

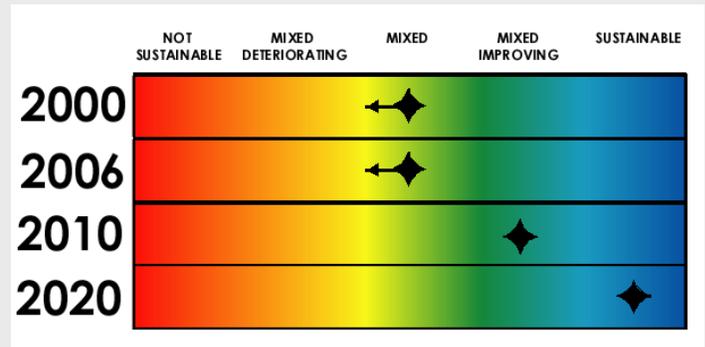
## Subgoal 8

# Are aquatic and terrestrial nuisance species prevented and controlled?\*

### Status

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. Increases in zebra and quagga mussels are altering the way energy is transferred from the base of the food chain to top predators. Populations of alewife, a long-established non-indigenous fish, have crashed, resulting in less food for Pacific salmon and native lake trout. *Diporeia*, or scud, an important native shrimp-like crustacean that is food for many other fish, has nearly disappeared from Lake Michigan. Populations of round goby, a species transported from Europe in the ballast tanks of ocean-going ships, continue to rise and spread throughout Lake Michigan. European ruffe, also introduced via ballast water, continue to be found in Bay de Noc near Escanaba, Michigan, but do not appear to be spreading at this time. 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. Once established, aquatic nuisance species (ANS) are very difficult and sometimes 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.

### Lake Michigan Target Dates for Sustainability



### Indicators (State of the Lakes Ecosystem Indicators by Number)

- 18 - Sea Lamprey Scars and Population
- 9002 - Non-Native Species (aquatic introductions)
- 9002 - Non-Native Species (terrestrial introductions)

### Challenges

- Prevention of aquatic invasive species introductions by ships through ballast water and other means
- Stopping invasions of species through canals and waterways
- Restricting trade in live invasive organisms
- Passage of comprehensive federal aquatic invasive species legislation
- Establishing a program for rapid response and management

### Next Steps

- Education and outreach on aquatic invasive species in order to accomplish
  - Ship and barge-mediated introductions and spread of AIS in the Great Lakes should be eliminated
  - Federal, state, and/or local governments must enact measures that ensure the region's canals and waterways are not a vector for AIS
  - Federal and state governments must take immediate steps 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

\* The title for this subgoal has been changed to reflect the importance of prevention as the most valuable goal in the fight against invasive species.

## National Developments

The 2004 Lake Michigan LaMP update reported on the introduction of legislation in the U.S. Congress to re-authorize and strengthen the National Invasive Species Act. Neither this proposed legislation nor subsequent introductions of similar bills have been passed.

### 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.

\* 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.



## Great Lakes Regional Collaboration Action Items

### Aquatic Invasive Species

Immediate action to stop the introduction of more **aquatic invasive species** (AIS) can prevent significant future ecological and economic damage to the Great Lakes. The steps needed include: prevention of AIS introductions by ships through ballast water and other means;

- stopping invasions of species through canals and waterways;
- restricting trade in live organisms;
- passage of comprehensive federal AIS legislation;
- establishing a program for rapid response and management; and
- education and outreach on AIS introduction and prevention.

In 2003 and 2004, the 3 committees of the Panel, Information and Education, Research and Monitoring, and Legislation and Policy, all initiated an update of priorities for prevention and control of ANS in the Great Lakes region. The committee reports will be available on the Panel's web site in 2004.

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

### U.S. Coast Guard's Ballast Water Management and Regulatory Program

Section 1101 of the Act provided authority to The Department in which the U.S. Coast Guard is operating to regulate and issue guidance for the management ballast water as a vector for introduction of aquatic invasive species. The U.S. Coast Guard's Ballast Water Management Program accomplished the following activities in Fiscal Year 2004:

- **Penalties for Non-submittal of Ballast Water Reports.** On June 14, 2004, the Coast Guard



## 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](http://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](http://www.protectyourwaters.net).

### Michigan Decal to Fight Invasive Species

The Michigan Great Lakes Protection Fund is selling a \$35 decal to help fight the spread of zebra mussels and other invasive aquatic species. Order forms for the decal are included in the 2006 watercraft renewal notices. The decal is for decoration only and does not replace required stickers.

More information is available at [www.michigan.gov/sos/0,1607,7-127-101483--,00.html](http://www.michigan.gov/sos/0,1607,7-127-101483--,00.html)

### "New and improved" Bait Bucket Sticker

Illinois-Indiana Sea Grant, in association with several Great Lakes partners, has revised their "Don't Dump Bait!" bait bucket sticker. The revised sticker maintains the look and message of the original, but incorporates two key changes: 1) the new directive is now "Dispose of Bait in the Trash" to address some states' concerns that the words "on land" violated littering regulations, and 2) for additional information anglers are now directed to [www.ProtectYourWaters.net](http://www.ProtectYourWaters.net), which readily provides additional actions anglers can take to prevent spreading and introducing invasive species.

If you are interested in purchasing these stickers, buying into the print run, or want more information contact Pat Charlebois ([charlebo@uiuc.edu](mailto:charlebo@uiuc.edu)).



