

Great Lakes Panel Member Updates

Spring 2019

Meeting of the Great Lakes Panel on Aquatic Nuisance Species
May 14-15, 2019 | Cleveland, Ohio

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

Research

[POC: Steve Pothoven]

- Continued long term research program on Lake Michigan off Muskegon, MI, that assess lower food web components along a nearshore to offshore gradient. Collections include invasive species, including quagga mussels and spiny water fleas. Quagga mussel assessments include assessing abundance, body condition, and reproductive status. This is an ongoing project.
- Long term assessment of consumption requirements of spiny water flea *Bythotrephes* relative to zooplankton production in Lake Michigan. Manuscript published
- Assessment of alewife and round goby energy density in Lake Michigan (in collaboration with USGS GLSC). Manuscript accepted
- Assessment of rainbow smelt energy dynamics in Lake Huron and Erie (in collaboration with USGS GLSC). Manuscript submitted
- Assessment of dreissenid veliger dynamics in Lake Michigan. Manuscript published.

[POC: Ashley Elgin]

- Concluded the field portion of a temporal study of quagga mussel body condition and metabolomics last November (in collaboration with NOAA NCCOS Mussel Watch).
- Will finish up a year-long quagga mussel growth experiment in Lake Ontario this May.
- This summer, we will conduct the annual Southern Lake Michigan Benthic Survey, and assist with Lake Erie benthic surveys for CSMI.

[POC: Hank Vanderploeg]

- Carry out experiments on role of dreissenid mussel in promoting HABs through mechanisms of selective feeding and nutrient excretion in Lake Erie and Saginaw Bay.
- As part of spatial and microbes cruises in Lake Michigan waters we will be exploring the consequences of *Dreissena* on food web spatial structure including *Dreissena* veligers.
- As part of a new Omics Program at NOAA, we will use eDNA technology to develop methods to monitor indigenous and non-indigenous species in the plankton of the Great Lakes region.

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

National Park Service

No update provided.

Contact: Erin Williams, National Park Service, 612-624-7286, erin_williams@nps.gov

U.S. Army Corps of Engineers

➤ CSSC Dispersal Barriers

- As part of efforts to improve operations of the Electric Dispersal Barriers in the Chicago Sanitary and Ship Canal, USACE conducted an assessment of Barrier II's equipment in January 2017. The assessment included an underwater inspection of electrodes and parasitics at IIA and IIB.

- The conductive material at Barrier IIA's narrow electrodes was significantly compromised. The rate of corrosion was expected to accelerate over time as the material becomes more permeable. As a result, USACE requested and received \$3.5M in Great Lakes Restoration Initiative (GLRI) funding to replace the narrow array electrodes at Barrier IIA. The contract was awarded in December 2017, and work was completed in April 2018.
- Due to savings realized by acquiring materials directly from the Defense Logistics Agency instead of the contractor, funds were available to also replace electrodes at Barrier IIB. This work was completed in February 2019. IIB's electrodes were nearly as corroded as those replaced at Barrier IIA in the prior year.



- USACE also received \$1.5M in GLRI funds to convert the Demonstration Barrier's cable electrodes to the steel billets used in Barrier II. This work, completed in January 2019, is part of the overall effort to upgrade the Demonstration Barrier to permanent status as directed by the Water Resources Development Act of 2007.

