

# Great Lakes Panel on Aquatic Nuisance Species

## Member Updates - Spring 2013

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### U.S. Army Corps of Engineers

The Buffalo District is currently engaged in an effort to develop concentration and exposure time (CET) requirements for fluridone use in the control of monoecious *Hydrilla verticillata* in the Cayuga Lake Inlet and Erie Canal, NY. They and their partners are also gathering data to better understand the biology/physiology of monoecious hydrilla. Initial CET recommendations are expected in early 2014.

Detroit District efforts remain focused on sea lamprey control in cooperation with USFWS and the Great Lakes Fishery Commission. The Trail Creek, IN barrier completed in 2011 performed as planned in its initial season of operation (2012). A new barrier is being planned for the Manistique River, MI which is thought to be the largest contributor of sea lamprey recruits to Lake Michigan. The planning phase of this project is expected to be completed this summer with construction occurring in 2014. In addition, the district is investigating a dozen additional sites in Michigan and Wisconsin for the possible installation of permanent sea lamprey barriers and/or traps.

The Corps is committed, as a member of the inter-agency Asian Carp Regional Coordinating Committee, to preventing the invasive Asian carp from becoming established in the Great Lakes through active prevention measures (the Chicago Sanitary and Ship Canal electric barriers); monitoring the waterways for the presence of Asian carp and Asian carp DNA; conducting research on the efficacy of the electric barriers; and conducting an extensive comprehensive study (the Great Lakes and Mississippi River Interbasin Study or GLMRIS) that examines options to prevent the transfer of aquatic invasive species between the Great Lakes and Mississippi River basins. GLMRIS considers transfer via the Chicago Area Waterway System and 18 other potential intermittent pathways along the basin divide. The Chicago District is leading this effort. Additional information can be found at:

<http://www.lrc.usace.army.mil/Missions/CivilWorksProjects/ANSPortal.aspx>

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### U.S. Coast Guard

The Coast Guard published its ballast water discharge standard regulation in March 2012. It adopts the IMO standard and will require the installation of type-approved BW management systems on "salties". The Canadian government and the Canadian industry (Domestic and foreign-flag) are very satisfied with the rulemaking.

- The use of 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. Initially, these requirements will not apply to Lakers but after additional analysis and development of more capable BW treatment systems, the Coast Guard may include more stringent requirements in a future rulemaking.

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.

Alternate Management Systems (AMS): Since it will take some time to certify all of the independent labs that will be completing this testing, the Coast Guard has 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.

#### Alternate Management Systems Status

-In April 2013, CGHQ approved nine ballast water treatment systems (BWTS) for AMS.

-For Independent Labs (IL) that will be involved in the type approval process, CGHQ approved NSF International in July 12. Duluth-Superior's Great Ship Initiative is part of the NSF team.

-USCG HQ has inquiries from 10 other labs from across the world. Only one has submitted an application to be accepted as an IL.

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## National Oceanic and Atmospheric Administration

NOAA's currently has two ANS-focused projects in the Great Lakes region. One is the continuation of the Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS), a NOAA project to increase accessibility of information on nonindigenous species in the Great Lakes system in support of research, management and information services. GLANSIS also serves as the Great Lakes specific node of the USGS NAS (nonindigenous aquatic species) database. The other is an extramural research project jointly funded by Agency base funds and funds from the Great Lakes Restoration Initiative. The project is an award through the Regional Ecosystem Prediction Program of NOAA's National Centers for Coastal Ocean Science Center for Sponsored Coastal Ocean Research (NCCOS/CSCOR). The overarching goal of this project is to provide resource managers with information on the potential ecological and economic impacts of new species likely to invade the Great Lakes. This information will be used to devise and evaluate alternative management strategies to prevent invasions, eradicate newly established invaders, or mitigate their impact if the previous are not feasible. Summaries of recent activities for the projects are provided next.

#### The Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS)

<http://www.glerl.noaa.gov/res/Programs/glansis/glansis.html>

GLANSIS is funded by the GLRI through fall of 2013 to bring on-line a suite of specific enhancements in support of early detection and rapid response:

- **Enhanced bibliographic information** - bibliographic contents of the Sea Grant SGNIS database (including grey literature) have been ingested and are available through the USGS NAS Reference Database interface. <http://nas.er.usgs.gov/queries/references/default.aspx>
- **51 non-technical fact sheets** for priority species of public interest were developed by IL-IN Sea Grant and are now available through GLANSIS (click on the common name following the basic search).
- **52 high priority watchlist species** have been added to the database - those which have been identified in the literature as high risk for invading and becoming established in the Great Lakes. 12 completed fact sheets are in review, the remainder are anticipated to be ready for review by early May.
- **11 species** have been added as **range expansion species** - those native to one portion of the Great Lakes but which are considered invasive to other portions of the basin. The complete fact sheet for *Ictiobus cyprinellus* is posted. Fact sheets for 5 additional species are in review. The remaining 5 are in progress.
- We've added updated and **consistent impact information** better able to support risk assessment. Information for 145 established species now available online. 35 plants still pending should be in review by the end of May.

- Addition of **management information** — regulations, best management practices and control methodologies - for all the species in the database. 79 management profiles completed, including all established parasites & diseases. Remainder scheduled for summer 2013.

