# Great Lakes Panel Member Updates
# Fall 2022

Meeting of the Great Lakes Panel on Aquatic Nuisance Species
November 1-3, 2022 | Virtual Meeting

## U.S. Federal

**U.S. Fish and Wildlife Service**
No update provided.

Contact: Amy McGovern, U.S. Fish and Wildlife Service, 612-713-5109, amy_mcgovern@fws.gov

**National Oceanic and Atmospheric Administration**
No update provided.

Contact: Felix Martinez, National Oceanic and Atmospheric Administration, 734-741-2254, felix.martinez@noaa.gov

**National Park Service**
No update provided.

Contact: Brenda Lafrancois, National Park Service, 715-682-0631, brenda_moraska_lafrancois@nps.gov

**U.S. Army Corps of Engineers**
No update provided.

Contact: Mike Greer, U.S. Army Corps of Engineers Buffalo District, 716-879-4229, michael.j.greer@usace.army.mil

**U.S. Coast Guard**
The Coast Guard published its ballast water discharge standard regulation in the Spring of 2012. The standard aligns with the IMO D-2 standard and require the installation of type-approved ballast water management systems (BWMS) on "salties". The use of type approved ballast water management methods are required on those new ships constructed after 1 DEC 2013 and will be implemented on existing ships during the vessel's first scheduled drydock after 2014 or 2016 depending on the vessel's BW tank capacity and availability of type approved systems.
The Coast Guard anticipates that more than 3,000 United States domestic vessels in various classes will be required to install an approved ballast water management system (BWMS). In addition, about 9,000 foreign vessels that enter U.S. waters each year will be subject to the rule. The IMO estimates that more than 60,000 vessels worldwide will need to comply with the Ballast Water Management Convention when it enters into force.

The multi-faceted type approval process consists of land-based and shipboard-based testing (by independent labs) focused on the biological efficacy of the BWMS. For those systems whose performance could be affected by the cold and pure fresh water of the Great Lakes, additional testing

may be necessary. Assessment of the BWMS' ability to properly operate in the harsh marine environment is also undertaken and all of the system's components are examined to ensure compliance with marine engineering, electrical, and mechanical standards. This testing and certification is usually conducted by vessel classification societies. The Coast Guard has certified five Independent Labs (IL) that are involved in the type approval process. Duluth-Superior's Great Ship Initiative is part of a certified IL. Since 2013, the Coast Guard Marine Safety Center has received 59 of Letters of Intent from BW treatment system manufacturers stating they intend to pursue type approval for their ballast water treatment system. The Coast Guard's Marine Safety Center has type approved 46 BW treatment systems.

The Ballast Water Working Group has completed the 2021 annual report and it is posted on this website; 2021 Summary of Great Lakes Ballast Water Management (greatlakes-seaway.com)
In 2021, 100% of vessels bound for the Great Lakes Seaway from outside the Exclusive Economic Zone (EEZ) received ballast management exams on each Seaway transit. In total, all 9470 ballast tanks were assessed during the 490 vessel transits. Vessels that did not exchange their ballast water or flush their ballast tanks were required to either retain the ballast water and residuals on board, treat the ballast water in an environmentally sound and approved manner, or return to sea to conduct a ballast water exchange.
In 2021, there were 324 ships with a working Ballast Water Management System (BWMS) onboard (148 on first transit, 176 on subsequent transit). Vessels that were unable to exchange their ballast water/residuals and that were required to retain them onboard received a verification exam during their outbound transit prior to exiting the Seaway. In addition, 100% of ballast water reporting forms were screened to assess ballast water history, compliance, voyage information and proposed discharge location. BWWG verification efforts indicated that there was no non- compliant ballast water discharged in the Great Lakes Seaway system.

On December 4th, 2018, the Vessel Incidental Discharge Act was signed into law as part of the Coast Guard Authorization Act. The title provides for a uniform, national standard to govern discharges that are incidental to vessel operations, such as ballast water discharges. It makes the Environmental Protection Agency the lead for establishing these standards, and it makes the Coast Guard the lead for monitoring and enforcing the standards. The Coast Guard and the EPA are working on their respective regulatory mandates.

Contact: Lorne Thomas, U.S. Coast Guard Ninth District, 216-902-6022, Lorne.w.thomas@uscg.mil

**U.S. Forest Service**
No update provided.

Contact: Amanda Kunzmann, USDA Forest Service, 414-297-3431, akunzmann@fs.fed.us

**U.S. Department of Agriculture-APHIS**
No update provided.

Contact: Vacant

**U.S. Department of State**
No update provided.

Contact: Nadia Sbeih, U.S. Department of State, 202-647-3228, SbeihND@state.gov

**U.S. Environmental Protection Agency**
No update provided.

Contact: Kevin O'Donnell, U.S. EPA- Great Lakes National Program Office, 312-353-0813, ODonnell.Thomas@epa.gov

