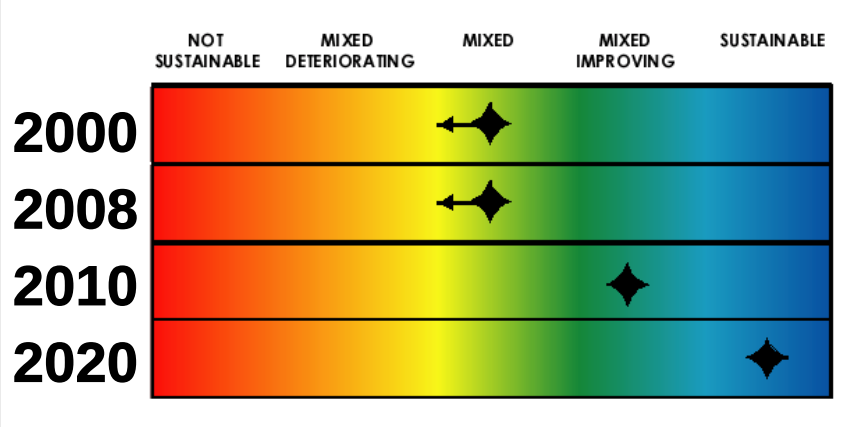
Subgoal 8
Are aquatic and terrestrial nuisance species prevented and controlled?

What is our target for sustainability?

The major pathways for invasive species have been identified and controlled and research has yielded some effective control actions.

Lake Michigan Target Dates for Sustainability



Why is this important?

The Lake Michigan ecosystem is in a state of flux due to changing populations of aquatic nuisance species and their resulting interactions with native species. Once established, aquatic nuisance species (ANS) are very difficult and nearly impossible to control. The best example of control is the case of sea lamprey. The Great Lakes Fishery Commission, with participation by State, Tribal and Federal agencies, has a mandate to assess and control sea lamprey populations in the Lake Michigan basin.

What is the current status?

- The 20th anniversary of the zebra mussel's introduction and spread is overshadowed by the more than 180 invasives that have followed.
- While the number of zebra mussels are declining they are being replaced by the more recent invasive quagga mussel in numbers not seen by zebra mussels at their height. The native diporeia are declining in numbers significantly, leaving less native food at the base of the food chain. The quagga mussels are also consuming larger amounts of food eaten by the diporeia and other native Lake Michigan species.
- Although Asian carp have not been seen in Lake Michigan, they remain a threat and are held back by an electric barrier in the Illinois Waterway Sanitary and Ship Canal. Funding for replacing the electronic barrier in the Sanitary and Ship Canal was approved in November 2007.

What are the major challenges?

- Preventing new aquatic invasive species from entering the Great Lakes through ballast water
- Preventing invasive species from entering through canals and waterways
- Establishing a program for rapid response and management
- Determining the role of invasives in the nutrient problems and shorebird deaths due to botulism

What are the next steps?

- Conduct education and outreach on aquatic invasive species.
- Eliminate ship and barge-mediated introductions and spread of AIS in the Great Lakes.
- Enact federal, state, and/or local governments measures that ensure the region's canals and waterways are not a vector for AIS.
- Take immediate steps at the federal and state government level to prevent the introduction and spread of AIS through the trade and potential release of live organisms.
- Establish a Great Lakes Aquatic Invasive Species Integrated Management Program to implement rapid response, control, and management programs and assess the effectiveness of those programs.

What are some tools for addressing the challenges?

- Keeping Exotics out of the Water Through Public Awareness Campaigns
- ANS Task Force Experts Directory
- Sea Grant Programs
- Controlling Invasive Species
- Great Lakes Aquatic Nonindigenous Species Information System(GLANSIS) Database of Aquatic Invasive Species on the Great Lakes.
- Control and Management of Invasive Phragmites

What are the State of the Lakes Ecosystem (SOLEC) indicators used to help assess the status of the subgoal?

Indicator #18 - Sea Lamprey
Status: Good/Fair; Trend: Improving
Indicator # 68 - Native Freshwater Mussels
Status: Not Assessed; Trend: Not Assessed
Indicator # 104 - Benthos diversity and Abundance - Aquatic Oligochaete Communities
Lake Michigan Status: Mixed; Trend: Unchanging, Deteriorating
Indicator # 109 - Phytoplankton Populations
Status: Mixed; Trend: Undetermined
Indicator # 123 - Abundances of the Benthic Amphipod *Diporeia* spp.
Lake Michigan Status: Poor; Trend: Deteriorating
Indicator # 9002 - Non-Native Species - Aquatic
Lake Michigan Status: Poor; Trend: Deteriorating
Indicator # 9002 - Non-Native Species - Terrestrial
Status: Not Assessed; Trend: Undetermined

For more information on status of indicators, see http://www.epa.gov/solec/sogl2007/

*** The terms "Aquatic Invasive Species" and "Aquatic Nuisance Species" are used interchangeably throughout this chapter. They both refer to species that are non-indigenous to Great Lakes waters.**

National Developments

The National Invasives Species Act (NISA) is the primary legislation for the prevention and control of aquatic nuisance species in the United States. NISA was slated for review by the U.S. Congress and eligible for re-authorization in 2002, however, despite new introductions of ANS in the Great Lakes and pressure from the Great Lakes States to take action at a national level, Congress has failed to pass a comprehensive reauthorization of NISA at the time of this report. Several bills have been introduced in the House and Senate including bills that would, specifically, regulate ballast water discharges, however, these bills are still pending.

U.S. Department of Transportation: Saint Lawrence Seaway Development Corporation

The Saint Lawrence Seaway Development Corporation, in conjunction with the St. Lawrence Seaway Management Corporation of Canada, have updated their rules and regulations to require that all ships coming into the Great Lakes and Saint Lawrence River from foreign waters and that are reporting no ballast on board (NOBOB) will be required to flush their ballast tanks with sea water in order to reduce the risk of the introduction of exotic species. Ships that enter the Saint Lawrence Seaway from foreign waters [outside of the Exclusive Economic Zone (EEZ)] and are reporting to the U.S. Coast Guard that they have ballast water in their tanks are required to exchange that water with sea water before entering however, until the recent rule change, ships reporting no ballast on board were under no such requirements.

Specifically, ships coming from outside waters under Canadian jurisdiction, declaring no ballast on board, must ensure that the residual ballast water in tanks has been exposed to salinity conditions equivalent to ballast water exchange by complying with one of the following options:

- The residual ballast water came from ballast water that was properly exchanged at sea;
- The residual ballast water meets the international standard for treated ballast water;
- The ship complies with sections 1, 2, 6 and 7 of the Code of Best Practices for Ballast Water Management of the Shipping Federation of Canada dated September 28, 2000, or;
- The ship conducted a saltwater flushing at least 200 nautical miles from shore.

It has been recognized that NOBOB ships often contain residual ballast water and sediments in their ballast tanks that can harbor exotic species and pathogens. When these ships enter the Great Lakes, they may visit more than one port and take on ballast water from the Great Lakes in one place and then release that water in another place allowing the foreign organisms to be released.