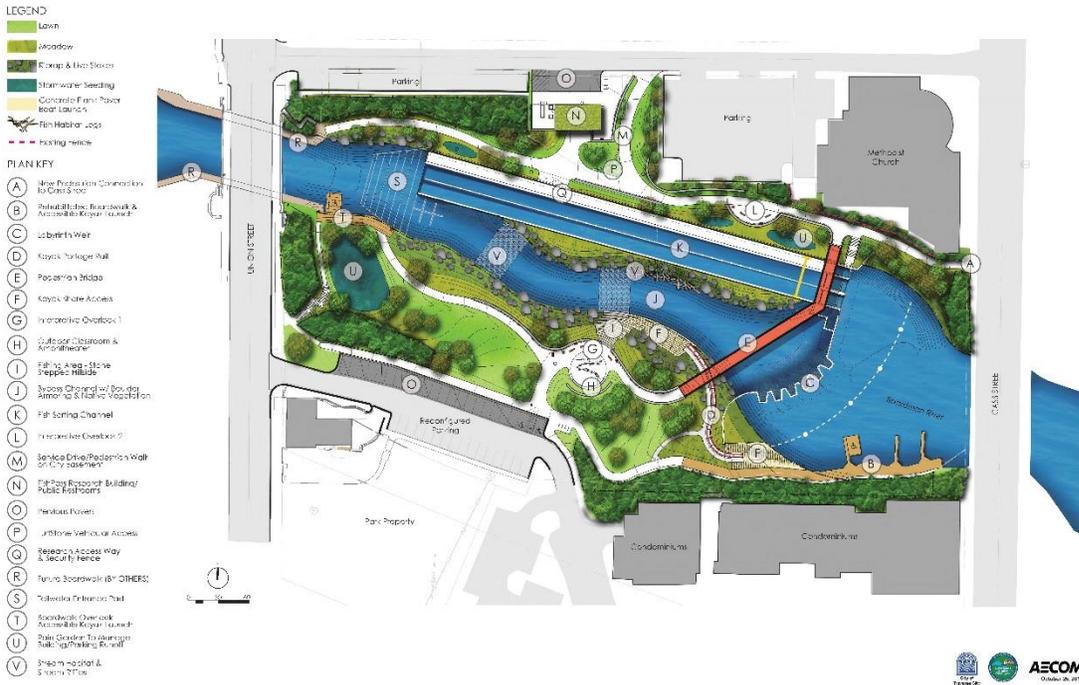
➤ **Hydrilla – multiple locations**

- Demonstration projects will continue at Tonawanda Creek/Erie Canal, NY; Cayuga Lake at Aurora, NY; and Cayuga Lake at Ithaca, NY.
- The Great Lakes Hydrilla Risk Assessment was posted to the Hydrilla Collaborative web page in April 2019, www.hydrillacollaborative.com.
- Buffalo District staff will partner with the NEANS Panel in June 2019 to discuss hydrilla monitoring, methods, and treatment on the Connecticut River.

➤ **Sea Lamprey Control – multiple locations**

- Harpersfield Dam, Grand River, OH: A construction contract was awarded for the removal of an obsolete dam and construction of a modern sea lamprey barrier with trap. Construction was put on hold in December 2018 and will resume on or about 01 July 2019.
- Bi-directional Fish Passage Project, Union Street Dam, Traverse City, Michigan: The USACE is participating in a study for a bi-directional fish passage project at the Union Street dam, located on the Boardman River in Grand Traverse County, Michigan. The proposed project is the reconstruction of the Union Street Dam for the development of a selective bi-directional fish passage project. The design consists primarily of two fish sorting artificial channels on the north bank and a nature-like rock armored bypass channel on the south bank of the Boardman River. The purpose of the project is to test multiple fish sorting technologies and techniques to provide up and downstream passage of native fishes while simultaneously blocking or removing undesirable fish species trying to pass, specifically sea lamprey. FishPass includes a secondary barrier to reduce the risk of unintended passage of sea lamprey. The result will be a world-class technology and research center in a park setting. Estimated Construction cost is \$12-22M, contract award is scheduled for 2nd qtr 2020.

Union Street Dam FishPass



- The Grand River Revitalization Project, Grand Rapids, Michigan: The proposed project will improve the function of the Grand River within and along the channel as it flows through downtown Grand Rapids, Michigan. The proposed project includes the removal of four low-head dams and the 6th Street Dam and the installation of a proposed adjustable hydraulic structure. Additional activities include adding substrate to the channel to increase channel complexity and provide for the ecological needs of the endangered Snuffbox mussel, Lake Sturgeon, Michigan State-listed sensitive species, and other aquatic species found in the Grand River. The project will improve diversity and complexity throughout more than 75 acres of regionally rare, river rapid habitat; and restore connectivity of more than 65 miles of the Grand River upstream of Grand Rapids, Michigan for native aquatic species while impeding upstream migration of sea lamprey. Other benefits expected include increased recreational and economic opportunities through increased access, boating, and angling along the restored reach of the river. A NEPA Public Scoping Meeting was held on Monday, April 8, 2019; the USACE Detroit District will prepare a draft Environmental Impact Statement (EIS) on behalf of the Great Lakes Fishery Commission (GLFC).

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

U.S. Coast Guard

Ballast Water Regulation

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 will 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.

CG Type Approval

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 dozens 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 has received +20 applications for type approval and the Coast Guard Marine Safety Center has type approved 17 BW treatment systems.

Alternate Management Systems (AMS)

The Coast Guard anticipated that some time would pass from the effective date of the rule to its acceptance of independent laboratories and its subsequent type approvals of BWMS. Therefore, the Coast Guard developed an interim program to accept the use of some BWMS that have been type-approved by other flag states. AMS is intended as a bridging strategy to allow for the use of BWMS type-approved by foreign administrations in accordance with the IMO Convention. The AMS must be installed and approved and would be used in lieu of ballast water exchange until full type approval can be obtained, but for a period of no longer than 5 years after the ship was otherwise required to comply with the ballast water discharge standard. The Coast Guard has issued 118 AMS Determination Acceptance Letters to date including several for fresh water operations.

Extensions

Many vessel owners are hesitant to install a BWMS accepted as an AMS because there is no guarantee that the BWMS will be granted U.S. type approval. If vessel owners would prefer to wait until Coast Guard type approved systems are commercially available, they may apply for an extension to their respective original compliance date listed in the regulations only if they can document that despite all efforts compliance with the regulations is not possible.

Because the Coast Guard has only recently type-approved BWMSs, the Coast Guard has been granting extensions to the compliance schedule for ships with scheduled drydock dates through 2018. Currently, over 12,000 extensions have been granted to qualifying vessels.

Now that type approved systems are becoming commercially available, the Coast Guard will continue to balance the need to ensure timely compliance with the regulations and the practical realities associated with the availability of type approved systems, manufacturing, and shipyard capacity. Whether a type-approved system is "available" will be based on evidence submitted by the vessel owner/operator with the application for extension.

The length of compliance date extensions, when granted, will be based on the availability of Coast Guard type-approved systems and detailed installation plans. Vessel owners and operators should anticipate that this would not typically align with scheduled drydocking.