**Habitattitude™**  
PROTECT OUR ENVIRONMENT  
DO NOT RELEASE FISH AND AQUATIC PLANTS



[www.Habitattitude.net](http://www.Habitattitude.net)



**STOP AQUATIC HITCHHIKERS!**

Prevent the transport of nuisance species.  
Clean all recreational equipment.

#### When you leave a body of water:

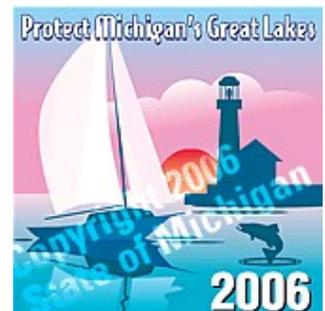
- Remove any visible mud, plants, fish or animals before transporting equipment.
- Eliminate water from equipment before transporting.
- Clean and dry anything that comes into contact with water (boats, trailers, equipment, clothing, dogs, etc.).
- Never release plants, fish or animals into a body of water unless they came out of that body of water.

**STOP AQUATIC HITCHHIKERS!**

Prevent the transport of nuisance species.  
Clean all recreational equipment.



**ANS**



**Dispose of bait on land or in the trash**

Bait and non-native plants and animals hitchhiking in bait can harm our lakes and rivers.

**PROTECT OUR WATERS...**



For more information about non-natives, visit [www.sgnis.org](http://www.sgnis.org)

**Sea Grant**

Great Lakes Network  
Developed by Illinois-Indiana Sea Grant, Illinois Natural History Survey, and Department of Natural Resources and Environmental Sciences at University of Illinois.



## 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 be accessed at the Sea Grant websites:

- National Sea Grant: [www.seagrants.noaa.gov/colleges/colleges.html](http://www.seagrants.noaa.gov/colleges/colleges.html)
- Michigan: [www.miseagrant.umich.edu/](http://www.miseagrant.umich.edu/)
- Illinois and Indiana: [www.iisgcp.org/](http://www.iisgcp.org/)
- Wisconsin: [www.seagrants.wisc.edu/](http://www.seagrants.wisc.edu/)

## Shedd Aquarium Opens Invasives Exhibit

Chicago's Shedd Aquarium opened a new permanent exhibit featuring many of the invasive species found in the Great Lakes. It is the first time in Chicago that the public has the opportunity to see many of these live animals and plants in person. The exhibit is part of Shedd's Great Lakes Conservation Initiative, which aims to draw public attention to the value and vulnerabilities of the Great Lakes.

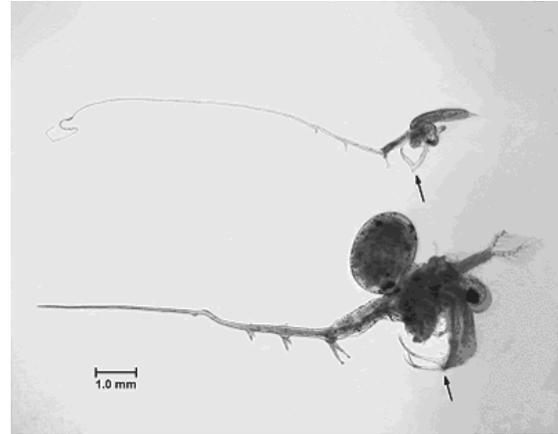
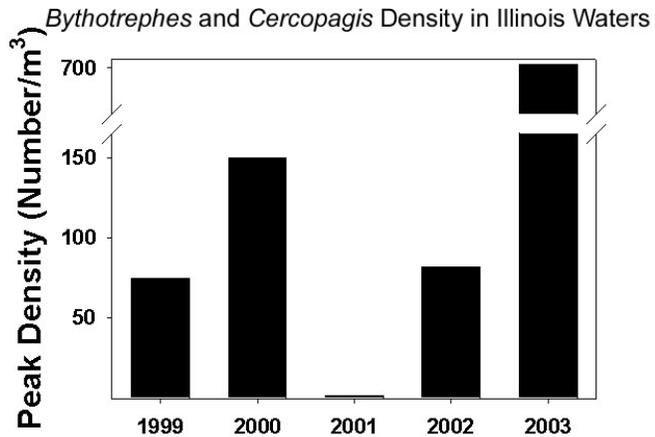


Photograph Courtesy of the  
John G. Shedd Aquarium

More information is available at [www.sheddaquarium.org](http://www.sheddaquarium.org).

published regulations establishing penalties for ships headed to the U.S. that fail to submit a ballast water management reporting form, as well as vessels bound for the Great Lakes or portions of the Hudson River that violate mandatory ballast water management requirements.

- **Mandatory Ballast Water Management Program for U.S. Waters.** On July 28, 2004, the U.S. Coast Guard published regulations establishing a national mandatory ballast water management program for all vessels equipped with ballast water tanks that enter or operate within U.S. waters.
- **New Ballast Water Management Equivalent Reporting Program.** The Coast Guard and the National Ballast Information Clearinghouse launched the new Equivalent Reporting Program for vessels operating exclusively in the U.S. Exclusive Economic Zone. The program offered an alternative for an Owner, Operator, Master, Agent, Person-in-Charge or Charterer of a vessel to submit required Ballast Water Management Reports in a single batch report on a monthly basis, instead of on a port-to-port, pre-arrival schedule as required under 33 CFR 151.204(b).
- **Shipboard Testing and Evaluation Program (STEP).** The purpose of the Shipboard Technology Evaluation Program is to facilitate the development of effective ballast water treatment technologies, through experimental systems, thus creating more options for vessel owners seeking alternatives to ballast water exchange. The STEP is available to all foreign and domestic vessels subject to the Coast Guard's Ballast Water Management regulations, 33 CFR 151 Parts C and D.
- **International Maritime Organization (IMO).** Seven Federal Departments, led by the U.S. Coast Guard, actively participated in meetings of the International Maritime Organization and its Marine Environment Protection Committee. In 2004, the IMO adopted the "International Convention for the Control and Management of Ships' Ballast Water and Sediments."
- **Environmental Technology Verification (ETV) Program.** The USCG partnered with the USEPA's ETV program to develop protocols for third party verification of new ballast water management systems. The USCG made progress on the ETV BWM system test protocols. These protocols included further development of a list of surrogate species for the standardized water (or challenge



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

water) for land based testing.