Finally, GLANSIS is in need of additional reviewers, especially those with expertise in aquatic plants and AIS control in the Great Lakes region. Name suggestions or self-nominations are welcomed. Please contact [Rochelle.Sturtevant@noaa.gov](mailto:Rochelle.Sturtevant@noaa.gov) for more information.

REPP/ Forecasting spread and bioeconomic impacts of aquatic invasive species from multiple pathways to improve management and policy in the Great Lakes.

This project is in its last year of funding (FY 2013), however, its period of performance ends on August 2014. Main project activities in the last 6 months have been completion of models to forecast the spread of new invaders through 1) background dispersal of larvae/juveniles in Lake Erie, 2) dispersal by recreational boaters, and 3) dispersal through the trade and use of live-bait. Work also continues in the development of a food web and an economic model for Lake Erie to evaluate the potential effects of new invaders. These models will ultimately be linked to provide a forecast of potential bioeconomic impacts to Lake Erie. Of note is that the project continues to be in contact with state resource agency staff to inform its activities so that they are responsive to their management needs and ensure that ongoing project results are provided in a timely manner.

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## U.S. Forest Service

### *Invasive Species Management on National Forests*

All six National Forests with land in the Great Lakes basin recently released annual reports of their 2012 invasive species management activities. Some highlights include Eurasian watermilfoil control on the Chequamegon-Nicolet National Forest, lampricide application on the Hiawatha National Forest, and AIS education on the Superior National Forest. Similar activities are planned for the 2013 field season.

The reports are available at the following links, organized by state.

#### Michigan

- Hiawatha National Forest - <http://go.usa.gov/T8GA>
- Huron-Manistee National Forest - <http://go.usa.gov/T8Gm>
- Ottawa National Forest - <http://go.usa.gov/T87Q>

#### Minnesota

- Superior National Forest - <http://go.usa.gov/T8fd>

#### New York

- Finger Lakes National Forest - <http://go.usa.gov/T8fR>

#### Wisconsin

- Chequamegon-Nicolet National Forest - <http://go.usa.gov/T8fC>

### *Outreach and Education*

The United States Forest Service has continues to partner with Shedd Aquarium (Chicago, IL; 2012-present) and Discovery World (Milwaukee, WI; 2011-present) on Aquatic Invasive Species (AIS) Outreach and Education exhibits and programming. Programming includes summer camps for children and summer jobs for teens. Exhibits include live animals, informative panels, and interactive displays. Approximately 2 million people visit the Shedd Aquarium each year, and Discovery World has 200,000 visitors annually. In January 2013, Discovery World received a Regional Partnership Award from the Eastern Region of the US Forest Service. In April 2013, Shedd Aquarium received a National Partnership Award from the US Forest Service National Invasive Species program for their outreach and education efforts.

The Forest Service is also an important contributor to Wildlife Forever's Threat Campaign partnership in the Great Lakes region (2010-present). The Threat Campaign is a multi-media invasive species outreach effort. Outreach

materials include billboards, television programs, web advertising, print ads, and public service announcements. In 2013, Threat Campaign messages will appear on billboards in Minnesota, Wisconsin, Michigan, and other Great Lakes states. With support from the Forest Service, Wildlife Forever has incorporated an AIS segment in the North American Fisherman television program that reaches millions of households each week.

The Eastern Region of the U.S. Forest Service recently renewed its partnership with the National Professional Anglers Association (NPAA). This partnership teaches youth and families about the threat of AIS and the steps individuals must take to prevent their spread. Each year NPAA members and Forest Service staff host fishing derbies and provide information about aquatic resources and aquatic invasive species, reaching hundreds of people in the Great Lakes basin.

#### Prevention of Secondary Spread of AIS by Recreational Boaters

In recent years the Forest Service has expanded partnerships with local communities to educate recreational boaters about what they need to do to prevent the spread of AIS, and to provide staff and equipment for boat inspection and decontamination. Most recently, the Huron-Manistee National Forest (Michigan) has established two agreements with local partners for purchase and operation of portable boat washing units. These partners are the Muskegon River Watershed Assembly and Manistee County, MI. Also, the Ottawa National Forest and the Hiawatha National Forest in Michigan's Upper Peninsula, as well as the Chequamegon-Nicolet National Forest in northern Wisconsin, continue to work with partners to operate portable boat washing units and to provide AIS outreach and education.

The National Forests in Michigan (Ottawa, Hiawatha, and Huron-Manistee) are posting improved AIS signage at water access sites on the forest. See photo of the sign here: <http://go.usa.gov/gbRw>.

Construction of the Ottawa National Forest's free-standing self-service boat washing station is complete. This spring and summer will be the station's first season in operation. The station is located at the public access boat launch on Hagerman Lake, near Iron River, MI. Photos of the completed washing station (<http://go.usa.gov/gbjd>) and construction plans (<http://go.usa.gov/T8dY>) are available.

#### Control and Management through Partnerships - Cooperative Weed Management Areas

As the Forest Service works with partners to control and manage invasive species on and off National Forests, Cooperative Weed Management Areas (CWMAs) are a valuable organizational tool. CWMAs are local organizations that integrate all invasive species management resources across jurisdictional boundaries to benefit entire communities. Thanks to dedicated staff and volunteers, and to Great Lakes Restoration Initiative funding, all five National Forests in the Great Lakes basin are now working with one or more active CWMAs. An current map of the CWMAs in the Great Lakes basin is available under the Attachments tab of the Wiki.