**U.S. Geological Survey**
Invasive Crayfish Control Technologies

In FY22, field treatments were conducted in ponds and burrows using a pyrethrin insecticide and a physical blocker (Benseal®, a clay sealant). Laboratory toxicity trials were conducted with a surrogate crayfish *(Faxonius virilis*) to determine lethal concentrations of carbon dioxide ($CO_2$) in cold water. State managers are considering using $CO_2$ under ice because it is a registered aquatic pesticide and may be viewed more favorably then pyrethrin by the public. One manuscript summarizing burrow treatments with physical blockers was completed and is in review. Six presentations were given at three scientific meetings summarizing field treatments, ongoing mesocosm and laboratory research, and collaborative and adaptive management challenges and outcomes associated with the control of invasive Red Swamp Crayfish (RSC; *Procambarus clarkii*). We began to investigate the potential registration of a pyrethrin insecticide for control of crayfish in aquatic ecosystems to address lengthy regulatory permitting reviews associated with the use of chemical control. Partners have consulted with 4 states outside the GL Basin to discuss possible methods for the control of recent localized infestations of alien invasive crayfish. In FY23, we anticipate additional manuscripts summarizing field treatments of ponds and burrows and recovery of native crayfish, other aquatic invertebrate, and plant communities. We also plan to begin assessing the feasibility of hot water as a control for RSC in burrows, the use of sterile males to control RSC populations, and various stimuli to enhance removal methods.

Grass Carp research

*Early life history*

During the 2022 field season, we sampled seven Great Lakes tributaries for Grass Carp eggs and larvae, including the Cuyahoga, Grand (OH), Huron (OH), Maumee, Sandusky, St. Joseph, and Tittabawassee rivers. Likely Grass Carp eggs were visually identified from the Maumee and Sandusky rivers. A subset of eggs from the Sandusky River have been confirmed as Grass Carp via genetics, and we await genetic results for Maumee River eggs. Although sample processing is not complete, no likely Grass Carp eggs were observed during surveys in other rivers. In addition to sampling high flow events, we also sampled each river once per month during lower flow conditions to improve baseline data.

*Acoustic telemetry*

In 2022, we deployed receivers in nearshore habitats of Lake Erie to attempt to identify grass carp movement corridors and to allow identifying grass carp locations to within a few meters at multiple locations in the Sandusky River. These efforts support control efforts and informing deployment of a seasonal barrier on the Sandusky River to block grass carp spawning. We presented results at local and national meetings, engaged stakeholders charged with managing Grass Carp, and submitted a manuscript for review that describe grass carp migration timing near the suspected spawning location in

the Sandusky River. Future efforts are expected to continue in the Sandusky River and Lake Erie nearshore habitats and to expand to better understand movement and space use in the Maumee River.

*Bait and attractant studies*

- Completed three 14-day trials on the Sandusky River testing bait and algae as attractants for Grass Carp.
- Deployed 111-receiver array to track movements of tagged Grass Carp to assess efficacy of bait and attractant stations across a broad spatial scale in collaboration with Michigan State University, Ohio Department of Natural Resources, and Michigan Department of Natural Resources.
- Deployed an 18-receiver array in Plum Creek to assess bait and algae efficacy for congregating Grass Carp within a smaller spatial scale.
- Captured 9 Grass Carp in hoop nets at sites in the Sandusky River.
- Completed six longitudinal assemblage trials representing approximately 128 river kilometers of the Sandusky River as a baseline for comparison following installation of the seasonal deterrent
- Deployed >100 mini fyke nets over >30 days, and conducted >20 days backpack and boat electrofishing searching for juvenile Grass Carp.
- Completed laboratory trials testing algae effectiveness in congregating juvenile Grass Carp and are processing videos in Ethovision.
- Drafted manuscripts on laboratory trials testing bait effectiveness in congregating juvenile Grass Carp and on evaluating 2021 field trial results from bait and attractants in the Sandusky River.
- Continuing long-term bait and algae trials in Plum Creek through October
- Retrieving VPS array receivers in November 2022.

*Literature review and Electro-olfactogram research*

In FY22, we completed analysis and writing and submitted to the Journal of Fish Biology our work on the use of electro-olfactogram (EOG) with Grass Carp, Bighead Carp, and Silver Carp to identify amino acids that could potentially be used as attractants or deterrents. We followed the EOG research with behavioral trials to test if the response we saw using EOG was reflected in their behavioral response. The behavioral information was presented at the Animal Behavior Society International meeting and the manuscript will be submitted to a journal. The behavioral response of these invasive carp species appeared somewhat contradictory to the EOG results. Additionally, a complete draft of a Grass Carp literature was produced that focuses on: diet and behavior; physiological limits, toxicity, and biology; and gut physiology and alternate control pathways in support of Grass Carp research. We plan to complete the publication process of the EOG, behavior, and literature manuscripts. Also, based on what we learned through the literature review process and laboratory studies we conducted, we plan to assess additional compound that have been identified by the invasive carp research community that need to be tested using the same EOG and behavior system with the potential for possible pond trials.

<u>Great Lakes Phragmites Collaborative</u>

The GLC and USGS are jointly leading a regional partnership – the Great Lakes Phragmites Collaborative (GLPC) – to improve communication and collaboration leading to more coordinated, efficient and strategic approaches to managing non-native Phragmites across the Great Lakes basin. The GLPC provides educational resources tailored to diverse interest groups, connects invasive species managers

with the latest research and technology, encourages the use of adaptive management, and facilitates alignment of partner efforts across jurisdictional barriers.