Ballast Water Working Group (BWWG)

The Ballast Water Working Group has completed the 2018 annual report and it is posted on this website; http://www.greatlakes-seaway.com/en/pdf/2018_BW_Rpt_EN.pdf

In 2018, 100% of vessels bound for the Great Lakes Seaway from outside the Exclusive Economic Zone (EEZ) received ballast management exams on each Seaway transit. All 9,343 ballast tanks, during 498 vessel transits, were assessed; (100% of the ballast tanks on inbound vessels were assessed in 2009-18).

Vessel Incidental Discharge Act (VIDA)

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. Additionally, it permits certain regions flexibility in setting their own standards.

The Coast Guard and the EPA are reviewing the legislation and formulating an implementation plan.

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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: Vacant

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

Grass Carp

The US Geological Survey (USGS) funds a Cooperative Agreement with the University of Toledo to assess Grass Carp reproduction in Lake Erie tributaries and its effects on vegetation throughout western Lake Erie. Our work includes sampling for direct evidence of reproduction in the Sandusky and Maumee Rivers from Mid-May through the end of August and using both hydroacoustics and physical samples of vegetation in nearshore areas, embayments, harbors, and river mouths throughout western Lake Erie to assess Grass Carp habitat and their effects on it.

Egg sampling in 2018 identified two spawning events each in the Maumee and Sandusky Rivers. On the Maumee River, eggs were collected during high-flow events that occurred between 11 and 14 June and between 23 and 27 June. On the Sandusky River, eggs were collected between 23 and 26 May and between 11 and 14 June. Approximately 80 eggs were sampled from the Maumee River and approximately 9,500 eggs were sampled in the Sandusky River. Nicole King at the University of Toledo also found several Grass Carp larvae in samples from the Maumee River. These are the first Grass Carp larvae sampled in the Great Lakes.

Otolith microchemical and oxygen isotope data for 21 Grass Carp captured during the Ohio DNR-led management action on the Sandusky and Maumee Rivers in June 2018 have been completed. As of this writing interpretations of the results had not been completed.

Verification of the model-projected spawning area in the Sandusky River provided an opportunity to validate the recently-developed reverse-particle tracking algorithm in the USGS-developed fluvial drift simulator (FluEgg). Simulations have been completed and interpretation of results is underway.

The USGS received a mandate from Congress to expand research on Grass Carp and provided a total of US\$2 million for the efforts. USGS is working with its state and federal partners to identify the most critical research needs to implement in 2019.

Great Lakes Phragmites Collaborative

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 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.

- Developed a Common Agenda to guide the work of the GLPC based on the principles of collective impact.
- Continued work on a proposed measurement system to evaluate GLPC progress toward the Common Agenda.
- Shared the work of the GLPC as a novel application of collective impact to the natural resources field at prominent events including the Wildlife Society, the North American Invasive Species Association, and Upper Midwest Invasive Species conferences.
- Regularly convened an Advisory Committee to guide the work of the GLPC and foster interjurisdictional partnerships.
- Hosted an ongoing webinar series where guest speakers shared successful models for Phragmites management, public outreach, and collaborative governance.
- Re-structured the GLPC website (www.greatlakesphragmites.net) to better direct visitors to resources specific to their needs.
- Began drafting audience-specific outreach materials across various multi-media formats.

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.

- Conducted 10 training sessions across the Great Lakes basin to educate Phragmites managers about PAMF and encourage their participation; reached 74 individuals from a wide variety of organizations
- Traveled to new management units and worked with managers to enroll their units into PAMF and assist with the initial monitoring.
- Provided management guidance for 88 enrolled management units.
- Working daily with partners to effectively coordinate efforts.
- Attended 6 conferences and 2 CISMA meetings; gave 5 oral presentations and 1 poster presentation.
- Drafting and executed a formal plan for outreach activities for the 2019/20 PAMF cycle
- Currently enrolling new management units for the 2019/2020 PAMF cycle year – contact the PAMF Coordinator at pamf@glc.org

Rusty crayfish work at GLSC-Chesterton: Research updates

Scientists with the Great Lakes Science Center are incorporating emerging, genomic technologies, such as environmental DNA (eDNA), in monitoring aquatic invasive species, including crayfish species, of significant concern to the Great Lakes and associated waterways. Recent work has shown that an eDNA marker for rusty crayfish (*Orconectes rusticus*) was positively correlated with electroshocking catch and crayfish biomass, indicating that eDNA is a valuable tool for detecting this nuisance invasive species. This eDNA technology was useful to distinguish streams heavily infested by rusty crayfish from scarcely infested locations in northern Indiana. Fish assemblage data revealed similar species composition in infested and non-infested sites, frequently including the green sunfish (*Lepomis cyanellus*), creek chub (*Semotilus atromaculatus*), white sucker (*Catostomus commersoni*) rainbow trout (*Oncorhynchus mykiss*), and brown trout (*Salmo trutta*). Water chemistry and habitat quality of areas surveyed suggested that rusty crayfish is highly adaptable to different habitat conditions. Future efforts will include development of a model using the habitat data and fish species composition to predict the spatial and temporal spread of rusty crayfish between watersheds of Lake Michigan and potentially other lakes.