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## Illinois

Asian Carp Removal Project This program was established to reduce the numbers of Asian carp downstream of the Electric Dispersal Barrier through controlled and contracted commercial fishing.

- Contracted commercial fishers and assisting IDNR biologists deployed 643.3 miles of net in the upper Illinois Waterway from 2010- 2012.
- A total of 44,658 Bighead carp, 47,474 Silver carp, and 496 Grass carp were removed by contracted netting. The total weight of Asian carp removed was 698.72 tons (62.41 tons in 2010, 351.78 tons in 2011 and 284.53 tons in 2012).
- Winter Sampling: Building upon success of Barrier Defense (above), bi-monthly sampling with contracted fishers that use gill/trammel netting as well as monthly seining events are scheduled to further remove Asian carps in the upper Illinois River during winter months.

- Commercial seines are ½ mile long and can remove large numbers of fish per haul.
- Winter 2012-2013 has been relatively cold with many weekly events rescheduled due to weather and ice. All of the scheduled effort was completed for the winter in March.
- Two December seine hauls yielded 15, 000 lbs and 50,000 lbs of Asian carp each.
- We will continue to schedule these events to maximize removal efforts.
- Over 8,200 bighead and silver carp (56.5 tons) were removed in this effort.
- Intense Surveillance above the Electric Barriers
- Estimated over 9,600 person-hours spent sampling at fixed sites upstream of the Barrier in 2010, 2011 and 2012.
- Estimated 3,713 person-hours spent sampling at fixed sites, and 3,805 person-hours spent sampling in random areas upstream of the Barrier in 2012
- 533 hours spent electrofishing and 165.9 miles of trammel/gill net deployed at fixed sites in 2010, 2011, and 2012 and random areas in 2012.
- 192 hours spent electrofishing and 81.7 miles of trammel/gill net deployed at fixed sites and random areas in 2012.
- Sampled 192,763 fish representing 67 species and two hybrid groups during electrofishing and trammel/gill netting at fixed sites in 2010, 2011, and 2012 and random sites in 2012.
- Sampled 99,234 fish representing 63 species and two hybrid groups in during fixed and random electrofishing and trammel/gill netting 2012.
- No Bighead or Silver Carp captured or observed during fixed site and random area electrofishing and netting in 2012.

#### Agency Fixed Site Monitoring Downstream of the Dispersal Barrier

- Estimated 5,267 person-hours spent sampling at fixed sites and additional netting locations downstream of the Dispersal Barrier from 2010-2012.
- 94.5 hours spent electrofishing and 81.1 miles of trammel/gill net deployed.
- Sampled 60,709 fish, representing 84 species and four hybrid groups.
- A total of 25 Bighead carp and no Silver carp captured during contracted commercial netting at Dresden Island Pool fixed sites and additional netting locations.
- Detectable population front of mostly Bighead carp located just north of I-55 Bridge at river mile 280 (47 miles from Lake Michigan). No appreciable change in upstream location of the population front in past five years.
- Sampled 17 Bighead carp and 185 Silver carp by electrofishing, and 455 Bighead carp and 258 Silver carp by netting at fixed sites and additional netting locations in Marseilles Pool. Presence of mature adults capable of spawning occurred in this pool about 55 miles from Lake Michigan. However, Asian carp larvae and juveniles were not detected upstream of Peoria Pool or less than 100 miles downstream of the Dispersal Barrier and 137 miles from Lake Michigan.
- No Bighead or Silver carp were captured by electrofishing or netting in Lockport and Brandon Road pools.

#### Additional Actions in the CAWS

- Completed five response actions with conventional and experimental gears in the CAWS upstream of the Dispersal Barrier during 2012. Three of the actions were triggered by three consecutive positive detections for Asian carp eDNA in the same location.
- Estimated 1,630 person-hours were spent to complete 59 hours of electrofishing, set 18.4 miles of trammel/gill net, make three 800-yard long commercial seine hauls, and deploy two tandem trap nets, 10 hoop nets and two Great Lake pound nets equal to 30.3 net-days of effort.
- Across all response actions and gears, sampled over 29,818 fish representing 53 species and 2 hybrid groups.
- No Bighead or Silver carp were captured or observed during response actions.

#### Law Enforcement:

- Invasive species unit (ISU) in IDNR law enforcement was formed.
- ISU logged 1,035 hours investigating invasive species issues.
- ISU gained much intelligence from a Chicago area live fish market inspection.

- Conducted a joint investigation with USFWS in which several charges and penalties were given to an out-of-state fish hauler.
- A multi-agency Asian carp task force was formed to share intelligence, information and plan future operations.

#### Urban Fishing Pond Surveys:

- Sampled 19 ponds with electrofishing and trammel/gill nets during 2012.
- Estimated 727 person-hours were spent to complete 30 hours of electrofishing and set 6.2 miles of trammel/gill net.
- Sampled 9,103 fish representing 29 species and 2 hybrid groups.
- Six Bighead carp were removed from three ponds (Garfield Park, Humboldt Park, Joe's Pond); three are on exhibit at the John G. Shedd Aquarium.

