan included the diversification of native vegetation, mechanical control of non-native cattail, and the creation of a hemi-marsh habitat by excavation of dense cattail stands. The inclusion of hemi-marsh habitat increases wetland interspersion and creates greater habitat diversity within the wetlands. Restoration of the marsh wetlands provides important habitat for fish, birds, and other wildlife, and promotes resilient ecosystems throughout the St. Louis watershed. . Cutting of cattail below the water surface began in late summer of 2024 and hemi-marsh creation excavation is planned for late fall or early winter of 2024. Construction will be accompanied by seeding and planting of vegetation native to Allouez Bay, followed by rigorous vegetation and avian monitoring, which will document effects of restoration and advise the need for follow-up restoration actions. This poster will present an overview of the design concepts and progress of restoration.</p> |
| <p>Alyssa Warrior, University at Buffalo</p> | <p>Analysis of Cattaraugus Creek Inputs to Lake Erie The poster board will be an analysis of Cattaraugus Creek inputs to Lake Erie at the mouth of the tributary on the Seneca Nation. The Cattaraugus Creek inputs</p> |

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| | <p>studied include: the Peter Cooper Site, the West Valley Demonstration Project along with others. As a few of these sites have undergone remediation efforts, analysis will be done on what was released prior to remediation and what has been done since to limit contamination. Along with this analysis there will be a brief overview of the possible health effects of said contaminants that have been released and possible routes of human exposure. These routes of exposure will be centered on the uses of the creek by the people of the Seneca Nation. Uses of the creek include food source, medicinal, and cultural. The conclusion of the study will show a need for further sampling and monitoring of the water of the Cattaraugus Creek due to the number of inputs and potential contamination. The mouth of the Creek into Lake Erie is of interest as many of the inputs settle there. Lake Erie provides fresh water for thousands of people and sediment built up at the mouth of the Cattaraugus could pose a threat. Further analysis is needed to understand what exactly has been and is currently being released down the Cattaraugus.</p> |
| <p>David Spiering, New York State Office of Parks, Recreation and Historic Preservation</p> | <p>Blasdell Creek Wetland Enhancement – Woodlawn Beach State Park, Buffalo, New York</p> <p>The project enhanced an existing wetland in a post-industrial landscape on the shore of Lake Erie south of Buffalo through expanding the wetland, reducing invasive species, and planting native vegetation. The wetland was expanded by excavation, regrading, and adding another connection to Blasdell Creek by installing a culvert under a trail creating an oxbow shaped wetland. This enhanced wetland will increase native vegetation and wildlife habitat and had second objective to improve water quality by reducing bacteria levels in the water before it enters Lake Erie. Native vegetation, wetland birds, frogs, and water quality will be monitored at the site.</p> |
| <p>Beatrice Miringu, City of Toledo</p> | <p>City of Toledo Urban Heat Island Mapping Campaign: A multi-disciplinary community-science partnership to increase awareness of urban heat islands in the community</p> <p>The City of Toledo participated in the NOAA-funded urban heat mapping campaign in 2023. This campaign was a collaborative community engagement partnership between the University of Toledo climate researchers, local governmental climate adaptation practitioners, not-for-profit organizations, businesses, and residents. This presentation will discuss how the climate adaptation practitioners are threading urban heat campaign across departments and the need to amplify the effect of urban heat islands as part of climate change adaptation awareness. It is well documented that the burden of excess in a community is not equally shared. Low-income and disadvantaged neighborhoods are more vulnerable to the impacts of urban heat. Also well-established is the impact of increasing urban tree canopy on reducing the impacts of urban heat. To address heat island effects, the city aims to increase urban tree canopy to cool city neighborhoods using nature-based solutions. In 2023, the City of Toledo was awarded \$6,098,294 in USDA Forest Service grants that will increase urban tree canopy by planting 10,000 trees in five years. This grant will also include a community awareness and engagement component of the many benefits of urban trees including reducing urban heat effects, reducing flooding, increasing water infiltration, reducing erosion, improving water quality and human health. While there are community awareness programs on the impacts of flooding on coastal communities and ecosystems,</p> |

