

Great Lakes Panel Member Updates

Fall 2016

Meeting of the Great Lakes Panel on Aquatic Nuisance Species
November 2-3, 2016 | Ann Arbor, Michigan

U.S. Federal

U.S. Fish and Wildlife Service

No update provided.

Contact: Mike Hoff, U.S. Fish and Wildlife Service, 612-713-5114, michael_hoff@fws.gov

National Oceanic and Atmospheric Administration

In July 2016, GLERL conducted their annual Southern Lake Michigan Benthic Survey and sampling processing is underway. This year, they will identify and enumerate all benthic organisms (as opposed to just mussels and amphipods as in some years). This more detailed survey will complement the Coordinated Monitoring and Science Initiative survey of Lake Michigan that was conducted in 2015.

GLERL is also conducting field experiments in Lake Michigan at 45 and 90m. The goal of this experiment is to produce year-round, in situ, growth estimates for quagga mussels. The experiment is designed to capture differing growth rates among the seasons, as well as differences between the two depth zones. In the past 5-7 years, quagga mussels have decreased in density around 45m, while densities at >90m have steadily increased. Differences in growth between these two populations may help to explain observed patterns.

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

National Park Service

Last year USGS/La Crosse (Jon Amberg and Chris Merkes) developed an "in-the-field" eDNA test kit for bighead/silver carp. They are working on some additional test kits as well. Through the Natural Resources Preservation Program (NRPP) process, NPS put forward a Statement of Need for additional test kits, including other AIS as well as amphibians, native mussels and some native fish. USGS will be submitting a proposal next week to develop a test kit for spiny water flea via this program. NPS and USGS are continuing the discussion on eDNA project needs, ideas and further collaboration with a recurring phone call (next one is in January 2017).

USGS is also very interested in completing a zebra/quagga mussel test kit though they lack the funds. NPS is working to help them secure funds for this project. For further information on this project, contact Erin Williams (erin_williams@nps.gov) or Chris Merkes at USGS.

Contact: Phyllis Green, Isle Royale National Park 906-487-7140 Phyllis_Green@nps.gov

U.S. Army Corps of Engineers

No update provided.

Contact: Jim Galloway, U.S. Army Corps of Engineers, 313-226-6760, jim.e.galloway@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 is 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 37 Letters of Intent from BW treatment system manufacturers stating they intend to pursue type approval for their ballast water treatment system. For the past 18 months, there have been up to 20 different systems at one time undergoing landside and shoreside testing at the Coast Guard accepted Independent Laboratories. The Coast Guard has received three applications for type approval and the U.S. Coast Guard Marine Safety Center is reviewing those applications.

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 58 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 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 not yet type-approved any BWMS, and because ballast water reception facilities and U.S. public water system sources are not generally available or practicable for vessel ballast operations, the Coast Guard is granting extensions to the compliance schedule for ships with scheduled drydock dates through 2018. Vessels are normally granted extensions until the date of their next scheduled drydock. Currently, over 10,000 extensions have been granted to qualifying vessels. Once type approved systems become 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.

Practicability Review

In May of this year, Coast Guard Headquarters published its initial Practicability Review to determine whether technology exists to support implementation of a more stringent BW discharge performance standard and if testing protocols can be implemented to measure the efficacy and compliance with this higher standard.

Due to a lack of type approved systems and the data that will be produced during the type approval testing processes, it will be very difficult for the Coast Guard to develop and then validate procedures designed to evaluate systems against more stringent discharge standards. Therefore, until enough BWMS systems are fully evaluated using standardized rigorous test procedures, and post-operational reliability is analyzed and more sensitive test methods are developed and validated to allow an evaluation of systems treating ballast water to higher discharge standards, it is not possible to determine whether technology exists to practicably implement a more stringent ballast water discharge standard.

Ballast Water Working Group (BWWG)

The ballast water working group has completed the 2015 annual report and it is posted on the Ninth Coast Guard District website. In 2015, 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 8,497 ballast tanks, during 454 vessel transits, were assessed; (100% of the ballast tanks on inbound vessels were assessed in 2009-15).

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

U.S. Forest Service

Partnered with Shedd Aquarium, Discovery World, and Wildlife Forever to provide education on pathways that spread aquatic and terrestrial invasive species with the Great Lakes. Also, provided GLRI funding to Forests within the Great Lakes for deployment of watercraft cleaning stations at public boat ramps and fishing tournaments to slow the spread of aquatic species through the recreational boat pathway.