- **Ballast Water System Test Facility.** The USCG partnered with the Naval Research Lab in constructing a ballast water system test facility in Key West, FL. This facility will provide the country's first testing platform to evaluate new ballast water treatment technologies in accordance with the testing protocols developed by the USEPA's ETV program.

## 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

#### *Illinois New Law to Limit Spread of Invasive Species*

On August 15th, 2005, Governor Blagojevich signed a new law that helps prevent the spread of exotic invasive species by bait dealers and the public, as well as prohibiting the release of unwanted species in Illinois waters. House Bill 1181 includes three major provisions: 1) clarification of the definition of minnow to exclude common carp, goldfish, bighead carp, black carp, grass carp and silver carp; 2) increased penalties for those who release injurious species into

## Quagga Mussels Increasing in Number to Compete for Food with Native Mussels

Quagga mussels, like zebra mussels, filter plankton from the water at fast pace. This allows more sunlight to penetrate the water and cause an increase in algae inedible to fish. But while zebra mussels are sensitive to water temperature and need a hard surface on which to colonize, quaggas can adapt quickly to extreme environmental changes. They thrive in any temperature, can survive turbulence, and are able to colonize both hard and soft substrate, even sand.

A pair of quagga mussels side by side, showing the change in coloration that has occurred as populations moved into shallower water.

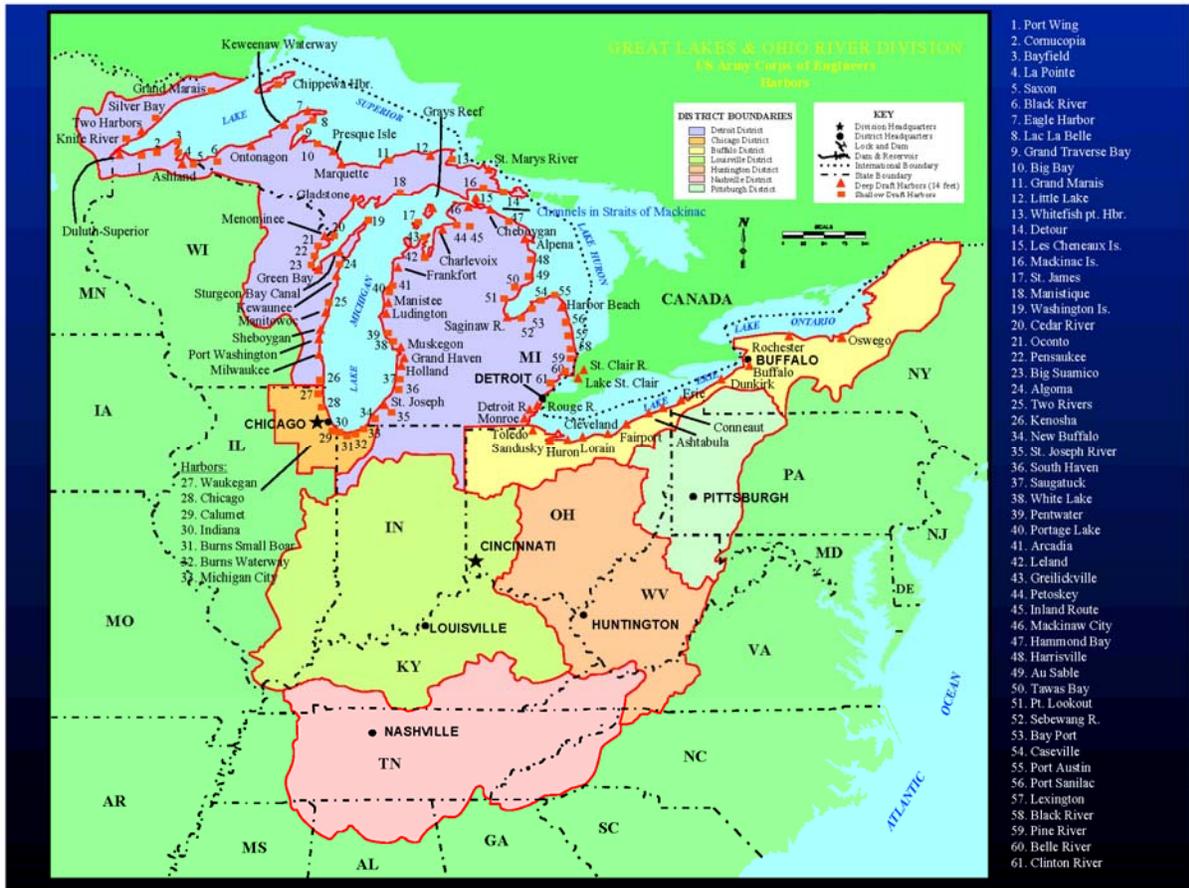
Unlike zebra mussels, they can be found at any depth of Lake Michigan. Researchers believe that the quagga's impact on the lake's food chain could be greater than the zebra mussel due to its greater hardiness.