#### Research

- Illinois DNR is developing control technology and understanding by funding research through multiple academic and research institutions in Illinois including: University of Illinois, Illinois Natural History Survey, Illinois-Indiana SeaGrant, Loyola University, Southern Illinois University, Eastern Illinois University, and Western Illinois University.
- Results will inform on efficacy of outreach-education, emergent technologies/barriers (chemical, electrical, and physical barriers), patterns of movement and risk of Asian carp movement, locations where Asian carp spawning is documented, documenting tributaries and locations statewide where Asian carp populations exist, provide response actions necessary to remove ANS from state waters
- Illinois DNR works closely with ACRCC partners in developing strategies to prevent establishment of Asian carps in the Great Lakes

#### Aquatic Nuisance Species:

- Illinois DNR has had a Statewide ANS plan since 1999. Work in 2012 began a critical review and update of this plan that will include pro-active risk driven planning and design multiple response plan based on ANS detected.
- USDA-APHIS issued an emergency rule for managing transport of species across stateliness (Great Lakes) due to VHS (Viral Hemorrhagic Septicemia). Statewide surveillance is now supported by IDNR funded work to keep an eye on this disease and potential impacts or movements into inland waters. Currently VHS has only been reported in Lake Michigan within Illinois.
- Other ANS of concern, black carp and grass carp, have been found in the Mississippi River Basin and work to monitor their spread is underway. Black carp collections are monitored closely with analyses of body parts to estimate where they have been spawned and where they are spending their time.
- ANS Program Manager Kevin Irons sits on several panels (Mississippi River Basin Panel on ANS, Great Lakes Basin Panel on ANS, co-chairs the Council of Great Lakes Governors AIS task force with MI, sits on the Mississippi Governor's Council on AIS to assist in developing consistent and appropriate policy and regulation to lower the threat of introduction of ANS into the system as well as optimize management efforts.
- Developed an Outreach and Education Brand that builds off of other National campaigns. The "Be a Hero, Transport Zero" campaign will launch in May and will educate statewide partners on proper care when using aquatic resources.
- Work on Lake Michigan has evaluated Alewife genetic flexibility and Zooplankton (rotifer) populations in the lake. This informs managers on the demise of Alewife but also gives us some insight into other pathways where small plankton may be introduced, as well as better understanding of the productivity of the Lake that has been invaded by plankton feeding organisms.
- IDNR/INHS/IL-IN Seagrant will be teaching proper boat washing techniques at ramps across NE Illinois to further prevent spread of ANS where they may already exist.

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## Minnesota

- Over the last two years, Minnesota's Aquatic Invasive Species (AIS) Program has grown substantially. This growth has occurred in both scope of the work and number of staff available to work on AIS prevention and management activities. To help the state carry out strategic and effective AIS prevention and management work the DNR Commissioner Tom Landwehr appointed a 15 member stakeholder AIS Advisory Committee. The committee also consists of 5 ex-officio members who represent key partners that provide the department with broad level, ongoing information and support crucial to the implementation of the state's AIS Program. Overall, the committee is designed to provide insight and perspectives to help guide the DNR's AIS activities.
- In 2012 the Minnesota DNR worked with the Iowa DNR to construct an electric fish barrier preventing fish from entering the Iowa Great Lakes through the Lower Gar Lake. The Iowa Great Lakes are fed by streams flowing from Minnesota. The Minnesota DNR contributed \$261,000 to project to protect streams and lakes in the southwest part of MN from the invaders.
- Over the winter MN DNR Enforcement observed the California Zebra Mussel Sniffing K-9 program. The program showed great promise and applicability for the MN DNR. In the spring of 2013 the MN DNR Enforcement Division developed a pilot program for zebra mussel dogs. This spring, 2-4 dogs will be trained and ready to deploy by ice out. The DNR hopes that these dogs will assist with inspections especially at road side check sites. On average the dogs can detect the presence of zebra mussels 15X faster than a human can.

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## New York

The IS Council, comprising 9 agencies, met February 13, 2012 and the IS Advisory Committee, comprising 25 NGOs, met March 26, 2012. Training session for iMapInvasives, the state GIS database, are being held throughout the state during spring 2013. Four Partnerships for Invasive Species Management (PRISMs) receive State support, staff are working to contract with the four remaining PRISMs (8 PRISMs total). Certification conditions were developed for the draft 2013 EPA's Vessel General Permit (VGP) in order to meet NY's water quality standards. A legal challenge against NYS's Certification was defended. Management of a large hydrilla infestation in the Inlet of Cayuga Lake has been ongoing since 2011, in collaboration with local stakeholders. A hydrilla management coordinator was recently hired for the Cayuga Lake project. Additional hydrilla infestations have been confirmed in Tonawanda Creek and Broome County. Two interns will be assisting with monitoring for hydrilla at Cayuga Lk and Tonawanda Creek. An intern will be reviewing results of NY's Aquatic Invasive Species eradication grants and conducting interviews and reviews to assess efficacy of the grant program. A literature review of monocious hydrilla was contracted through NEANS, the final products were recently received. A hydrilla workshop was held in August 2012 and a symposium convened in September 2012. Several aquatic plant ID workshops are planned for local partners during the 2013 field season. A statewide manual for boat steward programs is being developed, in collaboration with SeaGrant. Boat steward programs have expanded throughout the Adirondacks, Finger Lakes region and Catskills and will be newly deployed on the Erie Canal system during the 2013 field season. Monitoring and management for EAB continues with twenty counties now under quarantine, this number will increase to approximately forty-three in May. Assessments for nonnative animals and plants are underway in preparation for the development of regulations, in cooperation with the Department of Agriculture and Markets, focused on commerce of invasive species.