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

Indiana Department of Natural Resources has continued to utilize state and Great Lakes Restoration Initiative funding this past season to combat two high priority Aquatic Invasive Plants. In August 2006, DNR biologists discovered hydrilla during routine sampling at Lake Manitou, an 809 acre lake located in northern Indiana. In response to this first discovery of hydrilla in the Midwest, IDNR implemented a rapid response plan that included initial quarantine of the lake to prevent its spread and an eradication program utilizing season-long herbicide application strategies. Along with an aggressive control effort in with the goal of eradication, IDNR implemented an adaptive surveillance program that included tuber sampling, aquatic vegetation sampling, and scuba diver visual surveys. Over a 12 year history that involved 10 years of season long herbicide applications and the last 5 consecutive years without hydrilla detection within the lake we have declared this project a successful eradication. The total cost for the project was \$2,950,000. While that number seems large it is a small price to pay to keep on of the world's worst invasive species out of Indiana waters.

Although the hydrilla eradication project and surveys will end this year we continue to fight the spread and growth of another Aquatic Invasive plant called Starry Stonewort in northeast Indiana. This macroalgae has proven very difficult to control and has continued to spread throughout the region, we continue to try different chemical prescriptions and work with many interested partners in exploring research opportunities and treatment designs in hopes of finding one that is effective at limiting the growth and success of this invasive aquatic plant.

Contact: Eric Fisher, Indiana DNR, 317-234-3883, efisher@dnr.in.gov

Michigan

In January 2019 the Michigan Invasive Species Grants Program distributed \$3.6 million dollars. In addition, the new Department of Environment, Great Lakes, and Energy (EGLE, formerly DEQ) is initiating an aquatic invasive plant control and eradication grant program for inland lakes in accordance with new laws.

MDNR Fisheries Division is continuing surveillance and response efforts in 2019 to address infestations Red Swamp Crayfish in collaboration with USGS and Michigan State University. The team implemented carbon dioxide infusion in 2018 and will investigate a variety of additional novel control techniques in 2019 including pesticides, deoxygenation, and sound. The MDNR will continue to work on Lake Erie this summer to work towards eradication of grass carp.

EGL Water Resources Division is continuing to implement ongoing control and response aimed at eradication of aquatic invasive plants on Michigan's watchlist. In addition, staff will continue to participate in a collaborative effort to develop an adaptive management framework with Central Michigan University, Cooperative Invasive Management Areas, and others.

New boating laws, including a pull the plug law and strengthening other aspects of regulating the movement of AIS via recreational boating, went into effect in 2019. Staff are developing and implementing a communication and education strategy.

The MDARD and MDNR are implementing modifications to statute involving prohibited and restricted species. The MDARD and MDNR's Law Enforcement Division are continuing inspections and education efforts for wholesale/retail bait dealers, plant nurseries, the pet industry, and will increase activities targeting trade via the internet. Bighead, silver, and grass carp continue to be priorities as well as red swamp crayfish and prohibited/restricted aquatic plants in trade.

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

Minnesota

- The Minnesota Department of Natural Resources (DNR) Invasive Species Program, with funding from the Great Lakes Restoration Initiative administered by the U.S. Fish and Wildlife Service, is working with a contractor to conduct social science research to inform our AIS prevention strategies. The 11-month project aims to promote the adoption of desirable aquatic invasive species prevention behaviors and create positive social norms around AIS prevention in Minnesota.
- The DNR provided watercraft inspection training to a record 968 tribal and local government authorized inspectors in 2018. This was an increase from 949 trained inspectors in 2017. These inspectors operate under delegation agreements with DNR and they complement 75 inspectors employed by the DNR.
- The DNR, with funding from the Great Lakes Restoration Initiative administered by the U.S. Fish and Wildlife Service, is hiring a planner to work in the invasive species program and focus on reducing the risk of the organisms in trade pathway. This individual will work with partners in Minnesota and around the region on prevention activities in that pathway.
- The DNR, with funding from the Great Lakes Restoration Initiative administered by the U.S. Fish and Wildlife Service, is working with partners at the University of Minnesota, federal agencies, and others to host a working group meeting in 2019 about genetic biocontrol technologies for invasive species.
- The DNR partnered with the Minnesota Aquatic Invasive Species Research Center, University of Minnesota Extension, and many counties and local partners, to launch the second annual statewide search for new populations of starry stonewort. The event, called Starry Trek, involved more than 225 trained volunteers searching 187 Minnesota lakes. One new population of starry stonewort was discovered as a result of this event in 2018: Wolf Lake in Hubbard County.
- The DNR, University of Minnesota Extension and the Minnesota Aquatic Invasive Species Research Center put on a one-day aquatic plant identification workshop in 2018 at which over 40 participants, including lake services contractors, learned and were tested on their knowledge of over 50 native and nonnative aquatic plant species. Another workshop is planned for 2019.
- The DNR continues to work with western Lake Superior area partners from multiple jurisdictions, including representatives of federal, tribal, state and local authorities, to discuss aquatic invasive species monitoring and response efforts in the region. The group first convened in response to the announcement of confirmed *Hemimysis anomala* in western Lake Superior in early 2018

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

New York

- Our 2019 watercraft inspection steward program will cover more than 250 locations throughout New York. These programs will be using the watercraft inspection steward program app (WISPA) to collect data. We anticipate that more than 300,000 records will be collected.
- We have received 96 proposals for our recent round of Invasive Species grants (\$3 M) in four categories: boat steward programs/decontamination units, lake management plans, rapid response and control, and research.
- Our new AIS research scientist I, Steven Pearson, started on February 4th. He will be leading the development of an eDNA lab.
- The Task Force will continue work on hydrilla infestations in the Croton River, Erie Canal/Niagara River, Cayuga Lake, Spencer Pond, and several smaller locations this coming season.