The mussels are competing for food with the diporeia at all depths, and there is speculation that the increase in the numbers of quagga is quickening the pace of the decline of the diporeia.



Source: University of Wisconsin-Milwaukee

More information is available at: [www.uwm.edu/News/Features/04.12/quaggas.html](http://www.uwm.edu/News/Features/04.12/quaggas.html)



Great Lakes Harbors, Shallow and deep. Ocean-going vessels generally dock in deep ports where ballast water IS often discharged.

Source: U.S. Army Corps of Engineers

Illinois waters, and 3) regulation of the sale, transportation, stocking on private property, live sale and distribution of all aquatic life. To see the full version of the law, visit [www.ilga.gov](http://www.ilga.gov), search for HB1181 (lower left corner of home page), and then click on full text.

**Illinois Nurserymen's Association Adopts New Code of Conduct**

The Board of Directors of the Illinois Nurserymen's Association unanimously approved to adopt the Missouri Botanical Garden voluntary code of conduct developed in December, 2001. By adopting this code of conduct, association members will:

- ensure that invasive potential is assessed prior to introducing and marketing plant species new to

North America;

- work with regional experts and stakeholders to determine which species in the region are either currently invasive or will become invasive;
- Identify plants that could be suitable alternatives for the region;
- develop and promote alternative plant material through plant selection and breeding;
- phase out existing stocks of those specific invasive species in regions, where agreement has been reached among nursery associations, government, academia and ecology and conservation organizations, that are considered to be a threat;
- follow all laws on importation and quarantine of plant materials across political boundaries; and encourage customers to use, and garden writers to promote, non-invasive plants.

## Sound and Bubble Barrier Could Deter Asian Carp

Mark Pegg and John Chick of the Illinois Natural History Survey found that an underwater acoustic barrier is effective in deterring Asian carp. These researchers tested sound-bubble technology in fish raceways where it proved 95 percent effective in causing bighead and silver carp to turn around. Continued work should get the effectiveness closer to 100 percent. If funding becomes available and the technology continues to prove effective, an acoustic barrier may augment the electric barrier at its site, or downstream where it can protect the Chicago Sanitary and Ship Canal as well as the Des Plaines River.

For more information contact Dave Bender [dbender@ina-online.org](mailto:dbender@ina-online.org) or visit [www.centerforplantconservation.org/invasives/](http://www.centerforplantconservation.org/invasives/).

### *Gobies Rounded-up and Asian Carp Corralled*

The U.S. Fish & Wildlife Service (USFWS) conducted its 10th annual Goby Round Up and 4th annual Carp Corral in the Chicago Waterways/Illinois River in June, 2005. The primary objective of this annual event is to determine the farthest downstream (from Lake Michigan) distribution of the round goby and farthest upstream distribution (from the Illinois River) of silver and bighead carp. With the help of 8 other federal, state and non-governmental agencies and organizations, USFWS sampled almost 200 miles of Illinois' waterways over 4 days. The sampling revealed good and bad news. The good news is that the round goby was no farther downstream than reported last July (by the Illinois Natural History Survey) and the



The Round Goby

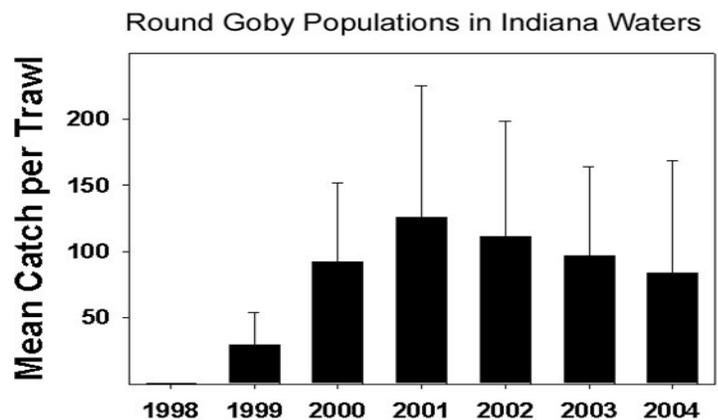
bighead and silver carp had traveled no farther upstream than previously found. The bad news is that the goby has traveled downstream 170 miles, and is already half of the distance to the Mississippi River; Asian carp are only 21 miles below the electrical barrier and only 50 miles from Lake Michigan. For more information contact Pam Thiel ([pam\\_thiel@fws.gov](mailto:pam_thiel@fws.gov)).

### *Update on the Sanitary and Ship Canal Electric Barrier*

The electrical barrier that currently is in place in the Sanitary and Ship Canal was installed with the understanding that it was temporary. Therefore, a second electrical barrier is being constructed. This barrier will have 2 sections, each creating its own electrical field. Having 2 separate fields would allow the barrier to continue operating in case one of the fields malfunctions. The first phase of the second barrier (Barrier IIA) should be completed by September 2006. Barrier IIB should be constructed and on-line early in 2006. Meanwhile, Barrier I (the temporary barrier) is operating well and will continue to operate until Barrier II A & B are fully operational. Full funding of the operation and maintenance of the barrier has not been finalized. For more information visit [www.seagrant.wisc.edu/AIS/Default.aspx?tabid=393](http://www.seagrant.wisc.edu/AIS/Default.aspx?tabid=393).