This development has been hailed by many participants of the Great Lakes Collaboration as a positive step towards the prevention of aquatic nuisance species in the Great Lakes. The requirement for all NOBOB ships to flush their ballast tanks with sea water or "swish and spit" as it has come to be known, was one of action items recommended by the Aquatic Invasive Species Strategy Team in the Great Lakes Collaboration report.

Great Lakes Ships Initiative

The Great Ships Initiative (GSI) is a collaborative effort managed by the Northeast-Midwest Institute to end the problem of ship-mediated invasive species in the Great Lakes-St. Lawrence Seaway System through independent research and demonstration of environmental technology, financial incentives and consistent basin-wide harbor monitoring. The overarching goal of the GSI is to resolve the problem of ship-mediated invasive species in the Great Lakes as quickly, effectively and economically as possible, and in coordination/ cooperation with prevailing regulatory regimes.

The specific objective of the GSI is to accelerate research, development and implementation of effective ballast treatment systems for ships that visit the Great Lakes from abroad. To achieve its research and development objective, the GSI has established research capabilities at three scales--bench, land-based, and shipboard scales. The GSI activates these capabilities to provide intensive testing services to developers of ballast treatment prospects suitable to Seaway-sized vessels. Meritorious systems can thereby progress as rapidly as possible to an approval-ready and market-ready condition. The GSI also provides financial incentives for early installation and technical assistance for effective operation of treatment equipment.

The Lake Michigan Toolbox
Keeping Exotics out of the Water Through Public Awareness Campaigns

Habitattitude

Federal agencies and the pet industry are teaming up to help consumers prevent the release and escape of nonnative plants and animals through Habitattitude, a new public education and outreach effort launched in September 2004. This government-industry coalition is formed from the Pet Industry Joint Advisory Council, the U.S. Fish and Wildlife Service and the Great Lakes Sea Grant Network. The campaign encourages aquarium owners and water gardeners to avoid unwanted introductions of nonnative species by adopting simple prevention steps when faced with an unwanted aquatic plant or fish. Habitattitude campaign materials will be displayed in aquarium stores, aquatic retail outlets, hobby magazines and nursery and landscape businesses across the country, as well as on packaging of related products.

More information is available at: www.habitattitude.net.

Stop Aquatic Hitchhikers!

Stop Aquatic Hitchhikers! is the first national public awareness campaign developed by the ANS Task Force. It brings public, private and nonprofit organizations together from the local, State, regional, and national levels to promote a single, straight forward, empowering message via a compelling brand that focuses on preventing the continued spread of aquatic nuisance species. The campaign targets all recreational water users to raise their awareness about aquatic invasive species and empowers them to adopt prevention procedures that limit the spread of aquatic invasive species to unaffected waters of the U.S.
More information is available at: www.protectyourwaters.net.

Lake Michigan Toolbox
Sea Grant Programs

Sea Grant is a nationwide network (administered through the National Oceanic and Atmospheric Administration [NOAA]), of 30 university-based programs that work with coastal communities. The National Sea Grant College Program engages this network of the nation's top universities in conducting scientific research, education, training, and extension projects designed to foster science-based decisions about the use and conservation of aquatic resources.

Michigan Sea Grant, Illinois Indiana Sea Grant and Wisconsin Sea Grant programs have ANS educational and outreach programs relevant to Lake Michigan.

These resources can accessed at the Sea Grant websites:

- National Sea Grant: www.seagrant.noaa.gov/colleges/colleges.html
- Michigan: www.miseagrant.umich.edu/
- Illinois and Indiana: www.iisgcp.org/
- Wisconsin: www.seagrant.wisc.edu/

Lake Michigan Toolbox
ANS Task Force Experts Directory

The Aquatic Nuisance Species Task Force created a database of invasive species experts who can be contacted to help identify species to determine if they are a new or existing invasive species. The database has been set up as a 2-tier system with the first tier accessible to the public. The public portion of the database will guide you to a state contact who acts as a filter for information and identifications. If they can't answer your question, these state contacts have the ability to log in to the second tier experts. This allows better tracking of the movement of invasives in the Great Lakes.

More information is available at:
www.anstaskforce.gov/experts/search.php

The GSI is also working collaboratively with federal, academic and state entities to establish consistent and credible harbor monitoring for newly established invasive species in harbors throughout the Great Lakes-St. Lawrence Seaway system.

ANS Task Force

The Aquatic Nuisance Species (ANS) Task Force is an inter-governmental body created by the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990. The Task Force is co-chaired by the US Fish and Wildlife Service and National Oceanic and Atmospheric Administration. Via regional panels and issue specific committees, the Task Force coordinates governmental efforts dealing with ANS in the United States with those of the private sector and other North American interests.

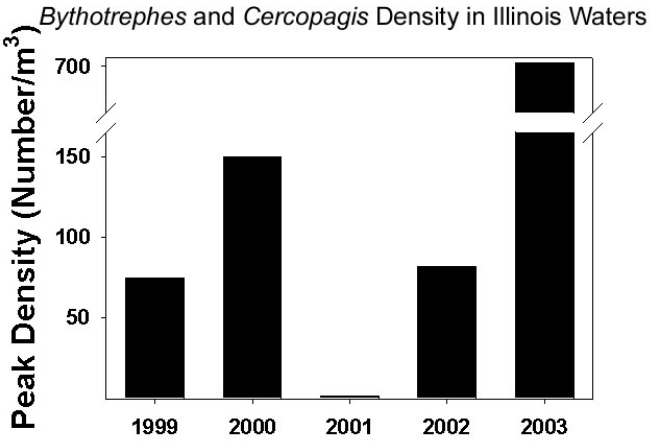
The following Task Force programs are very relevant to preventing introductions of ANS to Lake Michigan:

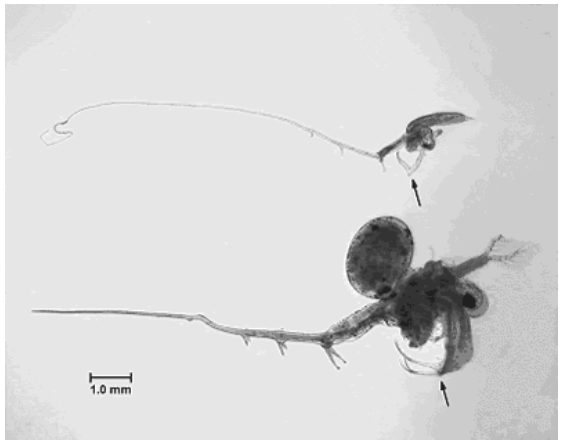
Great Lakes Panel on Aquatic Nuisance Species

The Great Lakes Panel on Aquatic Nuisance Species was officially convened in late 1991 by the Great Lakes Commission in response to section 1203 of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646). The Panel is directed to perform the following tasks:

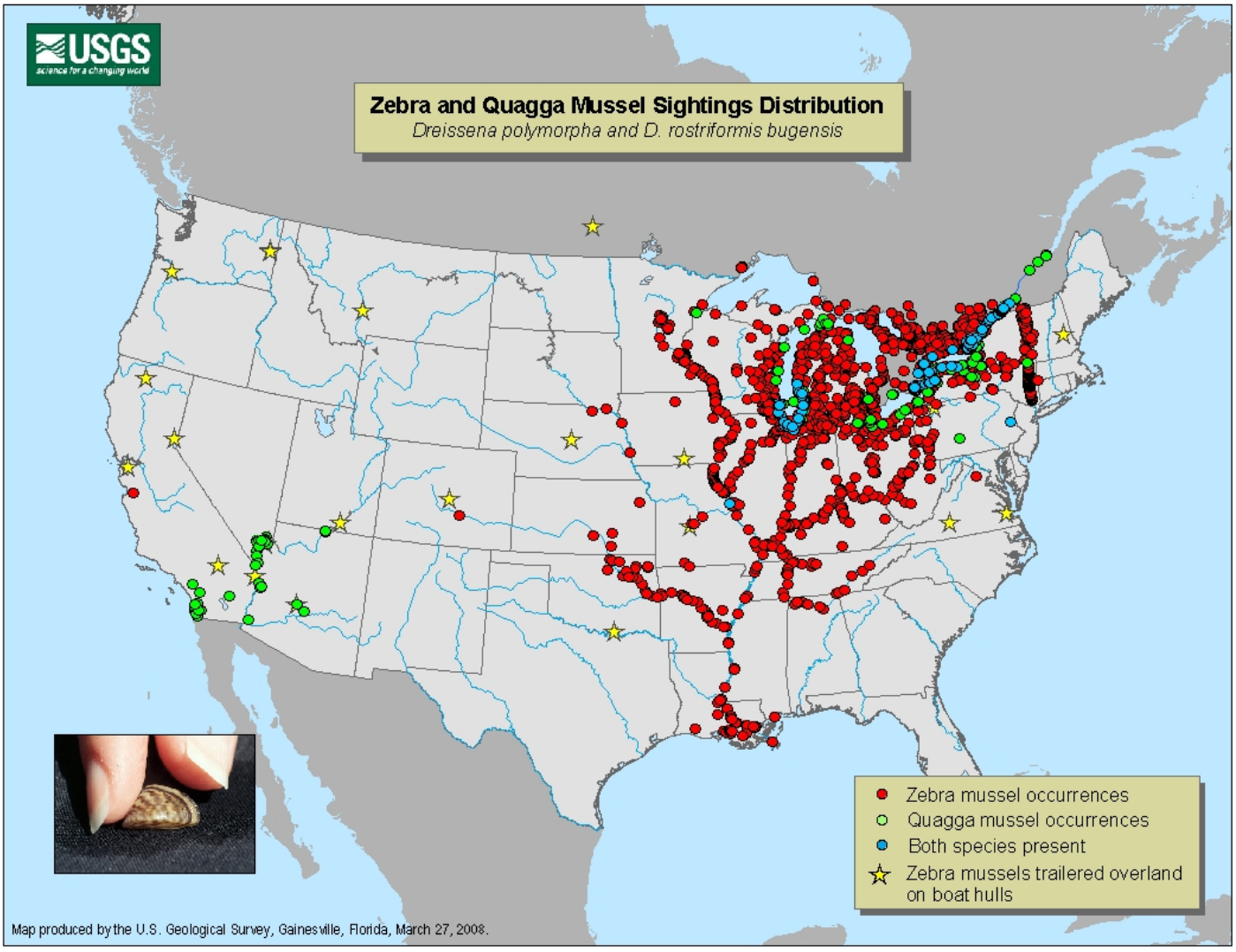
- Identify Great Lakes priorities
- Assist/make recommendations to a national Task Force on Aquatic Nuisance Species (also established via P.L. 101-646)
- Coordinate exotic species program activities in the region
- Advise public and private interests on control efforts
- Submit an annual report to the task force describing prevention, research and control activities in the Great Lakes Basin

The panel membership is drawn from U.S. and Canadian federal agencies, the eight Great Lakes states and the province of Ontario, regional agencies, user groups, local communities, tribal authorities, commercial interests, and the university/research community.





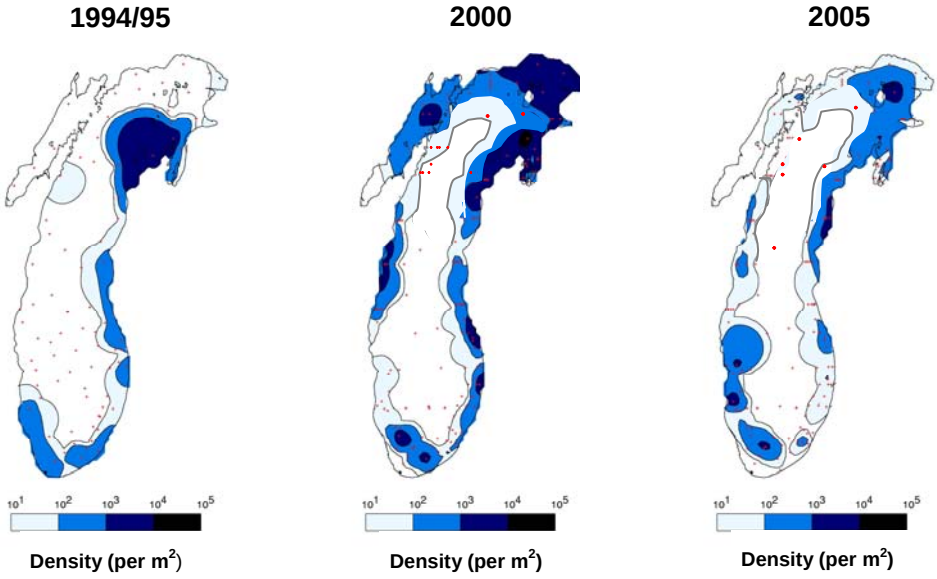
Spiny Water Flea (*Bythotrephes*) and Fishhook Water Flea (*Cercopagis*) Density in Illinois Waters of Lake Michigan
Source: INHS Sampling, Witt et al. (in review)



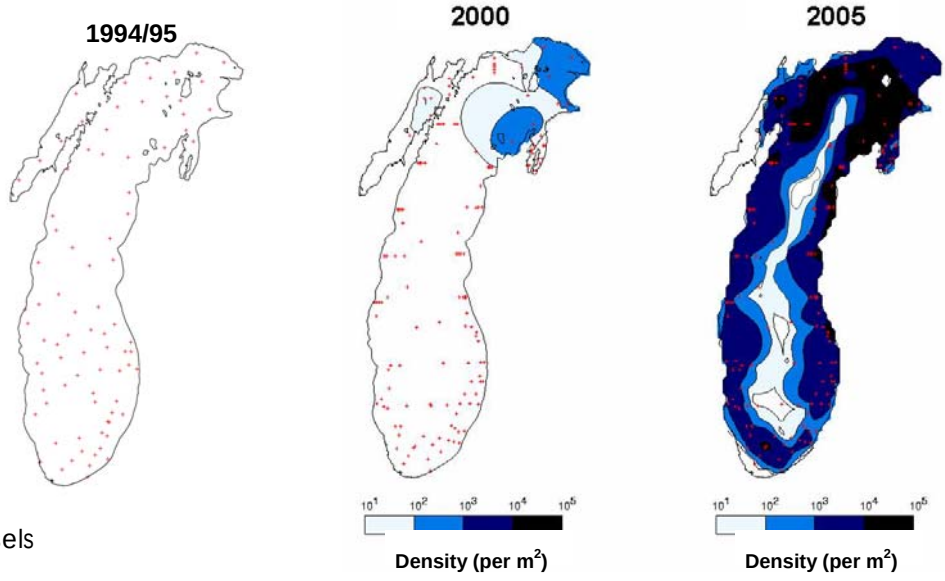
Spread of zebra and quagga mussels 20 years after the zebra mussel was first introduced to the Great Lakes.
Source: USGA