- Continued to provide information via the high-traffic website www.greatlakesphragmites.net
- Hosted several webinars in 2022, including an overview of gene silencing technologies for invasive Phragmites control presented by Dr. Ping Gong, US Army Engineer Research and Development Center

- Continued to draft audience-specific outreach materials across various multi-media formats
- Maintained a database and dynamic map of regional organizations (including CISMAs, CWMAs and PRISMs) working on invasive species in the Great Lakes
- Hosted over 18 case studies of Phragmites management in both Canada and the U.S.
- Shared the work of the GLPC at many national and international conferences

*Phragmites Adaptive Management Framework (PAMF)*

The GLC and USGS are working to promote effective Phragmites management and track the effectiveness and resource efficiency of management activities through the PAMF program (http://www.greatlakesphragmites.net/pamf/). PAMF engages a variety of land managers across the basin, from state and federal employees to private citizens, in a strategic attempt to help and learn from people actively managing Phragmites. The program needs your participation to develop data-driven best management practices as quickly as possible.

- In 2021, leadership of PAMF transitioned to the GLC, which continues to work daily with PAMF participants (representing over 60 different organizations) to coordinate efforts effectively
- Since 2017, PAMF conducted 38 total training sessions reaching over 400 people across the Great Lakes basin to educate Phragmites managers about PAMF and encourage their participation. In response to the COVID-19 pandemic, PAMF hosted live virtual trainings in summers 2020-2022, and it introduced self-paced online training courses through the Moodle platform. In 2022, PAMF reinstated in-field trainings for the first time since 2019.
- Increased total enrolled management units to 276 across all eight Great Lake states and Ontario; provided management guidance to 95 enrolled management units for the 2022/23 cycle
- During 2020-2022, PAMF staff assisted with monitoring 35 management units that managers were unable to monitor due to COVID-19 travel or budget restrictions
- Since 2018, PAMF staff promoted PAMF or presented at >20 scientific meetings or conferences · The animation “Phragmites Adaptive Management Framework: Participation Cycle” won a USGS Shoemaker Award for Communications Product Excellence in 2019
- Developed the PAMF Strategic Plan to guide successful implementation of PAMF by setting program-specific goals, objectives, and measures for five years (2020-2026)
- In 2022, PAMF added voluntary monitoring for invasive European Frog-bit to its monitoring protocol, providing 89 survey results to the European Frog-bit Collaborative
- Currently enrolling new management units for the 2022/2023 PAMF cycle year – contact the PAMF Coordinator at pamf@glc.org

<u>USGS Phragmites research update</u>

The USGS is conducting research into innovative control measures for non-native Phragmites australis (common reed), a highly invasive species with wide-ranging social, economic, and ecological impacts, based on the bacteria, fungi, and other microbes that it supports. A USGS-led group developed a science agenda (Kowalski et al 2015, https://pubs.er.usgs.gov/publication/70147339) that is guiding a nation-wide effort to develop new management approaches that promote the microbes that are harmful to this invasive plant and inhibit those that help it outcompete native plants. There have been many publications on this topic since 2015, all of which are highlighted in the Published Phragmites Research section of the GLPC web site (https://www.greatlakesphragmites.net/research/).

Close partnerships with the University of Michigan, Rutgers University, Tulane University, Louisiana State University, and other organizations are identifying the key microbes and microbial processes to target for manipulation as a form of plant control. Field and greenhouse studies over the past few years have tested the virulence of harmful microbes on Phragmites plants, cataloged the microbes associated with this invasive plant, and evaluated how the application of non-toxic antimicrobial treatments affect plant growth. These and other studies are helping identify the mechanisms associated with plant-microbe mutualisms and leading to the development of new management tools for managers of Phragmites and other non-native plant species. Field studies were initiated in Michigan and New Jersey to test potential treatments and patented technologies.

USGS continues to work closely with colleagues at the U.S. Army Corps of Engineers Engineer Research and Development Center to develop genetic biocontrol treatments for non-native Phragmites australis. Based on the natural plant process of RNA interference, the research team is developing species-specific treatments that limit the expression of plant traits (e.g., high growth) and offer managers additional treatment options. This work is being informed by genomic and transcriptomic analyses by USGS, Louisiana State University, and Tulane University, including the first published full genome description of non-native Phragmites. Additionally, we are working to describe the genome of the North American native Phragmites to be able to take a comparative genomics approach to understand the genetic underpinnings of Phragmites invasiveness and identify more specific and effective targets for genetic control.

The USGS is partnering with the U.S. Fish and Wildlife Service to explore the impacts of Great Lakes water levels on the growth, spread, and management of Phragmites. After several years of prolonged high water, many existing Phragmites populations in the coastal zone of the Great Lakes are being stressed or drowned. Additionally, land managers are taking advantage of the high water and cutting Phragmites below water to drown the plant as a control strategy. However, very little data have been collected on the viability of rhizomes following natural drowning or the efficacy of cut-to-drown management. We are combining field and greenhouse studies as well as cataloging geographic zones where retreat or expansion may occur under future water-level patterns. This work is funded by the USGS-FWS Science Support Partnership Program.