### *Illinois-Indiana Sea Grant Partners with the City of Chicago*

Illinois-Indiana Sea Grant is partnering with the City of Chicago on new AIS outreach initiatives via the city's facilities and activities. Illinois EPA participated in Illinois-Indiana Sea Grant's AIS-HACCP (Aquatic Invasive Species. Hazard Analysis and Critical Control Point) workshop in March, 2005, and has written and adopted an AIS-HACCP plan for its northern surface



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



## 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](http://www.great-lakes.net/teach/pollution/ans/ans_5.html)

water sampling. Illinois' ANS Management Plan is already 5 years old and currently is being updated and revised. More information is available by contacting Pat Charlebois ([charlebo@uiuc.edu](mailto:charlebo@uiuc.edu)).

## Indiana

### *New ANS Management Plan*

Indiana's ANS Management Plan was developed by D.J. Case and Associates under contract to Indiana DNR, Division of Fish and Wildlife. The plan was developed by a multi-agency task force. Indiana's ANS Management Plan was completed and approved by Governor Kernan in November 2003. The plan was approved by the National

ANS Task Force at their November 2004 meeting. An Aquatic Invasive Species Coordinator was hired in January 2005 to implement the Indiana ANS Plan. To view the Indiana ANS Management Plan, please visit: <http://www.in.gov/dnr/invasivespecies/inansmanagementplan.pdf>

The goals of the Indiana ANS Management Plan are:

- Coordinate all efforts among agencies and organizations both within Indiana and with other states and nations to manage aquatic nuisance species.
- Prevent new introductions of nuisance aquatic species into the Lake Michigan and Mississippi River basins of Indiana.
- Conduct monitoring programs to enhance early detection of introductions or invasions.
- Institute rapid response objectives to limit the cost of controlling new introductions.
- Limit the spread of established populations of aquatic nuisance species into uninfested waters of the state.
- Mitigate harmful ecological, economic, social, and public health impacts resulting from infestations of aquatic nuisance species.
- Evaluate the effectiveness of the plan and use adaptive management strategies to update the plan during initial implementation and after the five-year period of use.

### *Ballast Water Legislation Proposed*

Ballast water legislation for Indiana's portion of Lake Michigan has been proposed in the 2006 Legislative short session. This legislation is very similar to that which passed in Michigan in 2005.

### *Brazilian Elodea Threatening to Spread*

Besides Asian carp, which are widespread throughout Indiana's large rivers, the greatest threat to the Lake Michigan watershed is the recent invasion of Brazilian elodea (*Egeria densa*) into a public impoundment in south-central Indiana. The species has also been identified in a few southern Indiana private ponds. Control strategies are being developed for all bodies of water where it is currently known and should be implemented by the spring of 2006 with the goal of completely eliminating this exotic plant from the state.

The Lake and River Enhancement Program

appropriated over \$600,000 for aquatic invasive plant control in 2005. That is a great leap in project funding over previous years due to an increase in revenue for the program. Most projects targeted either Eurasian watermilfoil or curlyleaf pondweed. Brazilian elodea control will also be funded from the program in the future.

**Funding for Electric Barrier**

As with the other states bordering the Great Lakes, Indiana contributed nearly \$68,000 to assist in funding the Chicago Sanitary and Ship Canal permanent dispersal barrier.

**Monitoring for Snakehead**

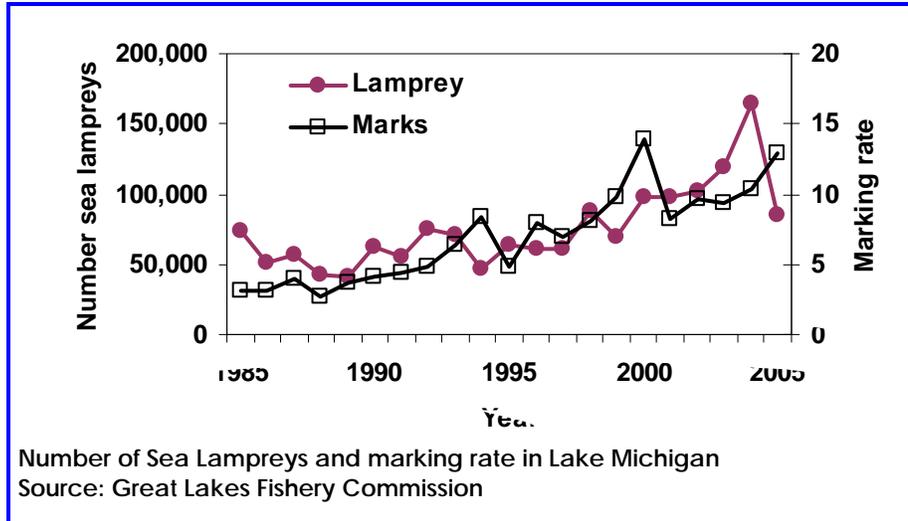
The Indiana Lake Michigan field staff participates in a joint monitoring program to conduct surveillance for snakehead. The surveillance is conducted in conjunction with field collections during the spring and fall as part of the GLNPO, fish consumption advisory program in Trail Creek and Burns waterway.

**Michigan**

**State Management Plan**

Michigan's Aquatic Nuisance Species State Management Plan was updated in 2002 and includes key recommendations for legislation and policy, research and monitoring, and information and education. Implementation of the plan is coordinated by Michigan's Aquatic Nuisance Species Council, established by Executive Order No. 2002-21 in November 2002. Michigan's Aquatic Nuisance Species State Management Plan Update, information regarding Michigan's Aquatic Nuisance Species Council, and information about the programs listed below are available at [www.michigan.gov/deq](http://www.michigan.gov/deq) in the Water section under Great Lakes, Aquatic Nuisance Control. Most of the recommendations in the 2002 update have been implemented and the plan will be revised in the near future.