Quagga Mussel Overtakes Zebra Mussel as Dominant Invasive Mussel

The quagga mussel (*Dreissena rostriformis bugensis*) was first found in Lake Michigan in 1997 and has now replaced the zebra mussel (*Dreissena polymorpha*) as the dominant dreissenid in the lake. A whole-lake survey (160 sites) in 2000 showed that zebra mussels comprised 98.1% of the total dreissenid population, but a similar survey in 2005 indicated quagga mussels comprised 97.7% of the population. Quagga mussels are replacing zebra mussels at depths <50 m, but are also increasing at depths (>50 m) where zebra mussels were not previously found. Further sampling at 40 sites in the southern basin in 2006 indicated that quagga mussels continue to increase. Densities in 2005 at the 0-30 m, 31-50 m, 51-90 m, and > 90 m intervals were 1,585, 6,810, 658, and 24 per m2, respectively, but densities in 2006 had increased to 11,622, 13,410, 4,754 and 180 per m2, respectively. Quagga mussel densities in 2006 were 8.5 times greater than peak densities observed for zebra mussels in 1999. The dreissenid phenotype found exclusively throughout each depth interval is quagga mussel "profunda", which is well suited to conditions found in deeper regions. As the quagga mussel has increased and spread to deeper water, the benthic amphipod *Diporeia* has continued to decline. The population of this fish food resource has declined 94% between 1995 and 2005.



Zebra Mussels



Quagga Mussels

VHS Virus

Concerns over aquatic invasive species (AIS) have been growing since the sea lamprey invasion of the Great Lakes in the early to mid-twentieth century.

Recently, a growing concern has emerged for aquatic invaders that cannot be seen with the naked eye, such as viruses, bacteria, and parasites. Although pathogens and parasites have received less attention to date, they are formally recognized as aquatic invasive species in the most recent amendment of the Nonindigenous Aquatic Nuisance Prevention and Control Act (16 USC 4702), and are clearly addressed in the mandate of the intergovernmental Aquatic Nuisance Species Task Force (ANS Task Force, Strategic Plan 2007 – 2012).

The Viral Hemorrhagic Septicemia virus (VHSv) has been identified in all of the Great Lakes, except Lake Superior, with a significant number of large-scale fish mortality events. The pathogenic effects of this microbe are clearly evidenced by massive die-offs among VHSv-infected Great Lakes fish, including muskellunge, freshwater drum, yellow perch, gizzard shad, white bass, and round gobies.

VHSv, a viral fish disease, caused mortality in rainbow trout and turbot aquaculture operations in Europe, and in Pacific herring and pilchard populations along the Pacific Coast of North America. This virus has a number of identified isolates (unique genetic types) grouped in four types: three from Europe and one from North America. The isolate recently found in Great Lakes fish is most similar to the VHS strain previously isolated from the Atlantic Coast in eastern North America.

Great Lakes Commission

Great Lakes Aquatic Invasions Booklet. Great Lake Commission staff, on behalf of the Great Lakes Panel on Aquatic Nuisance Species, completed work on the development of a comprehensive publication: Great Lakes Aquatic Invasions. The publication was printed at the end of February 2007 and unveiled with initial distribution in March at the Commission sponsored Great Lakes Day 2007 events in Washington, DC. Copies were also provided to members of the national ANS Task Force, the Panel and other interested parties at the Joint Meeting of the ANS Task Force and Great Lakes Panel in May 2007. Staff have distributed over 2,000 of the 10,000 copies to agencies, legislators and others at a variety of regional events. Further distribution of this educational tool will continue to be targeted toward state and federal legislators, as well as other prime user groups from the recreational and commercial sector. The Panel I/E Committee will also be asked to aid in the development a feedback survey to track the distribution and perceived value of the booklet. An electronic version and associated references is available online at http://glc.org/ans/aquatic-invasions .

Further information about the Panel, its activities, and its membership can be found at: www.glc.org/ans/

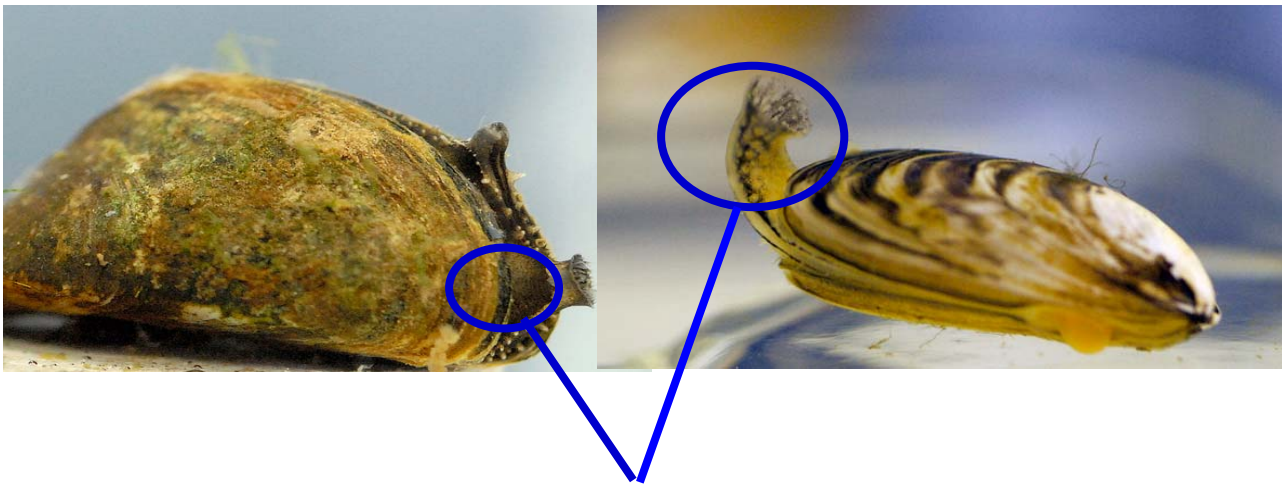
Organisms in Trade The Great Lakes Commission is currently conducting a collaborative planning exercise with the goal of identifying and detailing the primary components of a robust, outcome-oriented project to advance management of the organisms in trade vector for the Great Lakes region. Of growing concern in the Great Lakes region are the invasion risks posed by the organisms in trade vector and associated pathways such as the aquarium and pet trade, nursery and water garden outlets, aquaculture, and bait, among others. This project, funded through the Great Lakes Protection Fund, will allow public and private sectors to work together to address fundamental questions and identify information resources regarding high-risk pathways and associated species, business practices and consumer behavior, and management approaches (e.g., regulatory, voluntary and outreach).