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: James Schardt, U.S. EPA- Great Lakes National Program Office, 312-353-5085, schardt.james@epa.gov

U.S. Geological Survey

No update provided.

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.iron@illinois.gov

Indiana

No update provided.

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

Michigan

Michigan is entering into the 3rd year of administering its invasive species grant program. The grant program supported expansion of Cooperative Invasive Species Management Areas to cover most of the state; projects to advance management of Eurasian watermilfoil, starry stonewort, and European frogbit, and education and outreach efforts.

Ongoing removal efforts were completed in for 2016 to address existing infestations of European frog-bit in the Saginaw Bay area and water lettuce in southeast Michigan. The DEQ and DNR responded to new infestations of yellow-floating heart, parrot feather, European frog-bit, and European water-clover. New Zealand mudsnails were confirmed in 2 additional rivers. The DNR is working with Michigan State University to further investigate NZMS populations.

Collaborative efforts among the Great Lakes states, The Nature Conservancy, and other partners on developing an interstate Early Detection and Response Plan are wrapping up. The project will continue with Phase 2 beginning in FY 17.

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, 517-284-5472, lesages@michigan.gov

Minnesota

- Two red swamp crayfish were found in Tilde Lake in Clay County in northwestern Minnesota. It is the first time the invasive species have been confirmed in a Minnesota lake. The Minnesota Department of Natural Resources removed the crayfish and will continue to monitor the lake.
- A new permanent rule designating prohibited and regulated invasive species became effective on Monday, August 1, 2016. This rule makes starry stonewort (*Nitellopsis obtusa*) a prohibited invasive species in Minnesota and water hyacinth (*Eichhornia crassipes*) a regulated invasive species in Minnesota.
- The Minnesota Department of Natural Resources is using EDDMapS Midwest (www.eddmaps.org/midwest/) for reporting and mapping aquatic and terrestrial invasive species.

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

New York

No update provided.

Contact: Catherine McGlynn, New York DEC, 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.
- Continue surveillance for grass carp to determine if diploid (fertile) fish were present in the wild.
- Hosted a Sandusky River Grass Carp Action Planning Meeting in Port Clinton, Ohio with representatives from Ohio DNR, Michigan DNR, Illinois DNR, Ontario Ministry of Natural Resources and Forestry, Michigan State University, University of Toledo, USFWS, USGS, and Great Lakes Fish Commission in September 2016. The status of current Grass Carp research and monitoring activities was discussed as well as a group discussion regarding FY2017 and FY2018 potential planned responses based on the research / monitoring results.
- Continue to investigate closure options for the four Great Lakes Mississippi River Interbasin Study connections in Ohio at Little Killbuck Creek, Ohio Erie Canal, Grand Lake St Marys, and Mosquito Creek Lake. The USACE is completing the final design for the closure of the Ohio Erie Canal connection. Selected an engineering firm for the final closure designs at Little Killbuck Creek. Implementing the final phase for closing the connection at Grand Lake St Marys.
- Completed the second year of inspection program 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".
- Participated in the following groups: Great Lakes Panel, Ohio Aquatic Invasive Species Committee, and Asian 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 Natural Resources, 705-755-5136, Francine.macdonald@ontario.ca

Pennsylvania

No update provided.

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

Quebec

No update provided.

Contact: Isabelle Simard, Quebec Ministry of Sustainable Development, Environment and Parks, 418-521-3907 x4417
Isabelle.Simard@mddep.gouv.qc.ca

Wisconsin

No update provided.

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

Asian Carp

The Great Lakes Commission (GLC) continues to convene a 30-member advisory committee that is the primary regional stakeholder forum seeking solutions to the threat of Asian carp and other AIS passing through the Chicago Area Waterways System (CAWS) while maintaining current uses of the system. The committee last met on May 9 in Chicago. The meeting provided updates on several Asian Carp planning and study efforts, as well as presentations and discussion on process and technical assessments conducted to inform committee efforts moving forward. The next meeting of the Advisory Committee is scheduled for October 14 in Chicago. An independent assessment of the Advisory Committee process was prepared by Dr. Frank Dukes of the Institute for Environmental Negotiation at the University of Virginia under the oversight of the Gail Bingham, co-lead of the advisory committee facilitation team. Its aim was to gather lessons learned from the committee's work between March 2014 and January 2016 to guide future efforts. The assessment found strong consensus among the members in the value of the group and support for continuing to meet, although with some changes to the committee's structure and operations. There was clear recognition that the committee is the best forum for addressing the complex problem of AIS transfer through the CAWS. Future priorities for the committee include