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| | <p>the impact of excess heat awareness on public health and as a surface runoff pollutant is sparse. An increase in temperature in aquatic ecosystems due to warm stormwater runoff can be particularly stressful and even fatal to aquatic life.</p> |
| <p>Juliana Grace Smith, SUNY Brockport - Department of Environmental Science & Ecology</p> | <p>Comparison of dissolved oxygen dynamics and trophic state within restored and reference coastal wetland habitats along the southern shore of Lake Ontario</p> <p>Healthy Great Lakes coastal wetlands provide essential habitat for diverse native fishes, in addition to serving as a refuge for zooplankton and other invertebrates that are the base of the food web. However, ecosystem services provided by these wetlands have been degraded by cultural eutrophication as well as altered hydrology, which has facilitated colonization by invasive Typha species. Typha is known to alter biogeochemical processes and native species structure through the formation of dense mats that block access to occupiable habitat and create hypoxic and anoxic conditions for aquatic species. To combat this expansion and prevent future blockages from forming, the U.S. Army Corp of Engineers, in partnership with the EPA and U.S. Fish and Wildlife Service, excavated channels and potholes in Braddock Bay to create more accessible habitat. Similar initiatives were later taken to replicate this course of action at Buck and Cranberry Pond sites. The goal of our research was to compare water quality, trophic state, and zooplankton abundance and composition in restored versus reference habitats in each of these 3 wetlands. In June and July of 2024, we used standardized protocols to sample water chemistry (e.g., temperature, dissolved oxygen, specific conductivity, pH, oxidative-reductive potential, chlorophyll a, total nitrogen and phosphorus) and zooplankton. We sampled 8-10 sites per wetland, with sites classified as “reference”; “restored” channels; “potholes”; and “open water”. We also deployed dissolved oxygen dataloggers to monitor fluctuations in concentrations over a 3-day period in restored, reference, and pothole sites at each wetland. In general, dissolved oxygen concentrations were highest in restored versus reference habitats across all 3 wetlands. We also observed lower mean total phosphorus and chlorophyll a concentrations in restored channels at Braddock Bay, relative to concentrations observed in Braddock Bay reference sites as well as for the other 2 wetlands. Preliminary results suggest restored channels play an important role in maintaining water quality and overall ecosystem health. Future analysis will compare zooplankton abundance and composition patterns across sites for each of the 3 wetlands.</p> |
| <p>Dillon VanDemortel, Department of Environmental Science and Ecology, SUNY Brockport</p> | <p>Evaluating fitness benefits and patterns of use by young of the year fishes within restored coastal wetland habitats along the southern shore of Lake Ontario</p> <p>Great Lakes coastal wetlands yield a multitude of productive corridors for wildlife; however, these crucial habitats have been subject to degradation over many years. Degradation in the form of non-native cattail intrusion has diminished spawning habitat connectivity for fish. Restoration of habitat connectivity in the form of channeling has been implemented in many of these wetlands. The objective of this study was to evaluate the effects of habitat restoration on growth, condition, and presence/absence of three young of the year native fish species: Northern Pike (<i>Esox lucius</i>), Bluegill (<i>Lepomis macrochirus</i>), and Largemouth Bass (<i>Micropterus salmoides</i>). Three to four</p> |