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

Ohio

- Continued control efforts of *Phragmites* and *Hydrilla* in the Lake Erie basin and *Hydrilla* in Pymatuning Lake on the Ohio and Pennsylvania boarder (within 10 miles of Lake Erie watershed).
- Continued to monitor for Bighead Carp and Silver Carp in Lake Erie and the Muskingum River using eDNA, routine sampling activities, and telemetry.
- Finalized the *Lake Erie Grass Carp Response Strategy* to provide a road map for the next five years. As part of this plan, we are deploying a Grass Carp Strike Team dedicated to the eradication of Grass Carp from the western basin of Lake Erie.
- Continue to investigate closure options 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 awarded a contract for closing the Ohio Erie Canal connection and work has initiated with completion in the fall of 2019; 2) NTH completed the 25% closure designs (Study and Report) at Little Killbuck Creek and peer review of this document is being conducted by USACE – Buffalo. We are meeting with USACE in May to discuss their preliminary assessment and the final assessment should be done in the fall of 2019. At this time, we will determine a path forward; 3) The design for the final phase for closing the connection at Grand Lake St Marys will be initiated in 2019.
- Continue the surveillance of Ohio's bait and Grass Carp supply chain to determine if AIS, including Bighead and Silver Carp, are being transported through the bait trade.
- Continue an 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".
- In partnership with Ohio Sea Grant and The Ohio State University, completed the *Ohio Field Guide to Aquatic Invasive Species*. A waterproof version of this guide has been distributed to individuals in the field as an early detection tool. A non-waterproof version has been printed and distributed to the general public. We will continue to produce guides as needed.
- Participated in the following groups: Great Lakes Panel, Ohio Aquatic Invasive Species Committee, and Asian Carp Regional Coordinating Committee.
- Developed a risk assessment policy to screen potential new aquatic invasive species and we will be adding New Zealand Mudsnail and Marbled Crayfish to the list of injurious species in Ohio.

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 Natural Resources, 705-755-5136, francine.macdonald@ontario.ca

Pennsylvania

No update provided.

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

Quebec

The AIS team of the Ministère des Forêts, de la Faune et des Parcs (MFFP) attended to end-of-season meetings with its partners (MFFP regionals offices, DFO and OMNRF), to provides summary of the last field season and to convene on next season. An increasing effort and attention will be provided to Eurasian Tench (*Tinca tinca*), including increased knowledge acquisition in collaboration with academics and increased effort of detection and sampling at the distribution extremes (mostly Quebec/Ontario borders). Regular detection and monitoring activities for others AIS (Grass Carp, Spiny Waterflea, Rusty Crayfish) will be realized during the next field season.

Contact: Olivier Morissette, Quebec Ministère des Forêts, de la Faune et des Parcs, 418-627-8694 x7519
olivier.morissette@mffp.gouv.qc.ca

Wisconsin

Wisconsin's AIS Partnership has been focused on updating its AIS Management Plan and will be seeking approval from the ANS Task Force in May. The Plan is driven by the seven pathways that have been identified and known to carry AIS into and around the state. This new approach will direct many of the Partnerships activities over the next decade. The Great Lakes Restoration Initiative (GLRI) continues to provide funding that accomplishes a great deal at the local, state and regional level. From AIS control projects that have controlled *Phragmites* to efforts to find new invasive species in wetlands, lakes and streams GLRI has increased Wisconsin's capacity to educate, search for, respond to and control AIS in the Great Lakes basin and beyond. Spring is a busy time for the AIS

Partnership with a renewed sense of urgency and commitment to work with partners in improving the quality of the water resources in Wisconsin.

Contact: Bob Wakeman, Wisconsin DNR, 262-574-2149

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

Analysis of Great Lakes Aquatic Invasive Species Funding: The GLC is working with the Great Lakes ANS Panel (GLP) to conduct an analysis of AIS funding since the implementation of the Great Lakes Restoration Initiative (GLRI) to summarize progress, identify trends and gaps, and develop a strategy to target remaining priority needs and help direct invasive species work over the next decade. This effort will complement and enhance current GLRI reporting systems through the collection of additional project information and providing a more detailed analysis of how funding from GLRI and other sources has invested in invasive species prevention and control. The result will be a repository of information that includes detailed project data and metrics, as well as summary analyses which have been drafted and will be presented to the GLP for approval at the May GLP meeting.

Invasive Mussel Collaborative: 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; In November the IMC released a new strategy to reduce invasive mussels and their negative impacts. The *Strategy to Advance Management of Invasive Zebra and Quagga Mussels* is intended to drive investments, policy, and research around invasive mussels across the Great Lakes region and beyond. The IMC is also working to develop and implement a control method demonstration and evaluation project near the Sleeping Bear Dunes National Lakeshore to begin implementation of the Strategy. In addition, the IMC launched a new website (www.invasivemusselcollaborative.net) and video: <https://www.youtube.com/watch?v=mZgf4IAfVYY&feature=youtu.be>. Visit the IMC website for more updates and recordings of the latest webinars.