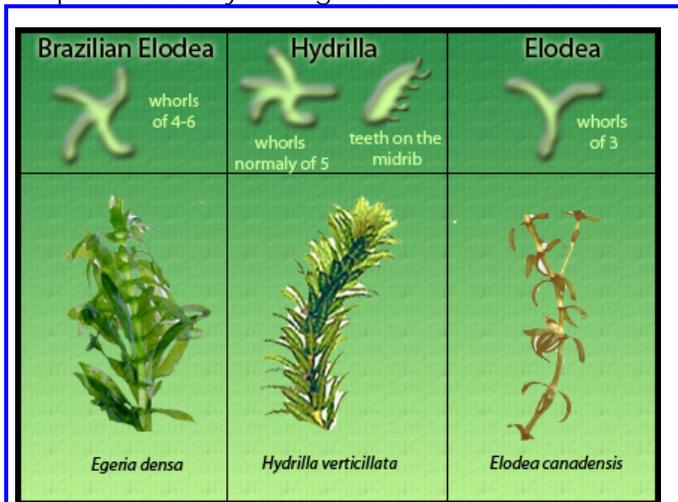
**Publications**



Several publications, including the Aquatic Nuisance Species Handbook for Government Officials, that provide information regarding identification, management, and environmental impacts of exotic species in Michigan and in the Great Lakes area are available through the state.

**Awareness Week**

Michigan has implemented an annual Aquatic Invasive Species Awareness Week each year in June, proclaimed by the Governor and implemented by Michigan's Office of the Great



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>

Lakes. A wide variety of educational activities occur throughout the state during the week in support of prevention and control for invasive species.

### ***Small Grants Program***

A small grants program for aquatic invasive species education and awareness is offered each year. Projects have included boat launch inspections, boat washing demonstrations, AIS prevention workshops, and AIS awareness campaigns for inland lakes.

### ***State Legislation***

State legislation enacted in 2005, including Public Acts 74-81, provide new state prevention and control mechanisms. These laws establish lists of prohibited and restricted species and penalties for possession. They also created an Invasive Species Council addressing both terrestrial and aquatic species and establish an Invasive Species Fund to be used for administration and information/education. They require publishing a web site for public information about aquatic invasive species. The Department of Natural Resources is the lead agency.

### ***Ballast Water***

The discharge of ballast water is a significant contributor to the introduction of aquatic invasive species to Michigan. The state has 3 ballast water regulation laws to prevent introduction of aquatic invasive species to waters of the state via ballast water discharge.

Michigan's Office of the Great Lakes is implementing Public Act 114 of 2001 that requires ships on the Great Lakes to report to the Michigan Department of Environmental Quality (MDEQ) on use of certain best management practices (BMPs) for ballast water. The legislation, BMPs, and list of ships complying with reporting are available at [www.michigan.gov/deq](http://www.michigan.gov/deq) in the Assistance and Support Services section under Environmental Reporting, Ballast Water Reporting.

The MDEQ's Water Bureau is implementing Public Acts 32 and 33 of 2005. These laws require a state permit from ocean-going vessels to conduct port operations in Michigan beginning January 1, 2007.

The permit is under development in 2005-2006 and will require treatment of ballast water prior to discharge in Michigan to prevent release of aquatic invasive species.

### ***Wisconsin***

#### ***Watercraft Inspection***

This effort involves dissemination of information to anglers and recreational boaters to make them aware of what invasive species look like and what precautions they should take to avoid spreading them. It also involves visual inspection of boats to make sure they are "clean" and demonstrating to the public how to properly clean their boats, trailers, and boating equipment. Watercraft inspectors also install signs at boat landings informing boaters of the infestation status, state law, and steps to prevent spreading invasive species. About \$56,000 was spent in FY 03 and \$174,900 in FY 04 on watercraft inspection efforts.

#### ***Monitoring***



Purple Loosestrife

Source: Lake Koshkonong Wetland Association

This effort involves monitoring for aquatic invasive species, including zebra mussels, Eurasian water milfoil, spiny waterfleas, and rusty crayfish. For zebra mussels, it involves collecting samples for veliger (larval zebra mussel) analyses and deployment of substrate samplers to monitor for the adults. More recently, specific sampling procedures were developed for spiny waterfleas and rusty crayfish, and in 2004 the DNR has begun sampling for these invasive species as well. For Eurasian water milfoil, monitoring efforts involve inspection of watercraft for invasive plants and visual shoreline inspections. About \$56,000 was spent in FY 03 and \$128,600 in FY 04 on monitoring efforts on inland waters.

### ***Information and Education***

In close cooperation with UW Extension and Wisconsin Sea Grant, education efforts focus on working with resource professionals and citizens statewide to teach boaters, anglers, and other water users how to prevent transporting aquatic invasive species when moving their boats. Efforts also involve addressing other potential mechanisms of introduction, including aquarium pet release and water gardening. Many educational tools are used to reach the public--brochures and publications, watch cards and wild cards, public service announcements and displays at parks, sport shows, convention and symposiums. Mandy Beall, education and outreach coordinator with UW-Extension, is funded through this program. This position is responsible for disseminating information and coordinating the statewide education efforts. About \$97,800 was spent in FY 03 and \$221,800 in FY 04 on information and education/outreach efforts.