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| | <p>restored wetland habitats within Braddock Bay, Cranberry Pond, and Buck Pond and three to four reference sites within these wetlands were sampled using passive gears during two consecutive years (2023 and 2024) from June to October. Water quality (temperature and dissolved oxygen) and nutrients (total phosphorus, total nitrogen, and chlorophyll-a) were also analyzed to help explain potential differences within wetland (restored vs reference) and among restored wetlands. Preliminary results will be presented to show the impacts of restoration on these three native fish species.</p> |
| <p>Lauren Kinsman-Costello, Kent State University</p> | <p>Evaluating Nutrient Function of Coastal Wetland Reconnections and Restorations: The H2Ohio Wetland Monitoring Program, Ohio, USA</p> <p>To assess the nutrient removal function of wetland restoration, enhancement, and creation projects being implemented as part of the H2Ohio Initiative, the Ohio Department of Natural Resources has established an independent monitoring program implemented by teams from six Ohio universities. The H2Ohio Wetland Monitoring Program takes advantage of a unique opportunity to investigate nutrient cycling in diverse wetland projects under a unified framework. We are developing tools for nutrient budgeting and indicators of wetland nutrient function using a tiered sampling approach. Indices of soil and water nutrient status and wetland hydrology are measured in all monitored wetland projects, while we collect more intensive, high-resolution data for comprehensive nutrient budgeting in selected, representative “Focal Projects.” This tiered approach balances evaluation of broad, state-wide restoration program trends and robust, mechanistic understanding to inform management. The H2Ohio Wetland Monitoring Program has now produced baseline data from monitoring surface water nutrient concentrations, soil nutrient status, and basic hydrology in approximately 30 projects, including 6 coastal reconnection projects. A centralized data management system ensures data quality, long term storage, accessibility, and shareability in accordance with open science best practices. This talk will provide an overview of the H2Ohio Wetland Monitoring Program’s approach, preliminary results, and future plans to leverage monitoring for improved management of coastal wetlands for nutrient retention and removal.</p> |
| <p>Dawn Dittman, USGS, Great Lakes Science Center</p> | <p>Lake Sturgeon Restoration: Reestablishment of the Genesee River Local Population in Lake Ontario</p> <p>The Genesee River in Rochester NY is a historically productive Lake Sturgeon (<i>Acipenser fulvescens</i>) spawning tributary of Lake Ontario. Lake Sturgeon have been absent since at least 1930 and in 2000 the local population was classified as extirpated. The lower Genesee River and nearby Lake Ontario waters are part of the EPA Rochester Embayment Area of Concern (AOC). One de-listing criterion for the AOC is that “Lake Sturgeon of all life stages inhabit the Genesee River or when the physical and biological habitat is suitable for Lake Sturgeon”. A multiagency collaborative research project was initiated in 1999 to test restoration actions focused on returning Lake Sturgeon to the river. A Lake Sturgeon habitat suitability model, using multi-year habitat sampling, rated the river habitat as again suitable for juveniles and adults (1999-2002). In 2003-2004, hatchery reared juvenile Lake Sturgeon were introduced into the study area, with further releases 2013-2023. River persistence and biological characteristics of the restoration population were assessed each year. Mark-recapture analysis and acoustic telemetry provided estimates of both first year</p> |