Great Lakes Regional Collaboration

Aquatic Invasive Species Rapid Response Initiative

The first line of defense against aquatic invasive species (AIS) introductions is prevention; however,

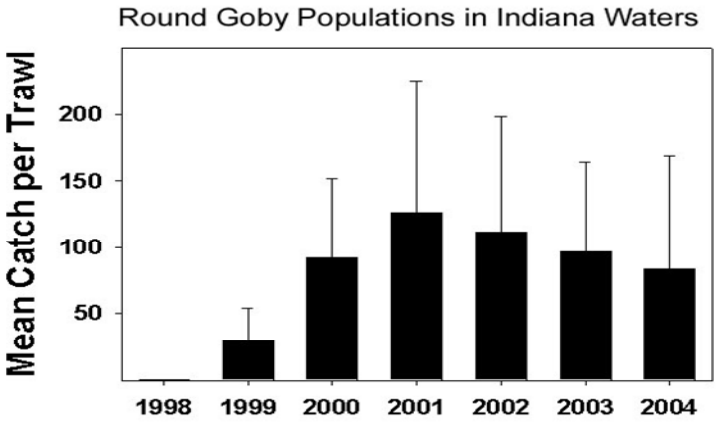
Zebra Mussel ***Quagga Mussel "profunda"***



Intake Siphon

Source: Great Lakes Environmental Research Laboratory

The Round Goby



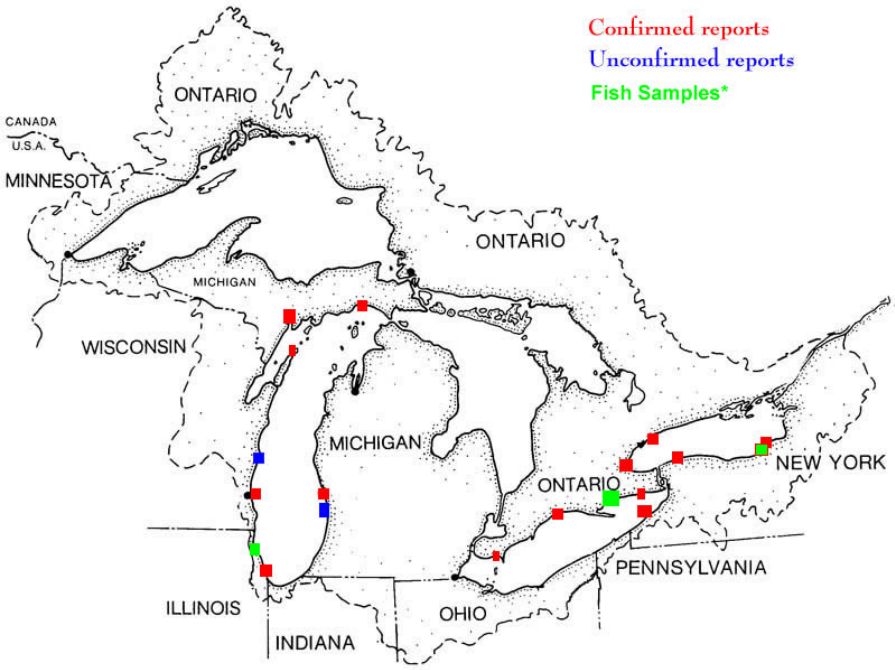
Round Goby Populations in Indiana Waters of Lake Michigan
Source: Ball State University (Lauer et Al., 2004)

even the best prevention efforts may not stop all introductions. Early detection and rapid response efforts increase the likelihood that invasions will be addressed successfully while populations are still localized and can be contained and eradicated. There are a variety of species-specific and location-specific contingency plans that have been completed by natural resource, environmental protection, and land management agencies. However, current organizational and fiscal resources do not allow for planning for all possible events. As an interim step toward improving AIS response capability in situations where specific contingency planning does not exist, a Rapid Response Communication Protocol has been developed to insure that agencies can efficiently coordinate and pool resources as soon as a new invader is detected.

In December 2005, the federal agencies endorsed forty-eight Federal Near Term Actions in support of the Great Lakes Regional Collaboration (GLRC) Strategy, including "The Federal Interagency Task Force will explore creating a Rapid Response Subcommittee under the Regional Working Group to serve as a central point of contact for information and activities related to invasive species rapid response efforts."

New ANS Mysidacea found in Lake Michigan

H. anomala, or Mysidacea, was reported for the first time in 2006 from two regions in the Great Lakes: southeastern Lake Ontario at Nine Mile Point near Oswego, New York, in May 2006. The species, native to the Ponto-Caspian region, was discovered during fall 2006 in the Lake Michigan basin. Large numbers of individuals formed aggregations in a shallow docking basin connected to the channel linking Lake Michigan and Muskegon Lake. It has since been confirmed in a growing number of locations around Lake Michigan and the Great Lakes. *H. anomala* was observed in the docking basin through April 2007, but disappeared thereafter. A few individuals were subsequently collected in the channel, and large numbers (>130) were found in a white perch stomach collected from Muskegon Lake in July 2007. Sampling in Lake Michigan off Muskegon (tucker trawls, benthic sleds, vertical tows, fish diets) did not reveal any *H. anomala* during fall 2006 through summer 2007. Additional isolated reports of *H. anomala* scattered around the nearshore areas of southern Lake Michigan from Muskegon to Cheboygan may indicate that the species is now widespread in the basin. This is aquatic nuisance species number 183 for the Great Lakes.



Reports of Mysidacea in the Great Lakes
Source: National Center for Research on Aquatic Invasive Species

For more information, or to report new findings of Mysidacea**, see:**
http://www.glerl.noaa.gov/res/Programs/ncrais/hemimysis/index.html.

Mysidacea
Source: NOAA GLERL

The Lake Michigan Toolbox
Controlling Invasive Species

Controlling the numbers and distribution of existing nonindigenous species in the Great Lakes is still extremely important in the ongoing battle against invasive species. There are a variety of methods of controlling existing populations. Some examples include:

- **Biocides:** Chemicals, such as the lampricide TMF (used to control sea lamprey populations) and herbicides on aquatic plants, are sometimes used to reduce or eradicate local populations of exotic species.
- **Barrier construction:** Barriers use a variety of methods, including sound waves, electrical impulses, and visual and physical deterrents. These barriers can help prevent the spread of exotics in smaller waterways like canals and streams.
- **Physical removal:** Harvesting small populations of aquatic plants, for instance, can act as a temporary control in smaller inland lakes and waterways.
- **Biological control:** Very carefully selected non-native species, usually predators, are introduced to control population growth of another invasive species. A good example of this is work done with insects that specialize in eating purple loosestrife.
- **Public education**

More information is available at: www.great-lakes.net/teach/pollution/ans/ans_5.html

Over the year 2006, the Regional Working Group established the Federal Aquatic Invasive Species Rapid Response (FAISRR or "phaser") Subcommittee. The subcommittee developed a Communication Protocol with formal points of contact to help insure that Federal agencies can efficiently coordinate and pool resources.