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## Ohio

- Ohio is continues to monitoring for Asian carp in the Ohio River and Lake Erie using traditional collection methods and eDNA. Both bighead and silver carp have been observed in the Ohio portion of the Ohio River

and although both silver and bighead carp eDNA has been detected in Western Lake Erie, no live fish have been detected in recent surveys using traditional sampling gear.

- Ohio is working closely with the USACE to develop closure options at the four Ohio GLMRIS connections. The two medium risk connections at the Ohio-Erie Canal and Little Killbuck Creek are a priority and are currently being evaluated. The USACE will evaluate the Ohio-Erie Canal closure options and we are in discussions with NRCS to take the lead on the Little Killbuck Creek.
- Ohio continues to work with several partners to combat Phragmites and Hydrilla in the Lake Erie Basin.
- Ohio's revised AIS State Management Plan was approved by the ANSTF in March of 2013. The plan addresses changes to the quickly changing AIS landscape. The plan will include a Rapid Response Plan (RRP). We have a draft RRP that we are currently finalizing with assistance from USEPA and Tetra Tech.
- Ohio is working with the USFWS and the Ohio River Fisheries Management Team on an Ohio River Asian Carp Action Plan. There is currently a draft plan that will be finalized this summer. Ohio is also working on a statewide Asian Carp Management Plan which will be completed by the end of 2013.

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## Wisconsin

Working with Minnesota and Michigan to develop a tri-state PSA on AIS. Implementing a "Drain Campaign" to increase public's awareness of the importance of eliminating water from boat, livewell, coolers, etc. Giving away a free ice pack with AIS message printed on it to encourage compliance. Purchased 10,000 refreezeable ice packs with printed message for approximately \$11K (includes shipping). Cooperating with USGS on field testing Zequanox (Zebra Mussel control agent). Developing fish passage policy. Concerned over reoccurring Water Hyacinth/Water Lettuce population in Pool 5...working with USFWS to implement RR plan. Participating on Midwest Gov. Association, Council on Great Lake Gov's, GLMRIS executive steering committee, MRBP, GLP, etc.

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## International Joint Commission

2010 GLRI funding enabled the IJC work group on binational AIS Rapid Response to build on its IJC-funded 2009-2011 priority work, complete additional studies and produce a pilot binational rapid response plan for AIS in the shared connecting waters between Lakes Huron and Erie. The final contracted technical reports were reviewed and completed by December 31, 2012. The draft reports are temporarily available for downloading at the following link: <http://www.canamglass.org/online/reports.phpuntil> a more suitable location is established on the new IJC website. This should be done before the end of May 2013, at which time a complete compendium of IJC work group reports on AIS rapid response will be made accessible on [www.IJC.org](http://www.IJC.org). The pilot binational AIS response plan is written in a manner that, through testing and refinement, could be easily adapted for a basin-wide approach and provides a solid foundation for work on the Great Lakes AIS binational response plan required by Annex 6 of the 2012 Protocol to the GLWQA. On February 20, 2013, the IJC partnered with the Invasive Species Centre to host a meeting on AIS Early Detection and Rapid Response in Flat Rock, Michigan to discuss the IJC work, how it might fit with work being undertaken by the Annex 6 AIS Sub-committee, and preliminary plans for a binational rapid response exercise with stakeholder from the U.S. and Canada. The record of that meeting, containing copies of the presentations is attached.

The IJC has actively promoted binational cooperative action on AIS and although our staff assignments will change to accommodate the new GLWQA, we will continue working to support the Annex 6 subcommittee as well as other initiatives, like the Michigan AIS Advisory Council, the Great Lakes Ballast Water Collaborative and others to continue a productive exchange between the U.S. and Canada.

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## Great Lakes Commission

- The GLC is working in partnership with the Great Lakes and St. Lawrence Cities Initiative to advance separation of the Chicago area waterways as a long-term solution to the threat of an invasion from Asian carp or other species, while maintaining and enhancing other uses of the system. Key consultants from the first phase of this project have been retained to carry out additional analysis on a "preferred option" for separation, as well as developing an interim partial barrier option. Another consultant has been hired to conduct a financing study to define mechanisms for paying for separation.
- Work is underway on a grant from the Great Lakes Restoration Initiative to develop software and tools to track, identify and monitor the sale of invasive species via the Internet. An informational webinar was held in January 2013 on this project with over 50 participants.
- The GLC continues to engage in activities to support new legislation that would strengthen federal programs to prevent the importation of potentially harmful non-native fish and wildlife. A fact sheet has been prepared for distribution at Great Lakes Day events detailing these recommendations.
- The GLC initiated a partnership with the USGS-Great Lakes Science Center to lead a regional communications strategy targeting the invasive plant Phragmites. The GLC has established the Great Lakes Phragmites Collaborative, which includes a regional advisory committee, interactive website, webinar series and communication tools intended to engage the resource management community, reduce redundancy, link science and management, facilitate adaptive management, and encourage a systems approach to management and conservation.