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| | <p>and longer-term habitat use of the Genesee River, and migration patterns between the Genesee River and other nearshore and tributary habitats in Lake Ontario. Catch rates for juvenile fish in the Genesee River.</p> |
| <p>Jacob Cianci-Gaskill, Ohio DNR - Old Woman Creek National Estuarine Research Reserve</p> | <p>Nutrient Limitation in wetland phytoplankton: Is nitrogen limitation more common than we previously thought?</p> <p>Nutrient limitation in phytoplankton has been a primary area of research in marine and aquatic sciences for decades. Phytoplankton play a large role in nutrient cycling, carbon sequestration, and determining oxygen concentrations in wetlands, as well as serving as an important food source for zooplankton and, in turn, larval fish. However, the factors that contribute to wetland phytoplankton growth, such as nutrient concentrations, are often overlooked. Here, we look at long-term nutrients in Old Woman Creek, a 0.6 km² flow through wetland on the southern shore of Lake Erie in Huron, OH. Water quality monitoring at Old Woman Creek dates back to 1980 and presents a unique opportunity to examine temporal patterns in nutrient limitation status in wetland phytoplankton. Using long-term nutrient data, we examine both seasonal and historical trends in the nitrogen to phosphorus ratio (N:P) to determine how nutrient limitation may be changing over time. Additionally, in 2023 we performed bimonthly nutrient debt experiments to complement our long-term analyses. We spiked in situ containers with phosphate, ammonium, and phosphate + ammonium to determine which nutrient was deficient in the phytoplankton community. While wetland phytoplankton appear to be phosphorus deficient most of the time, nitrogen deficiency often persists throughout the summer and seems to occur more frequently in Old Woman Creek than in lakes. While unsuitable for determining true nutrient limitation, our long-term analyses and in situ experiments present a compelling assessment of nutrient deficiency in wetland phytoplankton, suggesting that nitrogen may be more important in wetlands than was previously thought. A better understanding of which nutrient limits phytoplankton growth in wetlands, and when, will inform nutrient management on the landscape to ensure that management strategies achieve their intended goals.</p> |
| <p>Sarah Baughman, University of Wisconsin - Green Bay & Joe Torres, UW-Green Bay and Oneida Nation</p> | <p>Oneida Bird Monitoring Program's Outreach and Community Engagement</p> <p>Volunteer community scientists in Green Bay, Wisconsin are working collaboratively with the Oneida Nation of Wisconsin to impact conservation management and develop stewardship for future wetland, forest, and grassland restoration. Our bird monitoring effort is a partnership between the Oneida Nation, Northeastern Wisconsin Bird Alliance, University of Wisconsin-Green Bay Cofrin Center for Biodiversity, and Audubon Great Lakes. Our team has organized 100+ volunteers who have recorded >200 bird species at multiple Oneida restoration sites, including grassland, forest, and wetland habitats. On our poster, we will feature common and rare bird species detected during our surveys, providing both English and Oneida common names. The project helps develop a strong relationship by building a cultural exchange between the Oneida Nation and non-Tribal local birders, who are also learning about the Oneida's rich culture, history, and language while out in the field. We will highlight our key outreach and community engagement activities, which include an annual community day at a key restoration site, bird outings with the community and Oneida Tribal Elders, tabling at the Oneida Farmer's Market, and volunteering at Tsyunhekw[^] Farm.</p> |

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| <p>Jumanah Khan, ALUS Elgin</p> | <p>Rooted in Sustainability: Empowering Farmers to Protect the Great Lakes through Ecosystem Services</p> <p>The ALUS program plays a crucial role in improving water quality in the Great Lakes region by engaging farmers in implementing nature-based solutions on their land. This poster will share insights about the ALUS National program, highlighting its community-delivered approach to engaging partners and empowering farmers to address environmental concerns while promoting sustainable agricultural practices. Also of focus will be an exemplary project that has harnessed the effectiveness of nature-based solutions in intercepting agricultural runoff, slowing soil erosion, and supporting biodiversity. This example, which sits atop Lake Erie's bluffs, demonstrates the potential of ALUS and farmer-led initiatives in creating effective, sustainable solutions for water quality and ecosystem health in the Great Lakes region. By combining agricultural expertise with environmental stewardship, ALUS is fostering a new paradigm in land management that benefits both farmers and the broader ecosystem.</p> |
| <p>Michael Back, Kent State University</p> | <p>Sediment-surface water nutrient exchange across vegetation patches in a diked Lake Erie wetland</p> <p>Diked coastal wetlands along the Great Lakes have stable water levels between management actions; however, internal nutrient processing can vary across a wetland and lead to net nutrient release or retention associated with shifts in hydrology via management. Determining the direction and rate of nutrient exchange at the sediment-water interface of a diked coastal wetland can indicate the potential for nutrient release upon a shift in management actions. Long established methods for measuring nutrient exchange at the sediment-water interface often involve the incubation of intact sediment cores, but isolating sediment from the surrounding ecosystem could lead to inaccurate estimates of nutrient exchange occurring in the field. We asked how nutrient exchange varies at the sediment-water interface across vegetation patches of a diked Lake Erie wetland? And, how in situ and ex situ methods of measuring nutrient exchange compare? Our objectives were to estimate ecosystem nutrient exchange rates across the wetland based on area weighted means from each vegetation patch and to better explain differences associated with methods. We measured sediment-water nutrient flux (mg/m²/d) using intact sediment core incubations (ex situ) and stacked-resin bag core deployments (in situ) across five distinct vegetation patches in a diked wetland on the southwest coast of Lake Erie. In intact sediment cores, soluble reactive phosphorus fluxes range from -10.6–11.1, nitrate fluxes range from -2.9–4.2, and ammonium fluxes range from -3.9–151.8 (negative fluxes indicate net transfer from surface waters to sediments). Nutrient exchange rates are generally higher in magnitude from intact core incubations than stacked-resin bags, which could be attributed to the discrepancy of the temporal scale captured by the two methods (3 vs 10 days, respectively) or by confounding variables occurring in situ which are excluded ex situ. Understanding how sediment-surface water nutrient exchange varies spatially and temporally can guide management decisions in Great Lakes coastal wetlands, but also must be measured at a scale relevant to land managers.</p> |