Recognizing that this effort would only be successful if non-federal partners were included, the Regional Workgroup began discussions with GLRC Executive Committee. In the Spring of 2007, the GLRC Executive Committee endorsed the formation of an Aquatic Invasive Species Rapid Response Initiative which would expand the Communication Protocol to include points of contact within State, Tribal, and City agencies. A letter signed August 3, 2007 has been transmitted to GLRC agencies, requesting the identification of formal points of contact by September 15, 2007.

Pennsylvania has offered to host a Mock Exercise which will test the Communication Protocol. They are able to bring additional resources to the effort from an existing grant and will provide the meeting facilities at Presque Isle, PA. (This location/event may also occur in conjunction with Pennsylvania's Clean Boats Day.)

The next step is to form a small steering committee to guide the Mock Exercise. Membership will be on a volunteer basis, solicited from the Communication Protocol membership list.

Clean Boats Initiative

The Great Lakes are one of the top recreational boating destinations in the nation. Nearly 4.3 million boats are registered in the eight Great Lakes states. These boaters spend nearly $16 billion on boats and boating activities in a single year, directly supporting 107,000 jobs. Outreach efforts to this user group can help ensure a healthy Great Lakes ecosystem, as well as help support a strong and sustainable recreational economy. The proposed "Great Lakes Clean Boat Initiative" would promote these goals.

- The Great Lakes Regional Collaboration Executive Committee Sub-committee has proposed that U.S. Sea Grant representatives lead regional efforts on the Clean Boats Initiative. An initial conference call with GLRC partners, Sea Grant staff and other interested parties will be held in coming weeks to clarify the workplan and timeline moving forward.
- An informal steering group will be established that will coordinate efforts to establish a compendium of existing boater education and outreach materials. It is possible that the steering group will coordinate with the existing database hosted by Portland State University (http://www.clr.pdx.edu/projects/edoutreach/content/browse.php)
- Steering group members will also select a date or dates for Clean Boat Day to be held during the 2008 boating season. It is possible that Clean Boat Day will be held in conjunction with, or promoted along with, the GLRC Rapid Response mock

exercise.

State Efforts to Prevent the Spread of ANS

The states which share Lake Michigan's resources, (Illinois, Indiana, Michigan and Wisconsin) know all too well the negative effects that ANS have had on their industries, tourism and lifestyles. The states, collectively, are sharing the burden of controlling the ANS already established in Lake Michigan but they also share the desire to prevent further introductions. The following efforts are being conducted to prevent and control ANS on a state by state basis:

Illinois

Ilinois pet stores get a Habitattitude

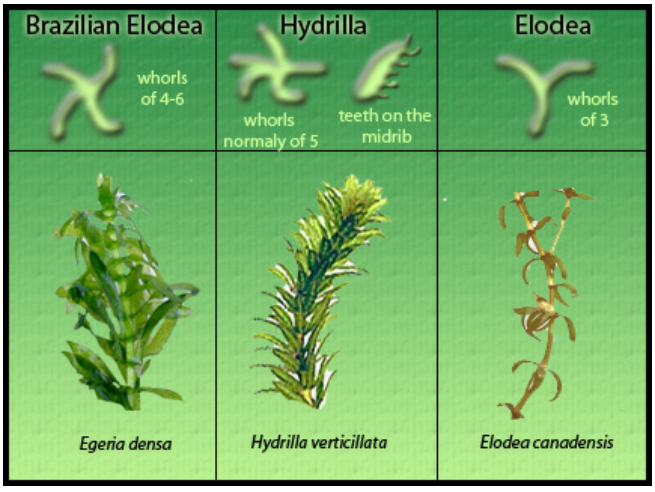
(TM)Habitattiude posters are now in nearly every pet store in Chicago. These posters, which were created through a partnership between Illinois-Indiana Sea Grant (IISG) and the City of Chicago Department of Environment, encourage aquarium owners to use alternatives to dumping aquatic pets and plants. Soon, the posters will be distributed throughout the state. The Illinois DNR,Äôs fishery biologists will be personally distributing the posters to pet stores in their districts. This means that aquarium hobbyists and backyard water gardeners statewide will have the information they need to prevent the introduction and spread of invasive species via their activities.

For more information, contact Kristin TePas (ktepas@uiuc.edu).

Chicagoland's "New Invaders Watch List" to add aquatics

The New Invaders Watch is a partnership of government, nonprofit, and volunteer organizations dedicated to the early detection and control of new exotic invasive plant and insect species in the Chicago Wilderness (CW) region, an area of globally threatened natural communities. They work to 1) increase understanding of invasive species impacts, their modes of invasion, and control measures to limit their spread, 2) provide mechanisms to collect and share information on plant and insect target species to improve management strategies and predict future distributions, and 3) facilitate the prevention and control of new exotic invasives. To do this, they rely on trained volunteers to locate and voucher target species. With newly-secured funding, they will

Exotic Species Advisory Sign



Indiana is working to prevent the spread of Brazilian elodea which has been found in the southern part of the state. This diagram shows how to identify Brazilian elodea from other nuisance aquatic plants.

More information is available at:
http://explorebiodiversity.com

be able to add aquatic plant species to their current list of mostly terrestrial target species.

More information is available at http://ewrr.inhs.uiuc.edu/newinvader/about_us.aspx.

AIS messages in 2007 fishing guide

Pages 48 and 49 of the 2007 Illinois Fishing Guide feature AIS messages including the ,"Stop Aquatic Hitchhikers" campaign and ,"Don't Dump Bait" logo. It also includes full-color photos of adult Asian carp to help anglers know these fishes. Side-by-side, full-color photos of Asian carp juveniles and shad are also featured, to show how similar the species appear. Because they are difficult to tell apart, anglers should not collect bait from Asian-carp infested waters for use on uninfested waters.

To view an on-line version of the fishing guide, visit http://dnr.state.il.us/fish/digest.

Chicago marinas get new AIS signs

The marinas along Lake Michigan in Chicago are decked out with new Exotic Species Advisory signs. The Chicago Park District posted the signs at their boat ramps so that recreational boaters see them as they pull in and out of Lake Michigan. The sign contains simple steps boaters can take to prevent spreading AIS. To view the sign, visit http://www.iisgcp.org/products/sign.gif.

Indiana

Brazilian Elodea Update

2007 marked the second consecutive year of Brazilian elodea eradication efforts at 109 acre Griffy Lake. Prior to eradication it was easy to fill sampling rakes with Brazilian elodea. In the spring of 2007 only two small sprigs of the plant were found; a hint that continued vigilance was required. During an August 2007 intensive plant survey no Brazilian elodea was found. While it is still too early to claim victory over the species in Griffy Lake, at least the plant is at a non-detectable level and may have been eradicated. Plant surveys will continue in the coming years to determine if there is any re-growth which will force additional treatments.

Hydrilla Update

Hydrilla was discovered in 735 acre Lake Manitou in August 2006. A multi-year eradication plan was developed between DNR and SePRO Corporation.

Purple Loosestrife

Purple loosestrife is a plant of European origin, that has spread and degraded temperate North American wetlands since the early nineteenth century. The plant was introduced both as a contaminant European ship ballast and as a medicinal herb for treatment of diarrhea, dysentery, bleeding, wounds, ulcers and sores.