Contact: Patrick M. Kočovský, U.S. Geological Survey, 419-625-1976, pkocovsky@usgs.gov

## State/Provincial

**Illinois**

No update provided.

Contact: Kevin Irons, Illinois Department of Natural Resources, 217-557-0719, kevin.irons@illinois.gov

**Indiana**
No update provided.

Contact: Eric Fischer, Indiana DNR, 317-234-3883, efischer@dnr.in.gov

**Michigan**
No update provided.

Contact: Sarah LeSage, Michigan DEQ, 517-243-4735, lesages@michigan.gov

**Minnesota**
• State plan revision: The Minnesota Invasive Species Advisory Council state invasive species management plan was revised and the aquatic elements of the plan were approved by the federal Aquatic Nuisance Species Task Force in May 2022.
• Nonnative *Phragmites*: The Minnesota Department of Natural Resources (DNR) continued to work with cooperators to implement a coordinated response to nonnative *Phragmites (Phragmites australis subsp. australis*) in Minnesota. In 2022 the Minnesota DNR hired a contractor to treat 370 nonnative Phragmites sites in 31 counties. Most of the counties where treatment occurred had a limited number of small sites; 23 counties had less than ten sites. The average size of treatment was 0.12 acres. At 100 of the sites no treatment was done because no nonnative *Phragmites* was found at the site, largely due to previous years' treatment.
• Ballast water: The Minnesota Pollution Control Agency (MPCA) general permit for ballast water discharges covers approximately 250 vessels, with coverage for 27 vessels added over the last year. The general permit requires development of a ballast water and sediment management plan, and in some cases a compatibility review of available ballast water treatment technologies to meet the IMO standards. The MPCA is still awaiting federal action on the National Standards of Performance for incidental discharges from vessels, including ballast water, as required under the Vessel Incidental Discharge Act (VIDA).
• Prevention highlight: Watercraft inspectors prevented the introduction of starry stonewort in Lake Superior during a watercraft inspection in Two Harbors, Minnesota.
• Invasive carp: The Minnesota DNR continues to build partnerships with the U.S. Geological Survey, U.S. Fish and Wildlife Service, Wisconsin Department of Natural Resources, National Park Service, and Wild Rivers Conservancy as it leads Modified-Unified Method (MUM) events in pursuit of invasive carp. Two MUM events were held on the Mississippi River in 2022. Each event provides valuable information that is used to inform the Minnesota DNR's approach to capturing invasive carp. The Minnesota DNR will be using structured decision-making to inform the update of the Invasive Carp Action Plan. It will evaluate the full suite of management options in a transparent, inclusive, and comprehensive way.
• Invasive aquatic plant management grants: In 2022, $1.25 million in grants was made available for the DNR AIS Control Grant Program, which will fund 223 invasive aquatic plant treatments from 2022-2023 in 142 grant awards.

Contact: Kelly Pennington, Minnesota DNR, 651-259-5131, kelly.pennington@state.mn.us

**New York**

<u>Prevention/Education and Outreach:</u>

-This season the watercraft inspection steward program performed more than 220,000 inspections with 8,113 detections of AIS. Eurasian watermilfoil, curly leaf pondweed, and zebra mussels were the most frequently found species. We participated in both the Great Lakes and Northeast AIS Landing Blitz from July 1st to July 10th.

Monitoring and Detections:

-Aquatic plant surveys of the Peconic River have been completed for this season. Twenty-three native plants were found along with the following aquatic invasive species: Brazilian elodea, Curly-leaf pondweed, European frogbit, Fanwort,
Floating water primrose, and Parrot feather

-The 2022 aquatic plant survey of select sites along the southern extent of the Hudson River were completed. No hydrilla was found.

- Hydrilla was found in three new locations: Lake Sebago in Harriman State Park (Rockland County), East Pier Marina and Shores Waterfront Marina and Restaurant in Tonawanda (Erie County)
- Floating water primrose (*Ludwigia peploides*) has been confirmed in Wolfes Pond on Staten Island (Richmond County)
- Water spangles (Salvinia minima) have been confirmed in Van Cortlandt Lake in the Bronx (Bronx County) and Silver Mine Lake in Harriman State Park (Rockland County)

Control and Management:

-Additional hydrilla was found north of the treatment area in the portion of Cayuga Lake near Aurora.

- October 2022 marks the completion of the Croton River Hydrilla Control Project. The last Sonar treatment ended on September 6th and aquatic plant surveys in early October found no hydrilla in the river. Monitoring will continue for an additional three years.

-Hydrilla control projects continued at Spencer Pond and Kuhlman Pond in Tioga County, Green and Hickory Lakes and Erie Canal/Tonawanda Creek in Erie/Niagara Counties, and at multiple locations in Cayuga Lake in Cayuga and Tompkins Counties. Work on Lake Sebago in Rockland County will begin next year.

-A total of 61 acres of surface area in the Peconic River were treated to control floating water primrose (*Ludwigia peploides*) and European frogbit (*Hydrocharis morsus-ranae*) using a combination florpyrauxifen-benzyl and imazamox on July 27, 2022.

Research:

-Application of NYSDEC developed water chestnut biomass estimates to statewide management efforts
    o Enables comparison between years within a site and across sites.