- tracking and advocating for implementation of the committee's recommendations;
- advising on what questions stakeholders would like to see addressed in future studies about the effects of, and mitigation for, implementation of AIS control points in the CAWS;
- guiding and receiving information from upcoming evaluations of hydraulic and hydrology issues associated with establishing control points in the CAWS and options for treating lock water to prevent AIS transfer;
- evaluating transportation needs in the CAWS and considering impacts to commercial navigation from AIS control measures and options to address them; and
- raising questions and learning about multi-jurisdictional governance and cost sharing models.

The GLC became a member of the Asian Carp Regional Coordinating Committee (ACRCC) in March and continues to participate on the Executive Steering Committee of the Great Lakes and Mississippi River Interbasin Study (GLMRIS), and serves as convener of the CAWS Advisory Committee (see above). The technical consultant for the Advisory Committee, HDR Inc., began work on a scoping exercise to outline potential hydrologic, hydraulic, and water quality investigations that are needed to inform and evaluate the conceptual elements identified by the committee for a long-term solution to AIS transfer through the CAWS. The specific aim of the investigations is to assess whether and how control points could be implemented consistent with the mid-system locations identified in the GLMRIS report (variations of GLMRIS Alternatives 6 and 7). A workshop with key stakeholders was held March 1, 2016 to discuss and receive input on existing data, models, and resources, and items requiring additional study. The scoping exercise will be completed by the end of the calendar year, after which funding will be sought to carry out the detailed studies, which will set the stage for more substantive planning, design and policy development. In addition, HDR prepared a case study of the Fargo-Moorhead Flood Diversion Project to illustrate multiple regional jurisdictions forming an entity to be a cost-share partner for a large water management project; the institutional arrangements and anticipated cost-sharing framework utilized; and the process for generating funding and allocating costs and responsibilities.

Internet Trade

The GLC completed work on a GLRI-funded project to develop software and tools to track, identify and monitor the sale of invasive species via the internet. The web-crawling software system – the Great Lakes Detector of Invasive Aquatics in Trade (GLDIATR) – is complete and in operation. The GLC was awarded a second GLRI grant in May to continue this work, including making improvements to the system and targeting reductions in the availability of specific species. Ongoing work will be coordinated with a multi-stakeholder team that includes NGOs, industry, and state and federal agencies.

Legislation

The GLC continues to support federal efforts to prevent the importation of potentially harmful non-native species. The GLC issued a news release in support of the Invasive Fish and Wildlife Prevention Act of 2016, legislation introduced by U.S. Sens. Kirsten Gillibrand (D-NY), Gary Peters (D-MI), Chuck Schumer (D-NY) and Debbie Stabenow (D-MI) that would expand the authority of the U.S. Fish and Wildlife Service to prohibit harmful nonnative species from being imported or sold in the United States.

Ballast Water

The GLC is working with a Ballast Water Task Force of the states and provinces to assess current ballast water standards and develop a common platform for the region from which to advance a future ballast water management regime. The Task Force met via conference call in February 2015. The task force has identified research topics that will be addressed through one or more white papers to its work. The GLC is coordinating with the Great Ships Initiative, the Great Lakes Ballast Water Collaborative and the Council of Great Lakes Governor's AIS Task Force in this effort.

Phragmites

The GLC continues to expand a partnership with the USGS-Great Lakes Science Center to lead communications and regional efforts to address the invasion of the non-native plant Phragmites. The Great Lakes Phragmites Collaborative (GLPC) engages the resource management community by facilitating regional collaboration, supporting technology transfer, linking science and management, and providing needed information products. The GLPC provides outreach via an interactive web hub, webinar series, social media presence and email list. A recent addition to the website is a series of case studies highlighting best management practices. The GLPC is guided by a regional advisory and steering committee using an approach known as Collective Impact. This approach provides structure to the collaboratives necessary to address complex natural resource challenges. The GLPC was described in the GLRI Action Plan II as a model for invasive species collaboratives and in April 2016 staff published a peer-reviewed paper in the journal Biological Invasions that showcases this approach as a novel strategy to align priorities and resources for complex issues. The GLPC is also advancing the science of non-native Phragmites management by launching the Phragmites Adaptive Management Framework (PAMF), a program that will develop a model to analyze monitoring data across the region to provide Phragmites managers with site-specific management recommendations.