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| <p>Garrett Moots, University of Toledo</p> | <p>The Dynamics and Human-Health implications of Microcystin Occurrence at Lake Erie Beaches</p> <p>Recent research has revealed that foreshore beach sands, can act as reservoirs for toxic concentrations of the cyanotoxin microcystin, commonly produced during harmful algal bloom (HAB) events. Foreshore sands, situated on coastal shorelines, are constantly rewetted by waves and therefore subject to a continuous input of algae during bloom events. This phenomenon poses significant human health and beach management challenges, especially for children who are more likely to come into contact with contaminated water and sand. Our study focused on three Ohio beaches: Maumee Bay State Park Beach in Oregon, Lakeview Beach in Lorain, and Huntington Beach in Bay Village. Using indirect, competitive ELISA to measure microcystin concentrations, we found that about 8% water samples had levels above the EPA no-contact threshold for recreational waters. The highest microcystin concentrations were most frequently observed at Maumee Bay State Park Beach in Oregon. To investigate the persistence of microcystin in foreshore sands, we conducted laboratory studies using autoclaved and non-autoclaved sand microcosms spiked with Microcystin. The sandy microcosms were incubated at 10% moisture and 30°C or 0% moisture and 10 °C for 49 days, and samples were periodically analyzed using Enzyme-Linked-Immunosorbent-Assay (ELISA). Results indicated that microcystin concentrations decreased by 46% in autoclaved treatments and by 100% in non-autoclaved treatments, with rapid, total degradation occurring between 21 and 28 days in non-autoclaved sands. This persistence suggests that microcystin can remain in the foreshore sands long after visible algae have disappeared, posing a lingering risk for beachgoers. To understand the potential for human exposure to microcystin through skin contact during recreational beach activity, we employed vertical static diffusion cells (Franz Cells) with pig skin as a surrogate for human skin. We tested microcystin permeation under various conditions: unaltered skin, skin with abrasions, and skin treated with sunscreen, suntan accelerators, and aloe vera, which are representative of skin conditions of beachgoers. Our findings showed that skin condition and treatments significantly influence microcystin absorption rates, highlighting the potential health risks associated with recreational beach exposure during HAB events. These findings highlight the importance of considering foreshore sands as a potential vector for cyanotoxin exposure in humans, necessitating better beach management practices, public health advisories to protect vulnerable populations, and the need for coastal resilience. Further research into the persistence, occurrence, and exposure pathways in humans of microcystin is crucial for developing comprehensive strategies to mitigate the risks associated with HABs in coastal and beach environments.</p> |
| <p>Marya Czech, Junction Coalition of Toledo OH</p> | <p>We're Back to Dr. Seuss's "As bad in Lake Erie"</p> <p>Harmful algal blooms (HABs) have become a persistent and escalating environmental challenge in the Western Lake Erie Basin, impacting water quality, public health, and local economies. This presentation will explore the multifaceted nature of HABs, delving into their causes, consequences, and efforts to mitigate their occurrence. The owners of Concentrated Animal Factory Operations present the most formidable challenge to HABs alleviation.</p> |