-Comparison of plant communities at waterbodies with and without history of copper-based herbicide use

-Comparison of plant communities in waterbodies with and without public access

Contact: Catherine McGlynn, New York State Department of Environmental Conservation, 518-408-0436, catherine.mcglynn@dec.ny.gov

**Ohio**

- Continued following the *Lake Erie Grass Carp Response Strategy (2019-2023)* with the deployment of multiple Grass Carp Strike Teams through the University of Toledo dedicated to the eradication of Grass Carp from the western basin of Lake Erie. Over 500 adult Grass Carp have been removed to date. We continue to track tagged Grass Carp with the GLATOS system and real-time receivers, and we are working through the University of Toledo to determine Grass Carp catchability and population size. Partners also include Michigan DNR, GLFC, USFWS, and USGS.

- Working with the GLFC, Michigan DNR, USACE, and USGS to develop a seasonal Grass Carp behavioral barrier on the Sandusky River to prevent their movement to spawning habitat. We are working through the USACE Great Lakes Fishery and Ecosystem Restoration program on design and construction funding.
- Continue closure for the three of the four Great Lakes Mississippi River Interbasin Study connections in Ohio at the Ohio Erie Canal, Little Killbuck Creek, and Grand Lake St Marys: 1) The USACE completed the closure of the Ohio Erie Canal connection in March 2020; 2) We are moving ahead with a GLRI funding request for Phase 1 of the Little Killbuck Creek closure with HDR consulting; 3) The preliminary design for the final phase to close the connection at Grand Lake St Marys has been completed and final design will be completed in late 2022.
- Continue the surveillance of Ohio's bait supply chain to determine if AIS, including Bighead and Silver Carp, are being transported through the bait trade. To date, no high risk AIS have been detected.
- Continue to work with Cleveland MetroParks on invasive plant EDRR in the Lake Erie watershed. Partnering with ODNR Parks and USACE on control efforts on Hydrilla just outside the Lake Erie basin at Pymatuning Lake and Mosquito Creek Lake.
- Continue the AIS outreach campaign through Wildlife Forever to target anglers moving bait. This outreach program includes billboards, print media, and items for distribution at events with the slogan "Trash Unused Bait".
- Participated in the following groups: Great Lakes Panel, Ohio Aquatic Invasive Species Committee, and Invasive Carp Regional Coordinating Committee.

Contact: John Navarro, Ohio DNR Division of Wildlife, 614-265-6346, john.navarro@dnr.state.oh.us

**Ontario**
No update provided.

Contact: Francine MacDonald, Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry, 705-755-5136, Francine.macdonald@ontario.ca

**Pennsylvania**
No update provided.

Contact: Jim Grazio, Pennsylvania DEP, 814-217-9636, jagrazio@pa.gov

**Québec**
This was a year of organizational changes within the Ministère des Forêts, la Faune et des Parcs (MFFP). First, the coordinator of the aquatic invasive species division, Olivier Morissette, left to pursue his career in an academic setting and two biologists joined our team. Jesica Goldsmit and Annick Drouin are the two representatives of the MFFP on the GLP.

Following the provincial election, the MFFP was split and merged with other ministries. We do not know yet how this will affect our organizational structure, but for the moment the madats are the same and the province of Quebec will continue its actions to fight aquatic invasive species.

On this subject, the zebra mussel which is present in Quebec in the St. Lawrence River and the Richelieu and Ottawa Rivers since the 90's has now been introduced in several inland lakes. The lack of

progression since its introduction has lowered our vigilance towards this threat. Its recent spread, particularly in the Saint John River watershed, has accentuated the need to strengthen measures to prevent the spread of this and other aquatic invasive species.

Also, a new invasive alien species, the tubenose goby, which is present in the Great Lakes, has been observed for the first time in Quebec in Lake Saint-François

Contact: Annick Drouin, Québec Ministère des Forêts, de la Faune et des Parcs, 418-654-6984 annick.drouin@mffp.gouv.qc.ca

**Wisconsin**
No update provided.

Contact: Amy Kretlow, Wisconsin DNR, 920-838-2597, Amy.Kretlow@Wisconsin.gov

## Regional/Binational

**International Joint Commission**
No update provided.

Contact: Mark Burrows, International Joint Commission, 519-257-6709, burrowsm@windsor.ijc.org

**Great Lakes Fishery Commission**
No update provided.

Marc Gaden, Great Lakes Fishery Commission, 734-662-3209 x14, marc@glfc.org

**Great Lakes Commission**

Invasive Mussel Collaborative

Overview: The Invasive Mussel Collaborative (IMC) is working to advance scientifically sound technology for invasive mussel control to produce measurable ecological and economic benefits. The IMC provides a framework for communication and coordination and is identifying the needs and objectives of resource managers; prioritizing the supporting science; implementing communication strategies; and aligning science and management goals into a common agenda for invasive mussel control.