Zebra and Quagga Mussels

Working in partnership with USGS, the Great Lakes Fishery Commission and NOAA, the GLC is supporting the Invasive Mussel Collaborative, which is providing a framework for communication and coordination among scientists, managers and others to share information and lessons learned, guide supporting research, and inform management actions related to control of zebra and quagga mussels. The collaborative is organized around a steering committee and a science team. This fall the collaborative will begin work on a strategy for *dreissenid* management in the Great Lakes that will include the identification of management and research priorities. The Collaborative is hosting webinars to facilitate learning and information sharing on topics related to control of *dreissenid* mussels; webinar announcements and recordings are available [online](#). The website and an email listserv have been established to provide and share information, webinar announcements and recent news, and to connect researchers, managers and others interested in *dreissenid* management.

Sea Lamprey

The GLC, in collaboration with the Great Lakes Fishery Commission, has maintained the barrier mapping application built over the last two years, which represents the location of lamprey barriers in the Great Lakes basin. It provides historical maximum extent data, showing how far up waterways sea lamprey larvae have been found, barrier fact sheets, and images of lamprey traps where relevant.

Data Integration

GLC AIS program staff are working with staff at The Nature Conservancy to develop and implement the AIS pilot of the Great Lakes Blue Accounting program. The pilot is focused on developing metrics and reporting progress on regional goals for AIS prevention and control. A proposed approach will be presented to the GLP at the fall meeting for feedback. Initial outcomes from this work will be completed by the end of 2017 and are likely to be focused on species risk assessments, policies, monitoring and surveillance. GIS and data management staff are continuing their collaboration with the Michigan Department of Environmental Quality under a U.S. EPA Exchange Network challenge grant to develop a data integration tool for citizen-scientist observations of invasive species. The project is a test case for a larger regional data integration tool that will allow data from multiple species identification and tracking programs to be consolidated into a central database. Finalized data transformation protocols are being implemented on a database housed at Michigan State University.

Contact: Tim Eder, Great Lakes Commission, 734-971-9135, teder@glc.org

Canadian Federal

Fisheries and Oceans Canada

Asian Carp Program:

- continuation of highly successful outreach and education campaign with Ontario Federation of Anglers and Hunters, Invasive Species Centre and the Royal Ontario Museum; continue work on a planned live Asian carp exhibit at the Toronto Zoo (spring 2017)
- finalization of the binational ecological risk assessment for Grass Carp in the Great Lakes basin nearly complete. Interagency briefing will be held.
- data analyses and writing up of research for physical control techniques in large mesocosm ongoing; some published MS.
- in 2016 visited 36 early detection sites in lakes Superior, Huron, Erie, Ontario; database entry from field season underway.
- DFO ICS protocol development nearly drafted to nest within domestic framework.
- Asian Carp Public Forum held October 3, 2016. Over 80 registrants.
- Asian Carp Program funding ends March 2017.

Ballast Water Research plans for upcoming year:

- scientific support to the Canadian Ballast Water Database;
- continued development and evaluation of ballast water sampling and analysis methods for compliance monitoring;
- evaluation of a science-based, decision-support tool to enable the prioritization of ballast water compliance monitoring;
- estimating the potential of ship biofouling as a pathway for the introduction and spread of aquatic invasive species into the Canadian Arctic.

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: Neil Kmiecik, Great Lakes Indian Fish & Wildlife Commission, 715-682-6619, nkmiecik@glifwc.org

Chippewa Ottawa Resource Authority

No update provided.

Contact: Mike Ripley, Chippewa Ottawa Resource Authority, 906 632-0072, mripley@sault.com

PRIVATE/COMMERCIAL

Council of Great Lakes Industries

No update provided.