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| <p>Adellia Baker, SUNY Brockport</p> | <p>Wetland restoration impacts on vegetation composition in Lake Ontario coastal wetlands</p> <p>Regulation of Lake Ontario water levels since the 1960s has been associated with an increase in cover of hybrid cattail (<i>Typha x glauca</i>) in the lake’s coastal wetlands. These wetlands have been negatively impacted by the growth of this clonal dominant as it has displaced native graminoids in the biodiverse wet meadow zone. To address this issue around Lake Ontario, previous efforts to restore the wet meadow zone have focused on managing cattail and updating the lake regulation plan. However, the effects of these methods on invasive species such as reed canary grass (<i>Phalaris arundinacea</i>), and abundant native grasses such as Canada bluejoint (<i>Calamagrostis canadensis</i>) have not been fully studied. In 2023, we conducted vegetation sampling in eight wetlands around southern and eastern Lake Ontario and the Upper St. Lawrence River to determine how previous cattail management has impacted the wet meadow zone following recent changes to the water regulation plan. Four of these wetlands have had chemical and mechanical cattail treatments implemented at the wet meadow – cattail interface between 2010-2018, while the remaining four wetlands have not been treated. Wetland sites were paired based on hydrogeomorphic type and wetland size. Results from 2023 suggest that restored sites had lower percent cover of <i>Typha</i> at higher elevations, but greater cover at lower elevations compared to unrestored sites. <i>Calamagrostis</i> cover was more prevalent in the middle elevations in the restored sites compared to the unrestored sites, while <i>Phalaris</i> trends varied greatly by site. The 2024 survey results will be added to examine changes over time. Results of this research should be considered by restoration practitioners when restoring wet meadow habitats and planning for potential impacts to non-target species and overall ecosystem functioning.</p> |
| <p>Catherine Landis, SUNY ESF Center for Native Peoples and the Environment</p> | <p>Wild Rice Recovery Pilot Study</p> <p>Wild rice (<i>Zizania aquatica</i> and <i>Z. palustris</i>) once grew commonly in lakeshore wetlands and along slow flowing waterways in the area we now call upstate NY. As a highly nutritious annual grass, wild rice provided food for waterfowl and for Indigenous human communities alike. Many wild rice stands have been lost to shoreline development, pollution, dredging, stream channelization and other factors. However, wild rice still occurs sporadically in NYS, for example along the Eastern shore of Lake Ontario in protected bays and inlets. The purpose of this project is to learn more about the historic and current distribution of wild rice in waterways in Onondaga Nation aboriginal territory, including Lake Ontario shoreline and the Oswego River watershed. Specifically, we seek to answer these questions, within the area outlined by the 2005 Onondaga Land Rights Action:- Where did wild rice occur historically?- Where does it grow now?-Where could it be and what restoration would be required?The project is in its early stages. We will present data we have so far in response to these three questions, and welcome feedback.</p> |

Field Trips



Irondequoit Bay REDI: Climate Resilience Projects for Recreation, Safety, and Economic Development

Field Trip Leader: Timothy Walsh, New York State Department of Environmental Conservation

Description: The group gathered at Irondequoit Bay and learned about various successes made possible by the Lake Ontario Resiliency and Economic Development Initiative (REDI) program. One example was a project that addressed the recurring flooding issues at the Irondequoit Bay State Marine Park boat launch and parking area. The project included repairing the parking area, modifying the boat launch dock system to accommodate higher water levels, and ensuring a launch area is available for emergency personnel at all times. Operated and maintained by the Town of Irondequoit, these infrastructure improvements enhanced resilience to fluctuating water levels caused by climate change.

The REDI program has helped build trust with local communities. Each project has had a high degree of specialization based on the interests of the community—it has never been one size fits all.