Recent and Upcoming Activities:

- Continued to support four work groups focused on dreissenid toxicity testing, research, coastal site prioritization, and planning and implementation for future management
- Supported the development of a manuscript outlining recommendations and best practices for testing new controls in lab settings
- Finalized development and release of a research and applied control coordination mapper that utilizes Survey123 and ArcGIS
- Maintained an active communication network, including a comprehensive website, email listserv with over 400 subscribers, twitter account, and released an updated quarterly newsletter

- Ongoing work includes preparing for the release of an interactive geographic site prioritization tool to identify critical coastal habitats that would most benefit from zebra and quagga mussel control efforts
- Upcoming work includes hosting a structure decision-making workshop with the guidance from the Planning and Implementation work group to inform future applied research and management activities in the Great Lakes basin

Lead Staff: Samantha Tank, sam@glc.org

Great Lakes *Phragmites* Collaborative

Overview: The GLC and U.S. Geological Survey are jointly leading a regional partnership – the Great Lakes *Phragmites* Collaborative (GLPC) – to improve communication and collaboration leading to more coordinated, efficient and strategic approaches to non-native *Phragmites* across the Great Lakes basin. The GLPC provides educational resources tailored to diverse interest groups, connects invasive species managers with the latest research and technology, encourages the use of adaptive management, and facilitates alignment of partner efforts across jurisdictional barriers.

Recent and Upcoming Activities:

- Regularly convened an Advisory Committee to guide the work of the GLPC and foster inter-jurisdictional partnerships
- Hosted an ongoing webinar series where guest speakers shared successful models for *Phragmites* management and provided timely research updates
- Convened the *Phragmites* Symbiosis Collaborative, a forum for researchers to share and collaborate on their microbial or genetic research
- Supported and convened four work groups comprised of Advisory Committee members and external advisors, tasked with advancing member strategies outlined in the common agenda through the development of a comprehensive *Phragmites* guidance document
- Updated the GLPC website (www.greatlakesphragmites.net) to meet the needs of our stakeholders.
- Distributing a biweekly newsletter that shares news, upcoming events, and relevant information to *Phragmites* management
- Shared content through the GLPC social media presence on Twitter and Instagram
- Developed audience-specific outreach materials across various multi-media formats

Lead Staff: Samantha Tank, sam@glc.org

*Phragmites* Adaptive Management Framework (PAMF)

Overview: The GLC works with the U.S. Geological Survey (USGS) and University of Georgia to promote effective *Phragmites* management across the Great Lakes basin and track the effectiveness and resource efficiency of those management activities through the PAMF model. PAMF is available to *Phragmites* managers across the basin, from state and federal employees to private citizens, in a strategic attempt to engage, learn from, and assist all levels of *Phragmites* managers.

Recent and Upcoming Activities:

- Maintained ongoing communication with program partners from USGS and the University of Georgia to effectively coordinate program efforts
- Completed the fifth annual model run and delivered *Phragmites* management guidance to 95 active management units
- Assessed progress on year two of the 2020-2026 PAMF Strategic Plan and are planning for fitting programmatic adjustments
- Prepared abstracts for presentations at upcoming conferences
- Distributed PAMF newsletters featuring a blog post and upcoming events
- Updated the remote training course for PAMF participants with lessons that include recorded presentations, targeted readings, helpful guides, and quizzes designed to be a comprehensive participant learning experience
- Completed a PAMF program manual to streamline program coordination and document annual outreach activities
- Hosted a live virtual training session open current and prospective PAMF participants
- Lead four in-person training events in Wisconsin, Ontario, and Michigan to train new and perspective participants on data collection protocols, engaging approximately 50 individuals
- Provided enrollment and monitoring assistance to participants upon request.
- Ongoing and upcoming work includes evaluation and subsequent updates to the PAMF model to further improve guidance and the participant experience.

Lead Staff: Samantha Tank, sam@glc.org

Interstate Aquatic Invasive Species Prevention, Early Detection, and Response (Phase IV)

Overview: The GLC is supporting the eight Great Lakes states in their efforts to plan and coordinate interstate aquatic invasive species (AIS) prevention, early detection, and response activities. During the fourth phase of this effort, the GLC will work with the interstate team to expand and improve the existing regional surveillance framework and to develop best practice guidance for aquatic plant surveillance. The GLC will also be coordinating the development of an enhanced web interface to support regional prevention, early detection, and response activities.

Recent and Upcoming Activities:

- Assisted The Nature Conservancy in continuing development of the Great Lakes surveillance site prioritization system
- Continued development of a standalone website for this program and its products
- Additional upcoming activities include planning for a series of workshops to refine the site prioritization system, to be held in February 2023, and planning for an annual surveillance coordination meeting, also to be held in February 2023

Lead Staff: Ceci Weibert, cweibert@glc.org

Great Lakes Detector of Invasive Aquatics in Trade

Overview: GLC developed the web-based software tool Great Lakes Detector of Invasive Aquatics in Trade (GLDIATR), which collects, analyzes and allows users to access information about how many and what types of Great Lakes AIS are available for sale on the Internet. This information is being used by

invasive species managers to inform and help target a variety of activities, including outreach and education, risk assessment, monitoring and surveillance, and enforcement.

Recent and Upcoming Activities:

- Provided sale information at the request of managers and other partners
- Investigating functionality of novel web tools in the marketplace and potential role in assisting collection, analysis, and dissemination of Great Lakes AIS information
- Identified third-party web scraping tools that may be used to support GLDIATR and contracted with those companies to support project activities

Lead Staff: Erika Jensen, ejensen@glc.org.