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## Chippewa Ottawa Resource Authority

CORA represents five tribes in Michigan with regard to the tribes' commercial and subsistence fisheries in the 1836 treaty-ceded waters of Lakes Huron, Michigan and Superior. The tribes which are party to the 1836 Treaty are the Bay Mills Indian Community, Grand Traverse Band of Ottawa and Chippewa Indians, Little River Band of Ottawa Indians, Little Traverse Bay Bands of Odawa Indians and Sault Ste. Marie Tribe of Chippewa Indians.

CORA, through the Inter-Tribal Fisheries and Assessment Program (ITFAP), participates on each of the upper Great Lakes Lake Committees, Technical subcommittees and Task Groups, and the Council of Lake Committees, which all operate under the umbrella of the Joint Strategic Plan for Management of Great Lakes Fisheries (Joint Plan). The Joint Plan is facilitated by the Great Lakes Fishery Commission, which is mandated to conduct sea lamprey control efforts. ITFAP also conducts extensive assessments species important to the tribal commercial fishery that are used to carry-out the mandates of the 2000 Consent Decree, a court-ordered settlement among the five CORA tribes, State of Michigan, and the federal government. The Consent Decree also established an inter-agency biological body, the Technical Fisheries Committee (TFC), which is tasked with producing harvest limits for key species through the use of state-of-the-art population assessment models. Finally, ITFAP conducts and partners with other agencies in a variety of research projects, many of which directly or indirectly involve invasive species.

Despite over fifty years of control efforts, sea lamprey predation remains one of the largest threats to the success and sustainability of the tribal commercial fishery. Through the Lake Committee process, ITFAP is highly involved in issues related to sea lamprey impacts, as well as control planning. In addition, in the Consent Decree forum, the inter-agency TFC evaluates the impact of sea lamprey predation on important fish species (e.g. whitefish, lake trout) based on wounding rates and subsequent estimates of mortality. In 2012, the TFC noted that sea lamprey-induced mortality on whitefish in northern Lake Huron had exceeded the estimate of mortality by commercial fishing by a factor of two-fold. This prompted the TFC to address the GLFC's Sea Lamprey Control Board in an attempt to both highlight the impact sea lamprey are having on the tribal fishery in northern Lakes Huron and Michigan, and the extent of sea lamprey mortality on whitefish and other non-lake trout species. ITFAP's

Assessment Biologist presented the northern Lake Huron whitefish mortality data to the Sea Lamprey Control Board which appears to have influenced the Commission's plan for control activities in 2013.

Based on assessments of prey fish in Northern Lake Huron, ITFAP has also produced a report on the influence of alternative prey including cisco and chubs on survival of young parasitic phase sea lampreys, which will also be useful in future sea lamprey control planning. CORA also anticipates assisting the U.S. Fish and Wildlife Service and partners for the fourth consecutive year with the sea lamprey treatment in the St. Marys River by providing a staging area for control chemicals.

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## **Cooperative Institute for Limnological and Ecosystems Research**

### Larval Dispersal, Habitat Classification, and Food Web Monitoring

We propose to use ecological models and GIS databases to support a NOAA CSCOR proposal (D. Lodge, PI) entitled "Forecasting spread and bioeconomic impacts of aquatic invasive species from multiple pathways to improve management and policy in the Great Lakes." To forecast what portions of the Great lakes are most vulnerable to invasions, we will use abiotic data layers to develop an environmental classification that groups areas of environmental similarity as a surrogate descriptor of biotic patterns, because abiotic data are available with more extensive spatial coverage than biological data. All GIS variables and classifications will be freely available as an output of the project and will provide a new spatial framework for a variety of applications of management interest. We will hold an expert workshop to elicit information on model input and uncertainties and to report preliminary results of simulations for Lakes Michigan and Erie. We will revise and report simulations for lakes Michigan and Erie, and run simulations for Superior, Ontario, and Huron, while incorporating uncertainty in model parameters and under different invasion and management scenarios. Products will include: maps and predictions of invasive species larval dispersal in four of five Great Lakes; developed databases and eco-regional habitat classifications for environmental niche modeling; Ecopath/Ecosim food web models and predictions of invasive species impacts on Great Lakes food webs and fisheries.

### Assessing Risk of Asian Carp Invasion and Impacts on Great lakes Food Webs and Fisheries

Impacts of Asian carps on aquatic food webs are potentially complex, and require spatially-explicit models of trophic interactions to assess direct and indirect influences. A spatially-explicit modeling approach allows a more detailed look at the effects of Asian carps on key members of the food web, and allows for the inclusion of density-dependent feedbacks (e.g., lower survival of age-0 fish, but higher growth and reproductive output by older survivors) which may help species compensate for the effects of an Asian carp invasion. Project objectives are: (1) Predict in which Great Lakes habitats Asian carps can successfully grow, survive and reproduce; (2) Predict Asian carp's impacts on food webs, key fish species and fisheries in different Great Lakes environments; and (3) Survey the Chinese literature for relevant information on Asian carps' energetics, vital rates and ecology

### Compliance Monitoring of Ballast Water Discharge Standards

We propose to use the sensor verification program developed by the Alliance for Coastal Technologies to develop and implement a test plan to evaluate the use of commercially available fluorometers as a tool for compliance monitoring. We will directly involve the USEPA and USCG in the planning process. We will build on the concepts and recommendations developed in the recent ACT/MERC Workshop on Ballast Water Compliance Monitoring Using Fluorometry (June 14-15, 2012, Annapolis, MD). The project will result in quality assured test data of various commercial sensors that may be used to effectively address gross exceedance of the discharge standards.