The REDI program has shown that resiliency can be greatly enhanced in urban environments when funding is available and projects were well-suited to their locations—it can be a potential model for other urban areas facing similar challenges.

Sodus Beach & Chimney Bluffs: Witnessing Lake Ontario's Dynamic Coastline



Field Trip Leader: Nance Arquiett, New York State Department of Environmental Conservation

Description:

Chimney Bluffs State Park: NYS Parks staff highlighted a habitat mitigation project. Northern Harriers, a state threatened bird species in New York, were spotted using an area where an

overflow parking lot was planned for the state park. Ash trees were removed and the area is now being managed as a grassland. A recent vegetation survey found 76 plant species including over 60 native species. Northern Harriers were again observed using the area in 2024 but have not been documented breeding. Chimney Bluffs State Park is named for unusual “chimney”-like formations along Lake Ontario. These formations are drumlins that are actively being eroded by the lake, ice, and wind, producing their unique shape.

Sodus Point Beach: The group met with the Mayor of the Village of Sodus Point, who spoke about the beach restoration at Sodus Point. Extreme flooding of Lake Ontario in 2019 damaged Sodus Point Beach. In response, the REDI program funded a beach restoration project that involved planting sea grass. The sea grass roots hold the dunes in place and prevent further beach erosion. This project has been completed. These dunes also buffer the many residences along the shoreline from wind and flooding from high lake levels.

Transforming Habitats and Building Resilience: Restoration Projects at Braddock Bay Wildlife Management Area



Field Trip Leaders: Rachel Schultz, SUNY Brockport; Heidi Kennedy, New York State Department of Environmental Conservation

Description:

Barrier beach restoration site: Project leaders Josh Ungire (Wetland Ecologist, USACE) and Greg Lawrence (SUNY-Brockport) described the restoration efforts and results. Restoration of the barrier beach led to a drastic increase in shorebirds using the site. Monitoring has shown that approximately 34 species of birds now use the inland beach area that is protected by the barrier beach.

Braddock Bay marsh: The group met with Alex Silva, a master’s student at SUNY-Brockport to observe the marsh where a potholing and channeling project occurred. The USACE had to re-dig many of the potholes and channels after high water levels during 2017 and 2019 caused the tiered benches that were excavated to collapse. This is one consideration that should be accounted for when designing these types of projects.

Cranberry Pond: Andy Hinckle (Audubon Great Lakes) and Brandy Nevelidine (Ducks Unlimited) took the group to one of the potholes that was excavated during the project. A lesson learned during the Cranberry Pond project was that excavating potholes in a more concentrated

pattern is preferred by secretive marsh birds. Additionally, adding dredged spoils on top of cattail mats simulated a meadow marsh and provided additional habitat for other marsh birds.

Bird Walks



Bird Walk at Highland Botanical Park

Field Trip Leader: June Summers, Genesee Valley Audubon Society

Description: Eleven participants joined June Summers for a tour of Highland Botanical Park, a historic park established in 1888 and one of the nation's first municipal arboretums. Although there wasn't a lot of bird activity, the group enjoyed glimpses of Ruby-crowned Kinglets and flyovers of American Crows and American Robins. As the Botanical Park serves as an outdoor museum of trees, the group also learned about native trees and were inspired by the park's mighty oaks.

Bird Walk at Cobb's Hill Park



Field Trip Leaders: Stephanie Beilke, Audubon Great Lakes; June Summer, Genesee Valley Audubon Society

Description: Seven participants joined June Summers and Stephanie Beilke at Cobb's Hill Park in Rochester. The group found 52 individuals of 19 bird species. Highlights included good looks at Brown Creeper, Tufted Titmouse, and Hermit Thrush. The group was also thrilled to hear the loud monkey laughs of a pair of Pileated Woodpeckers, but the sleeping raccoon spotted high up in the canopy stole the show.