Great Lakes Phragmites Collaborative (GLPC) & Phragmites Adaptive Management Framework (PAMF): The GLC and USGS are jointly leading the 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. Recently, GLPC released a map of local invasive species cooperatives in the Great Lakes region: <http://glcommission.maps.arcgis.com/apps/webappviewer/index.html?id=cff62bb6b6314f4490d5a80d3a520555>. See www.greatlakesphragmites.net for more of the latest news, updates, and progress of the collaborative.

The GLC and USGS are also working to promote effective *Phragmites* management across the Great Lakes basin and tracking the effectiveness and resources efficiency of those management activities through the PAMF model. PAMF requires working with a variety of *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. PAMF recently completed its first year of enrolling sites and providing management guidance; see <https://www.greatlakesphragmites.net/wp-content/uploads/2019/02/PAMF-Infographic-20190122.jpg> for detail.

Interstate Aquatic Invasive Species Prevention, Early Detection, and Response: The GLC is supporting the eight Great Lakes states in their efforts to plan and coordinate interstate AIS prevention, early detection, and response activities. The GLC recently completed a pathway risk assessment focused on high priority aquatic invasive plants. The purpose of the assessment is to help the states and regional partners understand pathway activity for invasive aquatic plants; determine which pathways are associated with high risk plant species; and identify gaps in management, compliance and law enforcement, and education for each pathway. The next phase of this project will involve developing a communications protocol to complement the previously completed regional surveillance and response plans.

Great Lakes Detector of Invasive Aquatics in Trade: The GLC developed the web-based software tool Great Lakes Detector of Invasive Aquatics in Trade (GLDIATR). GLDIATR 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.

Blue Accounting Aquatic Invasive Species Pilot: The GLC is working with The Nature Conservancy and regional partners to develop and implement an AIS pilot project under the Blue Accounting program. The AIS pilot is focused on surveillance and rapid response to new species introductions, the organisms in trade pathway of spread, and control and management of invasive species. GLC and TNC are working with a group of regional AIS experts and managers to provide input and guide implementation of the AIS pilot. In December 2018, the pilot, in partnership with state and federal agencies, launched a new suite of web-based resources and tools to support early detection of AIS in the Great Lakes. The resources include a detailed prioritization of monitoring sites in the Basin. More detail is available at <https://www.glc.org/news/BA-AIS-121318> and <https://www.blueaccounting.org/issue/aquatic-invasive-species>.

Other: The GLC continues to engage with partner groups and support its member states and provinces on other high priority AIS issues facing the Great Lakes region, including ballast water and Asian carp.

Contact: Tom Crane, Great Lakes Commission, 734-971-9135, tcrane@glc.org

Canadian Federal Fisheries and Oceans Canada

Asian Carp Program

- In 2017, an investment of up to \$20 million over five years and ongoing was allocated for Canada's Asian Carp Program to protect Canadian waters from Asian carps. The focus of the program is on prevention efforts, early warning surveillance and other management activities. The funding also assists the program with engaging Canadians through outreach and education about the threats posed by Asian carps.
- Outreach and education campaigns continued in 2018 in partnership with Ontario Federation of Anglers and Hunters, Invasive Species Centre, the Royal Ontario Museum, and with the addition of a new partner, the Federation of Ontario Cottagers' Associations.
- DFO completed several outreach projects, such as the creation of the:
 - Baitfish Primer Mobile App;
 - Infographics and Megamap;
 - an Asian Carp Program short documentary-style short film; and,
 - the completion of a comprehensive Gap Analysis.
- A new live Asian Carp Exhibit officially opened at the Toronto Zoo in February 2018.
- The binational ecological risk assessment for Grass Carp in the Great Lakes basin was completed.
- The socio-economic risk assessment for Grass Carp in the Great Lakes basin was completed.
- The binational ecological risk assessment meeting for Black Carp in the Great Lakes basin was held in December 2018. Documents have yet to be finalized, but are expected to be completed in the spring.
- In 2018, a total of 34 early detection locations in lakes Huron, Erie, and Ontario were sampled. In addition, sampling in Lake Gibson (Lake Erie Basin), and the St. Clair River was completed. A total of 1162 sites were sampled, capturing 64,519 fishes representing 90 species. No Asian carps were captured in 2018 through the early detection surveillance program.
 - Annual Asian Carp early detection surveillance sampling summary reports (2013-2017) are available online.
 - Three Grass Carp were captured in the Canadian waters of the Great Lakes in 2018 by commercial fishers. One was captured in Lake Huron, and two in Lake Erie. All three Grass Carp were triploid.
- DFO Incident Command System Strategic Response Plan was developed and will be updated annually/as required.

Contact: Lynn Bouvier, Fisheries and Oceans Canada, 905-336-4981 Lynn.Bouvier@dfo-mpo.gc.ca

Ballast Water Research

- DFO's Shipping Vectors Research Group (co-funded by Transport Canada) continues to conduct research in support of the implementation of the International Convention for the Control and Management of Ships' Ballast Water and Sediments which entered into force on September 8, 2017. The main activities currently in progress are:
 - Monitoring efficacy of ballast water treatment systems on ships arriving to Canadian waters, as well those operating within the Great Lakes
 - Developing methods/procedures for the collection of a "representative" ballast water sample for compliance testing
 - Developing methods/procedures for rapid, indicative analysis of ballast water samples for compliance testing
 - Developing a decision support tool for Inspectors to identify high-risk ships and prioritize enforcement activities

- Developing a modern, automated data entry system for collection of Ballast Water Reporting Forms; and, analysis of 2005-2018 data
- Establishing procedures for evaluation of exemption requests under Regulation A-4
- Outside of the Great Lakes, DFO has been conducting work to assess the risk of biofouling as a vector for non-native species to the Arctic

Contact: Sarah Bailey, Fisheries and Oceans Canada, 905-336-6425 Sarah.Bailey@dfo-mpo.gc.ca

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

Transport Canada

No update provided.