### ***Purple Loosestrife Biological Control***

This is a citizen-based project that emphasizes using two safe, purple loosestrife foliage-feeding beetle species, in combination with traditional methods, for controlling this invasive plant. Citizens of all ages make up the backbone of this cooperative program by rearing and releasing these insects in their local wetlands—and learning about these unique resources in the process. Brock Woods with UW-Extension is the purple loosestrife bio-control coordinator and directs the program. This position is funded through the

program. A total of \$68,000 was spent in each fiscal year, FY 03 and FY 04, to support purple loosestrife biocontrol efforts in the state.

### ***Clean Boats, Clean Waters Volunteer Program***

Sponsored by DNR, UW Extension, and the Wisconsin Association of Lakes, this program was initiated in the fall of 2003 and offers training on how to organize a watercraft inspection program, how to inspect boats and equipment, and how to interact with the public. Volunteers are also encouraged to help monitor for aquatic invasive species. Workshops are open to adults and youth, and adult groups are encouraged to work with local youth partners. Laura Felda-Marquardt, with UW-Extension, coordinates the volunteer efforts and is funded through the program. About \$75,000 was spent in FY 04 to support the Clean Boats, Clean Waters Volunteer Program.

### ***Research efforts***

The DNR has contracted with the UW-Madison Center for Limnology to develop monitoring protocols for rusty crayfish and spiny water fleas. DNR field staff are utilizing the draft protocols for these two species. Other activities that will be completed as part of the proposal include: 1) databases on the distribution of rusty crayfish, spiny water fleas, and rainbow smelt; 2) models predicting which waters are most vulnerable to invasion from these species; and 3) assessment of impacts and control strategies for Wisconsin, including development of a rapid response strategy. A total of \$20,300 was spent on the FY 04 on the contract with the Center for Limnology to conduct the research efforts. A total of \$29,719 is allocated in FY 05 for this proposal to complete this work effort.

### ***Aquatic Invasive Species (AIS) Grants***

New in FY 04 is a \$500,000 annual appropriation from the Water Resources Account of the Conservation Fund that the DNR administers as a cost share grant program to local units of government. The grants can be used for work that prevents the spread of aquatic invasive species into uninfested waters. The grants can also be used for eradicating non-native species and/or controlling their impact and working to re-establishing biological integrity. In FY 04,

approximately \$515,000 was encumbered for aquatic invasive species control and planning & education projects. At a glance, here are the highlights of the grant program:

- A 50% local match is required which can be cash, donated labor or materials.
- Local units of governments are eligible, including towns, cities, villages, counties, tribes, lake and sanitary districts. Lake associations or nonprofit conservation organizations (NCOs) are also eligible for any funds not spent on municipal projects.
- Projects should emphasize prevention, planning, education and boat launch inspections; control practices are limited to projects in DNR approved plans.
- The DNR completed writing permanent rules to administer the program .

The DNR, through the FY 05 -07 biennial budget process, is seeking to amend the statutes to include a 25% local match and also make grant funds equally available to lake associations and nonprofit conservation organizations. Both of these changes would make the AIS grants consistent with existing lake grants.

## Next Steps

- Education and outreach on aquatic invasive species in order to accomplish
  - Ship and barge-mediated introductions and spread of AIS in the Great Lakes should be eliminated
  - Federal, state, and/or local governments must enact measures that ensure the region's canals and waterways are not a vector for AIS
  - Federal and state governments must take immediate steps 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

### Michigan DEQ Report Outlines Impacts of Beach Maintenance

A report released in March 2006 by the Michigan Department of Environmental Quality found negative impacts to coastal areas where "beach grooming" had occurred. The report, developed by a team of scientists from Michigan State University and Grand Valley State University, compared groomed beaches with similar, nearby natural beaches, allowing the researchers to measure how fish populations, other animals, and marsh plants are affected.

The study showed that clearing vegetation through a coastal marsh alters the chemical and physical conditions of nearshore waters, reducing or eliminating habitat for Michigan's important game fish including yellow perch, smallmouth bass, and largemouth bass.

According to the Michigan DNR, approximately 90% of the 200 fish species living in the Great Lakes rely on coastal wetlands during some part of their life cycle. The report found negative impacts to several important game fish including yellow perch, smallmouth bass, and largemouth bass. The study also found that beach grooming destroyed stands of important plants and helped invasive species colonize the groomed areas.

In light of this research, MDEQ Director Steven Chester has recommended to the Legislature that the provisions created through 2003 wetlands legislation be allowed to expire according to the sunset dates in the law.

More information is available at: [www.michigan.gov/deq/0,1607,7-135-3313\\_3687-10202--,00.html](http://www.michigan.gov/deq/0,1607,7-135-3313_3687-10202--,00.html).

## Great Lakes Regional Collaboration Goals and Recommendations Relevant to the Lake Michigan LaMP Subgoal 8



### Aquatic Invasive Species Goals and Recommendations

#### Goals

Goal: Prevent all new introductions of AIS into the Great Lakes.

Goal: Stop the spread of AIS within the basin, extirpate harmful AIS, or if impossible, then control to levels that ensure sustainable ecosystems and the social, economic and cultural uses they support.

Interim Milestones: A complete list of all milestones developed to measure progress through 2010 toward reaching the goals is included in AIS appendix A. The most important interim milestones supporting the recommendations are to:

- Enact comprehensive federal legislation (*specifically* legislation that would incorporate all of the terms contained in S. 770, H.R. 1591 and 1592 as introduced in the 109th Congress; collectively the *National Aquatic Invasive Species Act—NAISA*; with modifications as outlined in recommendation #3) to authorize and fund AIS programs;
- Provide expanded federal support for AIS research and outreach programs; and
- Develop a binational plan of action to prevent additional species invasions, and control established populations of the most damaging AIS.