Contact: Kathryn Buckner, Council of Great Lakes Industries, 734-663-1944, kabuckner@cgli.org

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

Wisconsin Sea Grant -

- Intermediate Livewell and Bilge Testing to Simulate the Fox Locks Boat Transfer Station Hot Water Treatment (Titus Seilheimer - tseilheimer@aqu.wisc.edu) – Conducted boat scale testing of hot water treatment on boats of different hull types. Distribution and timing of hot water in compartments and livewells was recorded to determine effectiveness of treatment. Hot water treatment is proposed for use at a transfer station on the Fox River. Partnership between Dr. Phil Moy (private consultant) and Dr. Bart De Stasio (Lawrence University). Funding source: Fox River Navigation System Authority.
- Diagnosis and Management of Viral Hemorrhagic Septicemia Virus in Wisconsin (Tony Goldberg, UW-Madison, (608) 890-261, tgoldberg@vetmed.wisc.edu) Viral hemorrhagic septicemia virus (VHSV) is an invasive pathogen that continues to threaten Wisconsin's fisheries. With previous Sea Grant support, our team developed an accurate non-lethal test for VHSV. Our current goal is to validate our test for four important fish species in Wisconsin: bluegill, yellow perch, northern pike and brown trout. We will set test thresholds using samples from known positive and known negative fish. We will then measure the development of the immune response to understand how long fish retain antibodies. Finally, we test fish across Wisconsin, to map the distribution of VHSV in our state. The result will be new information about whether fish have been exposed to VHSV, the current immune status of populations, and where in Wisconsin VHSV has spread. This information will be used to manage VHSV and reduce its impact on our economy and recreational fisheries. R/SFA-13
- Carbon Fixation in Lake Michigan (Harvey Bootsma, UW-Milwaukee, (414) 382-1717, hbootsma@uwm.edu) Accurate measurements of carbon fixation and the physical and chemical forces that regulate it are fundamental to any ecosystem-based management program. Recent declines in the abundance of both forage fish and apex predators in Lake Michigan appear to be related to the loss of phytoplankton resulting from grazing by dreissenids. Dreissenid-mediated changes in nutrient cycling also appear to have altered the relationship between nutrient loading, phytoplankton production, and phytoplankton biomass. However, quantitative measures of photosynthetic carbon fixation and carbon dynamics at the base of the Lake Michigan food web are very limited, and so it has been difficult to define the response of the phytoplankton community to changes in external nutrient loading and internal nutrient cycling in quantitative terms. This research will improve our understanding of these relationships and help guide the revision of nutrient management models. R/HCE-28
- Seasonal Depth Distribution of Round Goby in Lake Michigan, Emphasizing Cold Seasons John Janssen, UW-Milwaukee, (414) 382-1733, jjanssen@uwm.edu) Round gobies are significant in the diet of certain coldwater predators, even though they are a warmwater species (based on summer habitat and spawning). This project is evaluating these evolving predator-prey interactions by finding areas in which round gobies are most accessible to coldwater predators. An understanding of the cold season predator-prey interaction will facilitate management by allowing managers to better assess the best balance of predators, particularly the largely stocked salmon and trout. The current shallowest USGS trawls are both off the preferred substrate and preferred summer depths for round gobies. In this novel and still evolving coastal ecosystem, management of round gobies is a balance between control of a nuisance species and management of the forage base. R/HCE-32

Pennsylvania Sea Grant -

- Kelly Grant. Gannon University. [PCR Tracking of Predation on Non-native Species in Lake Erie](#). (completed)
- Brian Mangan. Kings College. [Rusty Crayfish and Smallmouth Bass in the Susquehanna River: Who's eating Whom?](#) (completed)
- Matthew Shank. [Susquehanna River Basin Commission. Didymo geminata in Pennsylvania: an Investigation of Current and Historic Distribution, Habitat Suitability, and Nutritional Content](#). (completed)
- Erik Sildorff. [Delaware River Basin Commission. Nutrient Thresholds for Didymosphenia geminata Blooms and Stalk Formation in the Delaware River](#). (completed)
- Jay Stauffer. Penn State University. [Status of Exotic Round Goby and Tubenose Goby in Pennsylvania](#). (completed)
- Geoff Smith. [Pennsylvania Fish and Boat Commission. Preliminary determination of density and distribution of Flathead Catfish Pylodictis olivaris in the Susquehanna River and select tributaries](#). (in progress)
- Casey Wilson, Allegheny College and Jay Stauffer, Penn State University. [Determination of invasive round goby populations within the main stem of French Creek and their potential impact on benthic fishes](#). (in progress)

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

Invading Species Awareness Program, Ontario Federation of Anglers and Hunters

No update provided.