Contact: Chris Wiley, Transport Canada, 519-464-5092, chris.wiley@tc.gc.ca

LOCAL COMMUNITIES

United States

No update provided.

Contact: Vacant

Canada

No update provided.

Contact: Vacant

Private Environmental/User Groups

Great Lakes Sport Fishing Council

No update provided.

Contact: Dan Thomas, Great Lakes Sport Fishing Council, 630-941-1351, dan@great-lakes.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

Council of Great Lakes Industries

No update provided.

Contact: Vacant

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

Cooperative Research Unit

No update provided.

Contact: Tom Johengen, Cooperative Institute for Limnology and Ecosystems Research, 734-741-2203, johengen@umich.edu

At-Large

Invasive Species Centre

Since the last GLP meeting, the ISC has completed the first year of a 4-year agreement with Fisheries and Oceans Canada to continue our work on the Asian Carp Canada program. Some of the completed projects include 3 new webpages on www.asiancarp.ca, various targeted social media campaigns resulting in 800,677 impressions, webinars reaching 443 viewers, public information sessions welcoming 200 attendees, and the development of a media kit. This year, we will continue to update our website, run more social media and other targeted campaigns, host our webinar series and facilitate public information sessions. In addition, the ISC is working on AIS initiatives with the OMNRF, including literature review for socio-economic impacts of various AIS, analysis of the recreational boating pathway in Ontario, and a review of control methods and efficacy for invasive mussels in the Great Lakes Basin. Finally, the ISC is the conference secretariat for the International Conference on Aquatic Invasive Species (ICAIS), and is currently planning for ICAIS 2019, to be hosted October 27-31, 2019 in Montreal, Quebec. The conference theme will be: Aquatic Invasions in the Anthropocene, and an excellent technical program is being developed in collaboration with Dr. Anthony Ricciardi, conference Co-Chair technical program committee Chair.

Contact: David Nisbet, Invasive Species Centre, 705-541-5752, DNisbet@invasivespeciescentre.ca

Minnesota Aquatic Invasive Species Research Center

No update provided.

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

Invading Species Awareness Program, Ontario Federation of Anglers and Hunters

Ontario's Invading Species Awareness Program (ISAP) is a collaborative initiative led by the Ontario Federation of Anglers and Hunters (OFAH) in partnership with the Ontario Ministry of Natural Resources and Forestry (MNRF) to prevent the introduction and spread of invasive species to Ontario's forests and waters and to protect Ontario's biodiversity. The program engages and assists industry, citizens, communities, and government agencies to undertake prevention, monitoring, control and outreach activities, and recent achievements are summarized below.

The ISAP continues to participate on the PlayCleanGo working group established by the Canadian Council on Invasive Species (CCIS) and worked with CCIS to develop a new PlayCleanGo trailhead sign. As part of the on-going efforts to engage recreational communities in this messaging, staff attended the Ontario Trails' Trailhead Off-Road meeting where they connected with leaders (e.g., Canadian Quad Council, Ministry of Tourism, Culture and Sport) from the off-road vehicle industry and promoted the PlayCleanGo campaign.

Staff connected with the Provincial Marine Coordinator with the Ontario Provincial Police to discuss opportunities to engage OPP marine units in the clean, drain, dry messaging and share the protocols used by Conservation Officers to mitigate the introduction and spread of aquatic invasive species. It was a productive conversation resulting in the Provincial Marine Coordinator agreeing to 100% compliance from the estimated 430 vessels used by the OPP. A Standard Operating Procedure will be drafted by the Provincial Marine Coordinator, and once complete, it will be sent to OPP marine staff across the province.

ISAP staff continue to deliver resources and programs focused on preventing the introduction of Asian carps to the Canadian Great Lakes. An Education Liaison was employed to deliver classroom programming throughout Ontario. In total, the Education Liaison delivered 154 presentations to 4,186 students.

In addition to the many achievements highlighted above, the OFAH/MNRF Invading Species Awareness Program received the Conservation Project of the Year award from the Mississauga Spring Fishing and Boat Show recognizing the ISAP's on-going efforts to protect Ontario's natural resources from the threat of invasive species.

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

Wildlife Forever

Wildlife Forever and the Clean Drain Dry Initiative have been running full tilt this spring as we approach open water season. In 2019, growth continues as new partnerships form. So far, we are working with 12 states, 30 counties, 2 Tribes, and Canada to provide education and outreach services and tools. We welcome new partners to take advantage of our coordinated campaign and time saving services reducing duplication across agencies. The just released 2017-2018 Clean Drain Dry Bi-Annual Report noted 1.9 billion prevention message impressions achieved since the campaign inception in 2006.

In partnership with the USFS and funding from the GRLI, Wildlife Forever will be developing an online AIS Resource Library this year to provide the public and resource managers alike, a one stop shop of AIS related information: Management Techniques, Research, and Outreach. We will be requesting committee members from across the Great Lakes to help guide this process to ensure it provides value across the region and beyond.