Great Lakes Coastal Resilience Workgroup

Workgroup Meeting Summary

Current and prospective members gathered to launch the Great Lakes Coastal Assembly's newest workgroup focused on coastal resilience. This was an opportunity for informal introductions, early reflections on what folks were learning at the Symposium, and exploration of intentions for the Coastal Resilience Workgroup going forward. Participants brainstormed ideas for the workgroup purpose, which they envision as a space for workgroup members and guest speakers to share success stories and challenges for coastal resilience projects, discuss opportunities, address gaps, prioritize projects, and connect with partners throughout the Great Lakes.

To learn more about this emerging group, please reach out to the workgroup co-chairs: Jim Luke, U.S. Army Corps of Engineers and Rachael Franks-Taylor, National Oceanic and Atmospheric Administration.

Great Lakes Coastal Resilience Survey

Survey Questions

Summary of Findings



Thank You Sponsors



Great Lakes Level



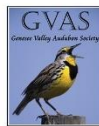
Department of Environmental Conservation



Lake Ontario Level



Braddock Bay Level



Genesee River Level



Planning Committee & Volunteers

Special thank you to our planning committee and volunteers.

Committee Co-Chairs:

- Stephanie Beilke, Audubon Great Lakes
- David Clarke, New York State Department of Environmental Conservation

Committee Members:

- Randall Knapik, Michigan Department of Natural Resources
- Kurt Kowalski, U.S. Geological Survey
- Brandon Krumwiede, National Oceanic and Atmospheric Administration
- Stevie Adams, The Nature Conservancy
- Kali Apelt, Sault Ste. Marie Tribe
- Liz Berg, U.S. Fish and Wildlife Service
- Wesley Bickford, U.S. Geological Survey
- Jessica Collier, U.S. Fish and Wildlife Service
- Jim Luke, U.S. Army Corps of Engineers
- Lexie Davis, New York State Department of Environmental Conservation
- Greg Mayne, Environment and Climate Change Canada
- Nathaniel Miller, Audubon Great Lakes
- Nicole Minadeo, Audubon Great Lakes
- Leslie Pelch, Delaney Event Management
- Beynan Ransom, New York State Department of Environmental Conservation
- Amy Roe, U.S. Fish and Wildlife Service
- Dr. Rachel Schultz, SUNY-Brockport
- June Summers, Genesee Valley Audubon Society
- Shannon Dougherty, New York State Dept. of Environmental Conservation
- Jillian Estrada, Great Lakes Commission
- Rachael Franks-Taylor, National Oceanic and Atmospheric Administration
- Brian Glenzinski, Ducks Unlimited
- Cherie Hagen, Wisconsin Department of Natural Resources
- Terry Heatlie, National Oceanic and Atmospheric Administration
- Bretton Joldersma, Michigan Department of Environment, Great Lakes, and Energy
- Janice Kerns, Ohio Department of Natural Resources
- Joshua Unghire, U.S. Army Corps of Engineers
- Don Uzarski, Central Michigan University
- Matt Walderon, Pennsylvania Department of Environmental Protection
- Timothy Walsh, New York State Department of Environmental Conservation

Additional Volunteers

- Erica Clites, Michigan Sea Grant
- Ryan Darnton, National Oceanic and Atmospheric Administration
- Emily Fell, New York State Department of Environmental Conservation
- Joli Springborn, New York State Department of Environmental Conservation

- Andy Hinickle, Audubon Great Lakes
- Linda Howell, Genesee Valley Audubon Society
- Bob Holsman, D.J. Case & Associates
- Elizabeth Jenkins, New York State Department of Environmental Conservation
- Doug Pearsall, The Nature Conservancy
- Rewa Phansalkar, Cornell University

Plans for the Next Great Lakes Coastal Symposium

The Great Lakes Coastal Assembly aims to host the Symposium every other year. Each cycle, the Assembly puts out a call for host site nominations to its members. The Assembly's goal is to host the Symposium in a different region of the Great Lakes each cycle. They anticipate the next event will take place in 2026, with early interest to host in Canada.