Contact: Sophie Bull, 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, Ichadderton@tnc.org

Wildlife Forever

Wildlife Forever's National Clean Drain Dry Initiative continues its collaborative approach to increase AIS public awareness and prevention of best management practices. Through innovative marketing and on-the-ground prevention outreach, partners continue to reach millions of recreational users each year. Promoting consistent messaging and brand awareness of Clean Drain Dry through television advertising, print media, highway billboards, radio commercials, airports, community based events, and access signage, positive prevention behaviors are reinforced establishing social norms throughout the Great Lakes region and beyond. Wildlife Forever most recently created and developed the Clean Drain Dry mobile application which incorporates Augmented Reality video to enhance and revitalize access signage while engaging users through incentives and local offers. The app is currently available now for free download in the apple and Google play app stores. Newly created signs have been developed with this technology which is similar to Pokémon Go! A pilot launch is being implemented currently in St. Louis County, MN with project partners the Initiative Foundation, MN Sea Grant, the USFS and Superior NF, the National Park Service, Lake Vermillion Association and Burntside Lake Association. Wildlife Forever and Ohio DNR continue to their public outreach campaign focused on the Trash Unused Bait message to increase awareness of Asian Carps which may inadvertently be transported in bait. Wildlife Forever also continues to work collaboratively with partners in NY, PA, WI, MI, MN and throughout the country providing coordinated and professional marketing, outreach, and media services. We'd like to thank our many partners and encourage others to reach out and collaborate with the Clean Drain Dry Initiative.

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

Minnesota Sea Grant

From June-September, Stop Aquatic Hitchhikers and Habitattitude booths featured at 24 festivals, fairs, kids fishing events, and meetings taught nearly 10,400 youth and adult attendees and visitors about how to prevent the spread of AIS. One highlight Sea Grant supported was St. River Quest, a shipboard education event for nearly 1,500 6th graders, Duluth, MN, in May (<http://www.seagrants.mn.edu/riverquest/>) in its 24th year.

Habitattitude Surrender event was held at Animal Allies (Humane Society), Duluth, MN, September 24, co-hosted by World of Fish and The Snake Pit, two local retailers. As the first ever such event in Duluth, fish, aquatic plants and reptiles from aquarists, water gardeners, teachers, students, and reptile owners "rehomed" their pets and unwanted live classroom study organisms. Ten animals including five reared slider turtles, three ball pythons, one coral snake and one beta Siamese fighting fish were returned. Twenty five Junior Allies were also educated on how to get Habitattitude. Next Habitattitude Surrenders will be co-hosted by the Minnesota Aquarium Society in late January, Bloomington, MN, and again in Duluth in late April, but this time at the University of Minnesota-Duluth Kirby Student Center.

Aquatic Invaders Summit II was held October 5-6, St. Cloud, MN, attended by over 225 people. One hundred visited the Stop Aquatic Hitchhikers! booth hosted by Minnesota Sea Grant.

Doug Jensen gave an invited presentation, Update on AIS Survey Research: Market Research and Evaluation, at the Top 10 AIS Counties Gathering, Brainerd, MN, September 26, 2016.

Co-chaired by Minnesota Sea Grant and University of Wisconsin Extension, the fifth biennial 2016 Upper Midwest Invasive Species Conference (UMISC) was held in La Crosse, WI, October 16-19. Over 650 attended from 30 states and provinces covering

management of 74 invasive species (42 terrestrial; 32 aquatic). Over 225 presentations, 36 posters, 44 exhibitors and 8 field trips provided updates on how invasive species can be better managed. UMISC has grown to be the largest and most comprehensive all taxa invasive species conference in the nation.

Contact: Doug Jensen, Minnesota Sea Grant, 218-726-8712, djensen1@umn.edu

Saint Lawrence Seaway Development Corporation

The Saint Lawrence Seaway Development Corporation (SLSDC) remains very interested in the issue of aquatic invasive species in the Great Lakes and St. Lawrence Seaway and continues to work with the ship industry and regulators on associated issues and solutions. SLSDC participates on the Great Lakes Ballast Water Working Group (BWWG) with the U.S. Coast Guard, Transport Canada – Marine Safety and Security, and the St. Lawrence Seaway Management Corporation. The BWWG is a joint effort to enforce harmonized ballast water management procedures and regulations and assure ships entering the Great Lakes pose minimal risk of introducing any new species. Since 2006 no new ballast-attributed species have been identified in the Great Lakes.

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

National Wildlife Federation

No update provided.

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

North Central Regional Aquaculture Center, Department of Fisheries and Wildlife

No update provided.

Contact: Chris Weeks, Department of Fisheries and Wildlife, 517-353-2298, weekschr@msu.edu