Contact: Pat Conzemius, Wildlife Forever, 763-253-0222, pconzemius@wildlifeforever.org

Minnesota Sea Grant

No update provided.

Contact: Doug Jensen, Minnesota Sea Grant, 218-590-7164, djensen1@umn.edu

Saint Lawrence Seaway Development Corporation

The Saint Lawrence Seaway Development Corporation (SLSDC) works in conjunction with the ship industry and regulators on issues and solutions associated with ballast water and non-native species. The Great Lakes Ballast Water Working Group (BWWG) is a joint inspection effort between the SLSDC, U.S. Coast Guard (USCG), Transport Canada - Marine Safety and Security, and the Canadian St. Lawrence Seaway Management Corporation. Inspections verify that the harmonized ballast water management procedures and regulations for the Great Lakes have been followed. Initiated in 2006, these inspections make sure that noncompliant ballast water is not discharged in the Great Lakes Seaway system, which assures that ships entering the Great Lakes pose minimal risk of introducing new species.

The Joint Ballast Management Exam Program involves a detailed review of ballast water reports, logs, records, and ballast water management plans, and an assessment of crew understanding of the requirements of the vessel's Ballast Water Management Plan. Inspection teams measure the salinity of detectable ballast water, and test for the presence of mud, to assess whether a satisfactory management practice has been employed.

- Vessels that do not exchange their ballast water or flush their ballast tanks are 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.
- Vessels that are unable to exchange their ballast water/residuals and that are required to retain them onboard receive a Letter of Retention (LOR) before being allowed to continue their inbound transit. A verification exam is conducted during their outbound transit prior to exiting the Seaway.

The 2018 BWWG report was released in January 2019. The complete 2018 report is available at:

http://www.greatlakes-seaway.com/en/pdf/2018_BW_Rpt_EN.pdf

Summary:

- 100% of vessels bound for the Great Lakes Seaway from outside the Exclusive Economic Zone (EEZ) in 2018 received ballast management exams on each inbound Seaway transit.
- In total, 9343 (+993 tanks, or +12%, compared to 2017) ballast tanks were assessed during 498 vessel transits (+41 transits, or +9%, compared to 2017).
 - Total tanks with satisfactory ballast water exchange – 9177 (equaling 98.2% compliance).
- 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. Vessels that were unable to exchange their ballast water/residuals and that were required to retain them onboard received a Letter of Retention (LOR) before continuing their inbound transit, and a verification exam during their outbound transit prior to exiting the Seaway.
 - 166 (1.8%) tanks on 58 vessel transits were issued a Letter of Retention (LOR):
 - 86 were due to improper reporting, carriage of liquids (other than ballast water) or not accessible for testing.
 - 50 were due to low salinity, compared with 68 in 2017.

- 30 tanks were on one ship, which did not have a Ballast Water Management System (BWMS) installed by the required compliance date.
 - No vessels were found to be in violation of their LOR (inspected upon departure).
- One ship had to pump ballast water ashore to a specialized company.
- Transport Canada issued one *Letter of Warning*¹ to a vessel in the Seaway.
- One vessel received an Administrative Monetary Penalty of \$6,000 from Transport Canada Marine Safety & Security for making false declarations. Ballast tank test results were inconsistent with information found on the Ballast Water Reporting Forms.
- Also, in many areas of the Great Lakes Basin, vessels are now restricted from discharging sewage, causing vessel operators to temporarily use ballast tanks as holding tanks. These tanks are issued a Letter of Retention.

In 2018, the USCG updated its policy regarding ballast water examinations for vessels fitted with approved functioning BWMSs. For these ships, rather than sample the ballast tanks, the USCG verified that the system is in compliance with regulations, and requirements for reporting and recordkeeping have been met. However, USCG continued sampling ballast tanks on vessels that did not have treatment or alternate management systems. Regardless, the Seaway Inspection Teams sampled 100% of ballast water tanks on all vessels, with or without treatment or alternate management systems.

In summary, since 2009, 100% of vessels/ballast tanks coming from outside the EEZ have received a Ballast Management Exam, and the results in 2018 sustain our strong track record of oversight, and demonstrate excellent compliance by the industry

Contact: Craig Middlebrook, Saint Lawrence Seaway Development Corporation, 202-266-0091, craig.middlebrook@dot.gov

National Wildlife Federation

National Wildlife Federation (NWF) launched a new coalition, The Great Lakes Conservation Coalition (GLCC), comprised of hunting, fishing, outdoor business and industry organizations to help prevent Asian carp from entering the Great Lakes and from spreading into new waters. Members of the GLCC are: NWF, Ducks Unlimited, Trout Unlimited, Izaak Walton League of America, Michigan United Conservation Clubs, Wisconsin Wildlife Federation, Minnesota Conservation Federation, Indiana Wildlife Federation, Ohio Conservation Federation, and Illinois Trout Unlimited. For more information, please visit: www.greatlakesconservation.com. This coalition, and over 200 conservation organizations, submitted comments to the U.S. Army Corps of Engineers in support of the Brandon Road plan to keep carp out of the Great Lakes.

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

¹ A Letter of Warning is issued when a vessel is found with discrepancies in its ballast water management plan, records, or reports. It is used for minor first-time offenses with a warning of possible assessment of a fine if not corrected.