Blue Accounting – Aquatic Invasive Species

Overview: The GLC is leading work on aquatic invasive species under Blue Accounting. This work focused on providing regional data and information on efforts to: stop species introduction and spread through priority pathways including live trade and recreational boating; Implement a targeted, binational program to detect new species; and control populations of harmful invasive species across the region.

Recent and Upcoming Activities:

- Contributed to management of the overall Blue Accounting initiative
- Upcoming activities include scoping development of data visualizations to track progress on the control of established species.

Lead Staff: Ceci Weibert, cweibert@glc.org

Great Lakes Aquatic Invasive Species Landing Blitz

Overview: The GLC is supporting the eight Great Lakes states in their efforts to prevent the spread of AIS via the recreational boating pathway. Boaters and other recreators learn about the risks of spreading AIS at public and private boating access sites across the Great Lakes region every summer. The Great Lakes AIS Landing Blitz events take place over a two-week period, emphasizing the need to Clean, Drain, Dry boats whenever they come out of the water, and Dispose of any unwanted bait in the trash.

Recent and Upcoming Activities:

- Executed 11 contracts through the RFP to support events in Michigan, Illinois, Indiana, Wisconsin, New York, and Ohio
- Developed and distributed “starter kits” of materials to each contract recipient
- Hosted online trainings for contract recipients
- Coordinated digital marketing for the 2022 event, increasing outreach and event webpage views
- Upcoming work includes summarizing successes of contract recipients and developing the 2022 event fact sheet

Lead Staff: Ceci Weibert, cweibert@glc.org

Contact: Erika Jensen, Great Lakes Commission, 734-971-9135, ejensen@glc.org

### Canadian Federal

**Fisheries and Oceans Canada**
No update provided.

Contact: Becky Cudmore, Fisheries and Oceans Canada, 905-336-4474, becky.cudmore@dfo-mpo.gc.ca

**Transport Canada**
No update provided.

Contact: Vacant

### LOCAL COMMUNITIES

**United States**
No update provided.

Contact: Vacant

**Canada**
No update provided.

Contact: Vacant

### Environmental/User Groups

**Ontario Federation of Anglers and Hunters**

The OFAH/ISAP continues to deliver programs focused on education/outreach, prevention, monitoring, control, and management.

2022 Snapshot:
• Hired approximately 20 'Hit Squad' staff to deliver invasive species content across the province out of partner organizations. Highlights include efforts on Clean, Drain, Dry, invasive species removal efforts, signage creation, etc.
• The recreational boater pathway remains a priority. With new boater regulations in Ontario, the ISAP prioritized efforts to promote Clean, Drain, Dry and its Water Steward Program. The ISAP also ran a social media campaign alongside partners (e.g., ISC, FOCA, & Boating ON) and achieved over 330,000 impressions and over 18,000 engagements.
• For the fourth year, the ISAP participated in the Great Lakes Regional AIS Landing Blitz. For the first time since 2019, the ISAP was able to deliver ten boater engagement events in person, reaching 383 people as well as a virtual campaign that included eight social media posts that reached 188,617 people and achieved 18,802 engagements.
• In its second year, the ISAP worked with volunteers through their Mysterysnail Management and Removal Program. Staff delivered multiple virtual training workshops to over 300 volunteers focused on how to monitor for, identify (including native lookalikes), report, and remove these invasive species from local waters. In 2022, volunteers removed over 125,000 mysterysnails, representing hundreds of

volunteer hours. This total brings the two-year removal total to over 675,000 banded and Chinese mysterysnails being removed from local waterbodies.
• The ISAP continued the annual monitoring and surveillance for water soldier (*Stratiotes aloides*) on the Trent-Severn Waterway to inform the large-scale herbicide treatment in 2022. Program staff also conducted monitoring and surveillance on Red Horse Lake to assess the efficacy of the 2020 and 2021 treatments and coordinated the treatment required in 2022.
• The ISAP continues to engage with school groups across the province to deliver curriculum-based invasive species education in the form of presentations (both in-person and virtual) focused on AIS, with a focus on Asian carps.

Contact: Brook Schryer, Ontario Federation of Anglers and Hunters, 705-748-6324 ext. 227, brook_schryer@ofah.org

Contact: Sophie Monfette, Ontario Federation of Anglers and Hunters, 705-748-6324 ext. 274, sophie_monfette@ofah.org

**The Nature Conservancy**
No update provided.

Contact: Lindsay Chadderton, The Nature Conservancy, 574-217-0262, lchadderton@tnc.org

**National Wildlife Federation**
No update provided.

Contact: Marc Smith, National Wildlife Federation, 734-887-7116, msmith@nwf.org

### Tribal Authorities

**Great Lakes Indian Fish & Wildlife Commission**
No update provided.

Contact:  Miles Falck, Great Lakes Indian Fish & Wildlife Commission, 715-682-2124, miles@glifwc.org

**Chippewa Ottawa Resource Authority**
No update provided.

Contact: Mike Ripley, Chippewa Ottawa Resource Authority, 906-632-0043, mripley1@chippewaottawa.org

### PRIVATE/COMMERCIAL

**Lake Carriers' Association**
No update provided.

Contact: Tom Rayburn, Lake Carriers' Association, 440-333-9994, rayburn@lcaships.com