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## Minnesota Sea Grant Program

**Outreach:** MNSG continues to partner with the National Park Service to promote *Stop Aquatic Hitchhikers!*<sup>TM</sup> and *Habitattitude*<sup>TM</sup> awareness and empower communities, organizations and businesses in Minnesota. Staff gave two guest lectures at the University of Minnesota Duluth and supported the campaigns at four events (conferences, consumer shows, and trade shows).

The Great Lakes Sea Grant Network (GLSGN) project, led by Minnesota, continues to implement a comprehensive outreach initiative targeting 15 pathways aimed at preventing the spread of AIS. It features *Stop Aquatic Hitchhikers!* (SAH!), *Nab the Aquatic Invader*, *Habitattitude*, *AIS-Hazard Analysis and Critical Control Point* (HACCP) program, and social media communications. Efforts over-achieved proposed GLRI goals and are winding down. So far for 2013, the GLSGN delivered 7 talks featuring *Stop Aquatic Hitchhikers!*; supported mass media communications efforts by Wildlife Forever and other partners; coordinated production of 11 new educational resources; co-hosted 4 displays at boat, sport, and travel shows and other events educating 1,687 visitors; posted education messages via 6 social media (Tweets and Facebook) generating 4,883 exposures; and issued 2 news releases combined with 9 stories in newspapers, which generated 242,820 exposures. *Nab the Aquatic Invader* featuring SAH!, taught 2,600 students and teachers. Together, efforts generated 700,000+ exposures (Jan-Apr 2013) for a two-year total of 14.2 million exposures (or 294% of the two-year plan). Importantly, surveys continue to show that AIS public education efforts are successful not for only raising awareness, but influencing actions aimed at preventing and slowing the spread, thereby, protecting our waters.

Building upon this successful effort, EPA awarded Minnesota Sea Grant, on behalf of the GLSGN, a second two-year GLRI grant to strengthen and broaden regional AIS outreach efforts. Working with partners in the pet and plant industries, the GLSGN is using a variety of marketing and education techniques to broaden the *Habitattitude*<sup>TM</sup> campaign partnership. The first ever statewide *Habitattitude* meeting was held in Minnesota in conjunction with the Northern Green Expo. The campaign was promoted at seven events educating 1,674 people and two new products (red swamp and mystery snail cards) were produced, which generated 225,800 product exposures. Eighteen social media generated over 27,600 exposures. Nine *Nab the Aquatic Invader* events taught 55 teachers and 373 students. Fourteen presentations and booths featured SAH! HACCP efforts involve federal, state, and tribal agencies, businesses, academia, and non-governmental organizations to help them prevent the spread of both terrestrial and aquatic invasive species through training workshops and new materials (see <http://www.seagrant.umn.edu/ais/haccp>). These entities could spread invasive species through the movement of field equipment or other research or management activities if appropriate actions are not taken. Five training workshops hosted by GLSGN staff taught professional resource managers. Overall, efforts generated 480,839 exposures (Jan-Apr 2013) bringing the total to 1,570,045 exposures (or 76% of the two-year goal).

EPA awarded Minnesota Sea Grant, on behalf of the GLSGN, a third two-year GLRI grant to extend outreach on Organisms in Trade (OIT). The GLSGN will host an OIT research symposium that will advance understanding for improved management of OIT. *Nab the Aquatic Invader!* youth education featuring *Habitattitude*<sup>TM</sup> will be broadened to include live study specimens and AIS and climate change curricula. For *Habitattitude*, total exposures generated were 5,844 based on two newsletter articles and three social media. For SAH!, over 700,138 exposures were generated based on mass and social media. Overall, efforts generated nearly 705,982 exposures (Jan-Apr 2013) bringing the total for two quarters to 983,471 exposures (or 98% of the two-year goal).

**Ballast Water:** Sea Grant continues to provide leadership and support in sharing the best available science to promote improvements to ballast water policy and assist in the timely and effective implementation of ballast water management and control systems on vessels. Staff continue to support the efforts of the Great Lakes Ballast Water Collaborative, participate on the SLSDC/SLSMC Highway H2O Advisory Committee, as well as the Green Marine Science Advisory Committee. We participated in the Great Lakes Ports Association Winter Meeting in

Toronto in addition to numerous other meetings at Marine Club, and continue to provide consultation and research for all groups seeking to understand the impacts of Maritime trade and AIS impacts in the Great Lakes. We also work closely with MN Pollution Control Agency, and the Duluth Seaway Port Authority at the State level. NOTE: the next major meeting of the Great Lakes Ballast Water Collaborative is being planned for early August in Washington D.C. at the NOAA Silver Springs Head Quarters.

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## Ontario Federation of Anglers and Hunters

*The Ontario Federation of Anglers and Hunters (OFAH), in partnership with the Ontario Ministry of Natural Resources (OMNR), have been working on a number of projects targeting different pathways:*

### Live Release Project

This project focused on better understanding the cultural motivations behind the live release of organisms into natural environments. A considerable amount of information was collected through a literature review and interviews with key stakeholders and/or practitioners. Twenty-eight interested and knowledgeable representatives from provincial, municipal and federal levels, conservation authorities, ENGOS, industry and academia, participated in the one day workshop held on April 10, 2013 regarding cultural motivations for the live release of organisms to share experiences and discuss opportunities for a second phase of this project.