The continued expansion of *the plant* coincided with increased development and use of road systems, commercial distribution of the plant for horticultural purposes, and regional propagation of seed for bee forage. It is found in all contiguous states (except Florida) and all Canadian provinces.

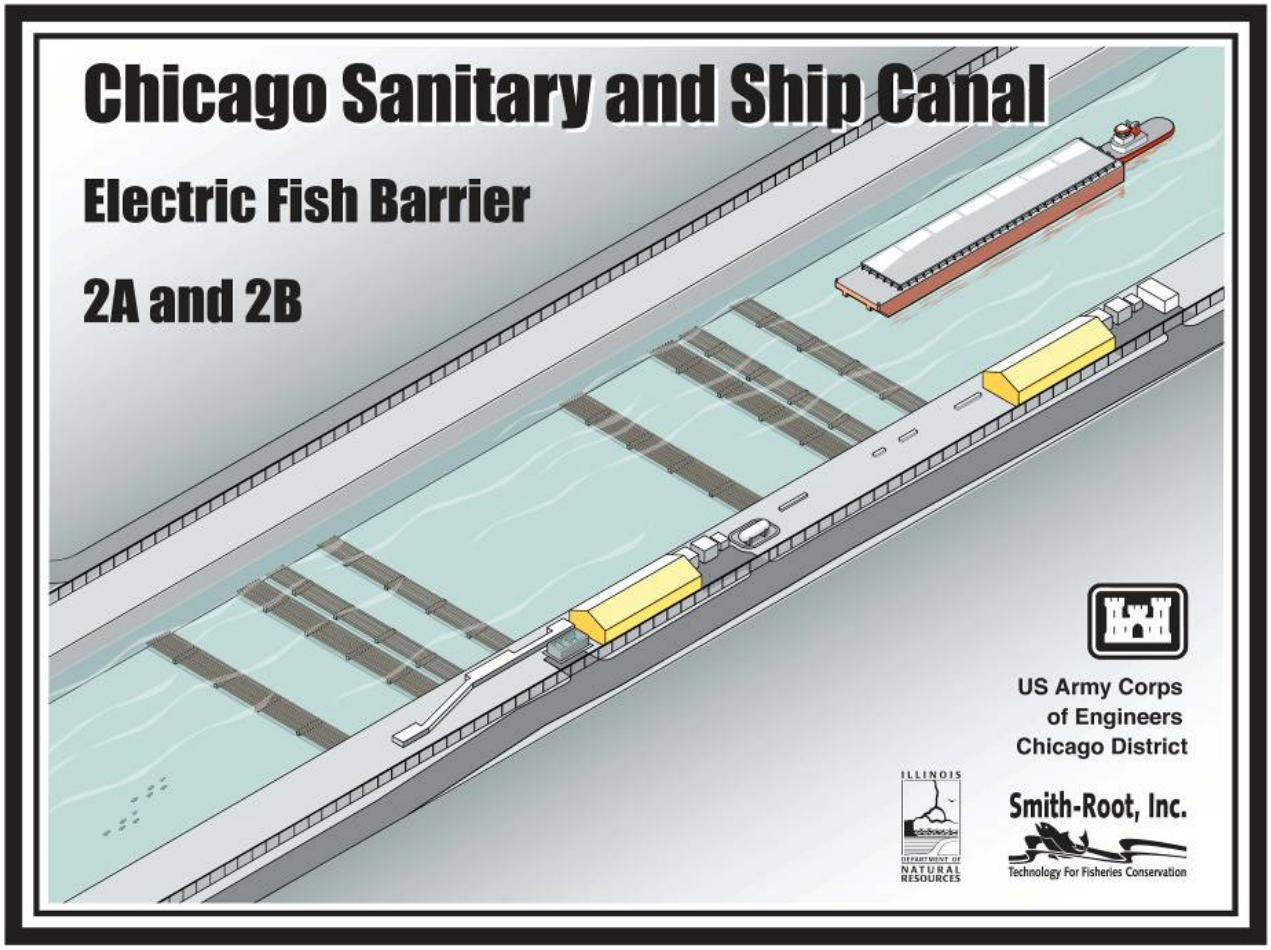
Once established in wetlands and along stream banks it crowds out native species. One plant may produce 2.5 million seeds. It is estimated that 200,000 ha of US wetlands are lost annually through invasion of this species. The loss of wetlands and native habitat impacts both flora and fauna with birds and migratory birds being especially impacted.

Purple Lossestrife
Source: Lake Koshkonong Wetland Association

Chicago Sanitary and Ship Canal Electric Fish Barrier Gets Funding

The Chicago Sanitary and Ship Canal provides an artificial link between the Great Lakes and Mississippi River basins. To prevent the trans-migration of invasive species between the two basins—and largely motivated by the spread of Asian carp toward the Great Lakes—the U.S. Army Corps of Engineers constructed and operates an experimental electrical barrier on the canal. This barrier is failing and is in need of retrofitting. In addition, a second, permanent barrier is being constructed near the experimental barrier to provide an extra layer of protection.

The second barrier consists of two arrays 350 feet long, which is 10 times the larger than the first. Unlike the first experimental barrier that has a 3-5 year service life, this barrier has a 20 year service life. $8.6 million in construction, $500,000 in operations and maintenance, and $665,000 in carry over funding was approved as part of the Water Resources Development Act for the second barrier. Funding already provided by the Great Lakes states for construction will be credited by the ACOE for other projects in the states.



The Lake Michigan Toolbox
Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) Database of Aquatic Invasive Species on the Great Lakes.

The Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS) is a database of Aquatic Invasive Species on the Great Lakes. The Great Lakes have a long history of aquatic nonindigenous species (ANS) introductions – both intentional and unintentional. As of 2007, over 180 nonindigenous species have been reported to have reproducing populations in the Great Lakes basin, i.e. lakes Superior, Michigan, Huron, St. Clair, Erie, Ontario, and their connecting channels and water bodies within their respective drainages.

The present database targets ANS that are not considered to have been native to any part of the Great Lakes basin. Species that are documented as native to part of the basin, but invaded other parts of the basin due to human-expedited mechanisms or range expansions are not included in this database at the present time, except for the **sea lamprey**.

More information is available at:
www.glerl.noaa.gov/res/Programs/ncrais/glansis.html

Implementation of that plan began in the spring of 2007. Sonar was immediately applied after hydrilla growth was observed in the spring. The last hydrilla vegetative material observed in Manitou was in the middle of June; just one month after treatment began. Lethal fluridone levels were maintained through at least October. The telling sign in determining whether the battle with hydrilla is being won is to watch the tuber bank in the sediment. Pre-treatment versus late summer 2007 tuber densities were compared. It appears as though the tuber bank has been reduced by more than 80% in the first year. While Indiana DNR has made great strides at reducing hydrilla at Lake Manitou in the first year, we still have a long way to go to achieve our goal of zero tubers and complete elimination of hydrilla. At least two more years of whole-lake treatments are anticipated.