#### Recommendations

1. Ship and barge-mediated introductions and spread of AIS in the Great Lakes should be eliminated, through the immediate promulgation of environmentally protective standards for ballast water, and the implementation of effective ship-board treatments and management measures. Specifically:

- Immediately require, verify, and enforce (in the current shipping season under existing

authorities) that ocean-going vessels in the no ballast on board condition (NOBOB) implement practices that are an improvement over current practices;

- Immediately require, verify, and enforce best performing ship-board ballast water treatment and hull management methods for ocean-going vessels (with a set approval period), with continued upward ratcheting of the treatment floor as treatment performance improves. Approved treatment must be to an environmentally protective standard by 2011;
- Immediately require monitoring, reporting, and public dissemination of all ballasting activities, prevention practices, and outcomes such that progress toward the goal is measurable and enforcement practical;
- Review and apply best-performing ballast water management practices to non-oceangoing vessels operating exclusively within the Great Lakes (including application of ballast water treatment for new ships) to eliminate the spread of AIS already introduced into the system; and
- Immediately and significantly expand research, testing, and evaluation of policies and technologies as alternatives to on-board treatment. Alternatives to be investigated should include (but not be limited to) cargo transfer, shore-based treatment, use of Clean Water Act discharge permits, and state/regional actions. Programs under which these investigations can be conducted include the Ballast Water Technology Demonstration Program and the Environmental Technology Verification Program. These investigations will hasten development of effective shipboard treatment systems. If ship-board treatments are shown to be inadequate, the team recommends implementation by 2011 of effective alternatives that prohibit ballast water from ocean-going ships from being discharged into the Great Lakes.

2. Federal, state, and/or local governments must enact measures that ensure the region's canals

and waterways are not a vector for AIS, including full federal funding of the Chicago San-Ship Canal barrier and the sea lamprey control program. Specific recommendations are:

- Complete construction of barrier II, make barrier I permanent, provide federal funds to operate both dispersal barriers in the Chicago Waterway system, and complete a study of options for permanent hydrological and/or biological separation of the Great Lakes and Mississippi River systems;
  - Fully examine options and their economic benefits and costs to prevent the spread of AIS via the Lake Champlain Canal and other canal systems linking the Great Lakes with other basins;
  - Close or modify, through the use of physical barriers or control structures, canals that have fallen into disuse or disrepair—if rebuilt, prevent passage of aquatic invasive species;
  - Prohibit development of new cross-drainage basin connections;
  - Address intermittent flood-related connections;
  - Initiate measures to prevent or reduce the movement of AIS into stream segments opened up by dam/impediment removal or culvert construction, and fully consider benefits to native species and impacts from AIS when evaluating cost-benefit of proposed fish passage projects;
  - Develop and implement AIS monitoring plans to provide comprehensive monitoring and reporting of AIS through the canal vector; and
  - Fully fund the Great Lakes Fishery Commission's sea lamprey control program.
3. Federal and state governments must take immediate steps to prevent the introduction and spread of AIS through the trade and potential release of live organisms. Specifically:
- Develop a list of species of concern for the Great Lakes basin and an immediate moratorium by the States on the trade of species on that list, until the species are screened and approved for trade ;
- Implement provisions of the pending NAISA legislation, as introduced, that establish a federal screening process for organisms proposed for trade;
  - Modify the pending NAISA legislation mandating that the screening process should classify species proposed for trade into three lists—prohibited, permitted, and conditionally prohibited/permitted;
  - Modify NAISA to clearly state that the screening process established must place the burden of proof of non-injuriousness on the importer;
  - Allocate sufficient resources to heighten the number of species under the Lacey Act as "injurious," to prevent the interstate transportation of harmful species;
  - the Fish and Wildlife Service FWS should list black, bighead, and silver carps as injurious under the Lacey Act;
  - Significantly increase resources for the enforcement of laws governing the trade of live organisms; and
  - Develop and implement risk models for organisms in aquaculture.
4. 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. This program, which will require authorization, must:
- Allocate funds for development and implementation of State and Interstate Aquatic Nuisance Species Management Plans through the Aquatic Nuisance Species Task Force, with a particular emphasis on the immediate use of techniques to control or slow the spread of AIS
  - Encourage investigation of economic requirements and incentives (e.g., bonds or insurance) to prevent new introductions;
  - Establish a revolving fund for rapid response actions; Establish an interagency, Great Lakes Federal Rapid Response Team, that will conduct activities on federal lands, and in other locations with State, Tribal, and local cooperation; and Allocate funds to implement a system of

enhanced monitoring and ecological surveys in the Great Lakes;

- Support additional research to develop and implement new control methods for uncontrolled species of concern; Establish a coordinated data management system, through the Smithsonian Institution, the Great Lakes Environmental Research Laboratory, or other suitable entity, to develop an accessible, integrated, and centralized database that allows for the reporting and tracking of AIS infestations; and
- Ensure overall coordination and accountability through the Invasive Species

Council, including developing regular and comprehensive reports summarizing the status of AIS activities (including those of the Aquatic Nuisance Species Task Force and the Great Lakes Panel on ANS in implementing the National Invasive Species Management Plan), formulating a complete AIS federal budget request, overseeing progress in addressing AIS, evaluating the collective response to AIS, and communicating AIS needs and problems to Congress and the public. The National Invasive Species Management Plan should include specific focus on AIS in the Great Lakes.