### Interactive Display at Algonquin Park

With funding support from the Canada/Ontario Invasive Species Centre, program staff developed an invasive species interactive display at the Algonquin Park Visitor's Centre. The touch-screen display includes invasive species profiles, information on how to help prevent spread, issues specific to Algonquin Park, and a game that illustrates the impacts of invasive species.

### Pet Store Outreach

With funding support from the Canada/Ontario Invasive Species Centre, program staff worked with key partners, including Big Al's Pet Store, Ontario Streams, and the Pet Industry Joint Advisory Council (PIJAC), to coordinate a pilot project with pet stores to encourage pet owners to not release unwanted pets into the wild. We amalgamated the *Habitattitude* campaign with ISAP's "Keep, Care, Be Aware" messaging in order to create a unified campaign targeting the release of unwanted pets. This messaging will be delivered to corporate staff and consumers via our partnership with Big Al's, and will be promoted using on-line resources, social media outlets, and a media event (May 2, 2013).

### Early Detection and Distribution Mapping System

With funding provided by the Invasive Species Centre, ISAP staff worked with the University of Georgia's Centre for Invasive Species and Ecosystem Health to implement the Early Detection and Distribution Mapping System (EDDMapS) for Ontario. Staff will be continuing to develop this system for Ontario, as well as a mobile application.

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## St. Lawrence Seaway Development Corporation

The Saint Lawrence Seaway Development Corporation (a modal administration within the U.S. Department of Transportation) is a key member of the binational Ballast Water Working Group (BWWG), which also includes the U.S. Coast Guard, Transport Canada, and the Canadian St. Lawrence Seaway Management Corporation. The Ballast Water Working Group's members coordinate closely to enforce ballast water management regulations in an effort to reduce the introduction of aquatic invasive species via ballast water for international vessels entering the St. Lawrence Seaway.

The Ballast Water Working Group administers the Joint Ballast Management Exam Program, which uses a comprehensive, binational approach to vessel inspections. The inspection begins prior to the vessel entering the Seaway with a detailed review of ballast water reports, logs, records, and ballast water management plans. The

crew is interviewed to assess their understanding of the requirements of the vessel's Ballast Water Management Plan as well as to answer questions on actual practices. Finally, ballast tanks are sampled for salinity or the presence of mud that would suggest a satisfactory management practice was not employed.

In 2012, 100 percent of vessels bound for the Great Lakes Seaway System from outside the Exclusive Economic Zone (EEZ) received a ballast management exam on each Seaway transit. This inspection ratio has remained at or near 100 percent since the Group was formed in 2008: 100% in 2011, 100% in 2010, 100% in 2009, and 99% in 2008. In 2012, 100 percent of ballast tanks were assessed via sampling or administrative review; 6,974 ballast tanks, during 386 vessel transits, were assessed. 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 verification boarding during their outbound transit prior to exiting the Seaway. In addition, 100 percent of ballast water reporting forms were screened to assess ballast water history, compliance, voyage information and proposed discharge location. BWWG verification efforts in 2012 indicated that there was no non-compliant ballast water discharged in the Great Lakes Seaway System. The BWWG anticipates continued high vessel compliance rates for the 2013 navigation season.

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## Wildlife Forever

The Stop Aquatic Hitchhiker! Threat Campaign collaboratively selected 44 highway billboards in MN as part of the growing multi-media marketing and outreach campaign. Similar efforts will soon be under way in the remaining Great Lake states. States investing in media outreach and prevention should contact Wildlife Forever for matching resources up to \$13,000. Leveraging partner funds allows for consistent messaging, volume discounts / savings and significantly greater public reach.

Under a new Cooperative Agreement with the U.S. Fish and Wildlife Service, Wildlife Forever has a part time employment position available to help assist with management of the Stop Aquatic Hitchhiker! campaign. Full job description will be announced soon.

Through leadership and partnership with the U.S. Forest Service, a new Silent Invaders DVD will soon be released and available for distribution. This new outreach tool will feature seven unique invasive species programs each 30 minutes in length. Also featured will be a complementary, broadcast ready, public service announcement disc with multiple invasive species prevention PSAs. This tool will allow viewers the opportunity to engage local broadcast stations and request airing the Stop Aquatic Hitchhiker prevention message. Distribution will be available in June.

Through partnership with the Great Lakes Restoration and EPA, a waterfowl hunter marketing and outreach project is currently underway. Targeting waterfowl hunters of the Great Lakes, this project aims to elevate invasive species prevention awareness through the use of public service announcement, event brochures, and mass media outlets.

Invaders of the Great Lakes pocket field guide will be made available starting in June. Produced in partnership with the Great Lakes Sea Grant network, National Professional Angler Association, U.S. Fish and Wildlife Service, National Park Service, and the U.S. Forest Service, the field guide highlights 37 aquatic invasive species of the Great Lakes. Loaded with Stop Aquatic Hitchhiker prevention how-to, this new guide will be a valuable resource for both adults and youth.

Agencies and organizations interested in partnering for joint outreach and education marketing should contact Wildlife Forever.

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