### University/Research

**Great Lakes Sea Grant Network-Research and Extension**
No update provided.

Contact: Rochelle Sturtevant, NOAA Great Lakes Sea Grant Network, 734-741-2287, Rochelle.Sturtevant@noaa.gov

**Minnesota Aquatic Invasive Species Research Center**
No update provided.

Contact: Nick Phelps Minnesota Aquatic Invasive Species Research Center, 612-624-7450 phelp083@umn.edu

**Invasive Species Centre**

The ISC has continued to work on education and outreach work surrounding Asian carps. We have completed ads in angling magazines, angling e-mail newsletters, and updated the Asian Carp Canada website. We have also started two new partnerships, one with Fish'n Canada where we will be podcast guests and run ads through their networks on Grass Carp ID and reporting, and the other with the popular fishing app Fishbrain, where we will utilize their app to share content and resources on Asian carps.

The ISC is also continuing our zooplankton diagnostics work where we analyze water samples for presence or absence of invasive mussel veligers and spiny water flea in in-land lakes across Ontario. We are also continuing our volunteer-based sampling program run in partnership with the Federation of Ontario Cottagers' Associations, IsampleON, where Lake Associations collect samples that they will then send to our lab to be tested for presence or absence of veligers. The ISC is also working with many partners to develop a Phragmites framework for Ontario through our Green Shovels program and also working with volunteers to collect eDNA samples and test for presence of aquatic invasive species

Contact: Rebecca Schroeder, Invasive Species Centre, rschroeder@invasivespeciescentre.ca

### At-Large

**Doug Jensen- Minnesota DNR**
As of June 30th, Doug Jensen joined the Minnesota Department of Natural Resource's as an AIS Prevention Planner. Previously for nearly 30 years, he worked as an assistant professor and AIS program coordinator supporting AIS research, outreach and communications. In his new role, he provides technical support to counties, local governments, and their partners to develop and optimize AIS prevention strategies and direct state AIS Prevention Aid funding. He will also facilitate regional workshops convening local government staff who lead their county's AIS prevention programs with community partners to share, learn and support collaborative efforts aimed at AIS prevention, along with supporting AIS outreach with community partners at local events. Doug also plans to continue to provide leadership as Co-chair (with Tim Campbell) the Aquatic Nuisance Species Task Force's AIS Community of Practice and Chair the GLP's Information and Education Committee efforts.

Contact: Doug Jensen, Minnesota DNR, 218-590-7164, doug.jensen@state.mn.us

**Great Lakes Saint Lawrence Seaway Development Corporation**

Craig Middlebrook, Great Lakes ANS Panel representative for the Great Lakes St. Lawrence Seaway Development Corporation (GLS), retired from government service on September 30. He will be replaced as primary agency representative by Ms. Elizabeth Fox, Policy and Program Specialist with GLS.

Mr. Middlebrook started with GLS in 1996 as the agency's Chief of Staff. He became Deputy Administrator in 2006, and subsequently also served as Acting Administrator several times, most recently since January 2017.

In 2008, he was instrumental in establishing joint harmonized regulations with Canada to implement strict requirements for ballast water entering the Great Lakes via the Seaway. The result of these regulations was recently documented by Ricciardi and MacIsaac (Ricciardi, A., & MacIsaac, H. J. (2022). Vector control reduces the rate of species invasion in the world's largest freshwater ecosystem. Conservation Letters, e12866. https://doi.org/10.1111/conl.12866). They analyzed non-native species establishment records for the Great Lakes from 1981 to 2019, and concluded "To our knowledge, the 2006/2008 regulation is the only case of a policy intervention that is linked to a massive reduction of the invasion rate of a large aquatic ecosystem."

In 2009, Mr. Middlebrook also facilitated the founding of the Great Lakes Ballast Water Collaborative, through which he worked to bring together state environmental regulators and U.S. and Canadian federal regulators to promote consistency in ensuring that vessels entering the Great Lakes comply with all ballast water management requirements. The Collaborative was active from 2009 through 2014.

In 2011, he was awarded the Presidential Rank Award for Distinguished Service by President Barack Obama. In 2013, he received the "Partner of the Office of Water" Award from the U.S. Environmental Protection Agency (EPA) for his work assisting the EPA's efforts on ballast water management to protect the environment in the Great Lakes states region.

Ms. Fox came to GLS in 2021, from the Office of the Undersecretary for Policy at the US Department of Transportation (USDOT). There she served as a Transportation Policy Analyst and was the Policy Office expert and liaison to both GLS and the Federal Highway Administration. Prior to joining USDOT, Ms. Fox worked as a staff member with the US House of Representatives Committee on Transportation and Infrastructure, Water Resources and Environment Subcommittee, to enact the Water Resources Development Acts of 2016 and 2018.

David Reid will continue in his present capacity as Alternate GLS member to the Panel.

Contact: David Reid, Consultant, Saint Lawrence Seaway Development Corporation, 734-663-0198, dfrBWR@gmail.com

**Wildlife Forever**
No update provided

Contact: Dane Huinker, Conservation Program Manager, 763-253-0222, dhuinker@wildlifeforever.org