Contact: Doug Keller, 317-234-3883, dkeller@dnr.in.gov

Michigan

Michigan Passes Ballast Water Reporting Law

Michigan passed a ballast water reporting law that requires the Michigan Department of Environmental Quality (MDEQ) to determine whether ballast water management practices are being complied with by all vessels operating on the Great Lakes and the St. Lawrence waterway.

The State of Michigan wants to take action to protect the Great Lakes from aquatic invasive species. Law supporters believe that If actions are not taken to stop the spread of aquatic invasive species, additional species will be transported into the Great Lakes (and from the Great Lakes to other parts of the world) through ballast water. Additional major impacts such as elimination of native species may be seen on the Great Lakes ecosystem.

Under the law, owners/operators of vessels must register with The Michigan Department of Environmental Quality's Ballast Water Reporting List and fill out a Ballast Water Management Practices Report Form. Information required on the form includes:

For oceangoing vessels:

- Indicate whether during the last 12 months, the vessel maintained compliance with the Code of Best Management Practices for Ballast Water Management provided by the Shipping Federation of Canada.
- Indicate whether the vessel is currently complying with the ballast water management practices

For nonoceangoing vessels:

- Indicate whether during the last 12 months, the vessel maintained compliance with the Voluntary Management Practices to Reduce the Transfer of Aquatic Nuisance Species within the Great Lakes by the United States and Canadian Domestic Shipping, provided by the Lake Carriers' Association and the Canadian Shipowners' Association
- Indicate whether the vessel is currently complying with the ballast water management practices.

More information is found at: http://www.michigan.gov/deq/0,1607,7-135-3313_3677_8278---,00.html

As a result of Public Act 33 of 2005, Michigan's Ballast Water Control General Permit became effective January 1, 2007. As of October 2007, MDEQ has issued 83 permits to 28 international shipping companies to conduct port operations in Michigan. A lawsuit was filed in federal court in Detroit by a group of shipping interests, who sought to nullify Public Act 33 of 2005; however, a federal judge dismissed the suit determining the statute was clearly rational and valid due to the fact that Michigan is facing a serious threat to its environment caused by AIS, has determined the likely avenues by which those species are being introduced, and has taken measures to stop this introduction.

The Michigan DNR has also developed a process for listing or delisting a species from Michigan's current list of prohibited and restricted species. Under the process, anyone can submit a request to the MDNR proposing to list or delist a species provided they complete the required request form including reasons for the proposal and documentation (scientific studies, expert opinion, etc.) that supports the proposal. The MDNR will then review the information for completeness and then charge a technical review committee with assessing the species. An opportunity for public input will be offered. The Technical Committee will then provide findings to the MDNR who will then prepare a "Final Species Recommendation" for the MDNR Director. Once a decision has been made by the Director, legislative action will be sought.

Wisconsin

Ballast Water

The WDNR has a draft rule completed on invasive species control. The rule classifies existing and new invasive species based on established criteria. The rule places restrictions on the purchase, sale, possession, transportation, and cultivation of invasive species that are classified as prohibited or restricted. It allows for the conditional possession of some invasive species when authorized by a permit from the WDNR. The WDNR will be taking the rule out to public meetings in January to obtain input from stakeholders and interested parties.

A Port of Milwaukee onshore ballast water treatment feasibility study report was completed by Brown and Caldwell via a contract with the WDNR. The ballast water would be treated using filtering screens and ultraviolet light to kill

Black Carp Listed as an Injurious Species

The U.S. Fish and Wildlife Service (FWS) on October 18, 2007 added black carp (Mylopharyngodon piceus) to the list of injurious fish under the Lacey Act. This action prohibits live black carp, gametes, viable eggs and hybrids from being imported into or transported between the states of the continental U.S., the District of Columbia, Hawaii, the Commonwealth of Puerto Rico, or any territory or possession of the U.S.

Black carp originally entered the U.S. in 1973 as a "contaminant" in imported shipments of grass carp or other Chinese carp stocks. The second introduction of black carp took place in the early 1980s when it was used in fish production ponds in the southeastern U.S. for biological control of a parasite, and as a potential food fish. Since that time black carp have become more commonly used and transported, particularly during the late 1990s to control another species of snail-borne parasite at primarily catfish and hybrid striped bass farms.

Lake Michigan Toolbox
Control and Management of Invasive Phragmites

Phragmites australis (frag-MY-teez), also known as common reed, is a perennial, wetland grass that can grow to 15 feet in height. While *Phragmites australis* is native to MIchigan, an invasive, non-native, variety of phragmites is becoming widespread and is threatening the ecological health of wetlands and the Great Lakes coastal shoreline. Invasive phragmites creates tall, dense stands which degrade wetlands and coastal areas by crowding out native plants and animals, blocking shoreline views, reducing access for swimming, fishing, and hunting and can create fire hazards from dry plant material.

Phragmites
Source: Michigan Sea Grant
ww.miseagrant.umich.edu

Phragmites can be controlled using an integrated pest management approach which includes an initial herbicide treatment followed by mechanical removal (e.g., cutting, mowing) and annual maintenance. For large areas with dense stands of phragmites, prescribed burning used after herbicide treatment can provide additional control and ecological benefits over mechanical removal. Early detection is key to preventing large dense stands and is also more cost efficient.

What You Can Do

1. Identify plants to confirm if it is invasive phragmites
2. Read the Landowners Guide to Phragmites Control to understand the management issues
3. (In Michigan) Determine the location of the plants relative to the Ordinary High Water Mark (OHWM) by contacting MDEQ's Land and Water Management Division (LWMD) for assistance
4. If necessary, apply and obtain permit(s):
   - If chemical treatment below OHWM or in standing water, submit application for single-season Aquatic Nuisance Control permit before August 15 in the year of the proposed chemical treatment
   - If regulated mechanical activity below OHWM, submit application for 5-year LWMD permit

If necessary, submit application for permit from Army Corps of Engineers

5. Conduct treatment
6. Monitor impacts of the treatment(s)
7. Fulfill any permit reporting requirements
8. Repeat the process in future years

What You Should Know

- To Identify Phragmites, visit www.invasiveplants.net/phragmites/phrag/morph.htm or http://plants.usda.gov/java/profile?symbol=PHAU7
- Frequently Asked Questions about Control of Phragmites using Herbicides
- Required Criteria to Qualify for the General Permit for Limited Great Lakes Shoreline Management Activities - "Control of Phragmites on Great Lakes Shorelines"

Searchable Database for Licensed Herbicide Applicator Businesses (search under category "Aquatics")

More information is available at http://www.michigan.gov/deq/0,1607,7-135-3313_3681_3710-178183--,00.html

organisms. Study results focused on the Port of Milwaukee, but the approach would work in other Great Lakes at a cost of $1 to $2 million per port. The onshore treatment offers a less expensive alternative to smaller ships that may find on-board treatment technologies prohibitive.

Hydrilla

Hydrilla was discovered in August in a small pond in northeast Wisconsin. The WDNR, the Department of Ag, Trade, and Consumer, local county officials and the landowner developed a plan to eradicate the invasive plant. The pond was chemically treated with an aquatic herbicide and other area waters were surveyed to assure that the plant hadn't spread to nearby waters. The pond has been recently dewatered in preparation for the colder weather with the goal being to hopefully freeze the hydrilla tubers and propagules this winter.