

INVASIVE SPECIES

I. What is the issue? Why are we concerned?

Invasive species have the potential to cause significant damage to terrestrial and aquatic ecosystems. In the past century, two-thirds of the 40 North American freshwater fish species extinctions have been caused by invasive species. Invasive species are recognized as one of the greatest threats to biodiversity, second only to habitat destruction. The economic impacts of invasive species on land and water resources in the United States have been estimated at \$138 billion annually. Invasive flora, fauna, diseases and parasites increasingly threaten Minnesota's natural resources. Prevention of further invasions and the spread of invasive species are necessary to prohibit biotic homogenization of Minnesota's ecosystems.

II. What are the trends?

Aquatic invasive species (AIS) are found in increasing numbers in Minnesota's waters. Approximately 35 percent of primary recreational lakes in the state have been found to have at least one invasive species. AIS rated as being a serious threat in Minnesota include: Eurasian watermilfoil, curlyleaf pondweed, round goby, Eurasian ruffe, common carp, zebra mussel, and spiny water flea. Lake Superior has 27 invasive species of plants, fish, aquatic invertebrates, diseases, and parasites. Eurasian watermilfoil is now found in 190 lakes in the state with 13 new lakes added in 2006. Curlyleaf pondweed is found in over 740 lakes and zebra mussels are found in four inland lakes, isolated areas in Lake Superior, and parts of the Mississippi and St. Croix rivers. These trends are expected to accelerate with time as AIS become more established in Minnesota. AIS are a long term problem that will need continued management and educational outreach programs.

III. Why is this issue important to address?

AIS have characteristics that increase their ability to have a negative impact on their environment. Life histories of these species make them key competitors with native species. They typically have high rates of survival, reproduction, and spread because in their new environment they lack predators, parasites, pathogens, and competitors.

AIS effects on native biodiversity

- Compete directly for resources
- Compete indirectly by changing the food web or the physical environment
- Prey on or hybridize with native species

AIS effects on humans

- Damage to boats, docks, power plants, and municipal water sources
- Competition with game fish
- Prohibiting swimming and boating
- Costly control, prevention, and research
- Impacts on ecosystems indirectly affect factors from duck hunting to aesthetics

IV. What factors contribute to this issue?

One factor contributing to the issue of AIS is that they are being spread by human actions. They are spread unintentionally by boats and equipment when they are used in more than one water body. In a survey of boaters, the percent of respondents that reported using their boat in different water bodies within the same year was high. This is related to the fact that there are abundant water resources in the state and boaters make use of these resources.

V. What is the regulatory oversight?

The DNR has an Invasive Species Program. Through regulation, education, inspection, and enforcement, the DNR monitors and manages AIS in the state.

VI. Is this issue a priority for other non-governmental groups?

- Minnesota Waters Aquatic Invasive Species Initiative

VII. Who are the primary stakeholders?

Boaters and recreational water users, commercial fisheries, anglers, duck hunters, lake property owners, companies that use lake water, the conservation community, citizens, nonprofit organizations, local governments, and tribal governments.

VIII. What is working?

Education

The DNR's education efforts have included printing AIS Laws, the Minnesota infested waters list, and the "Stop Aquatic Hitchhikers!" information in the Minnesota Boating Guide and the state's fishing regulations. Billboards and exhibits have been placed at a Cabela's store and the Minnesota State Fair. Informational signs have also been posted at public water accesses, boat launches, and resorts at various lakes in the state.

To prevent the further spread of AIS between water bodies, forty-five DNR watercraft inspectors provided information to boaters about watercraft inspections and invasive species. They conducted inspections from late April to October to reach anglers as well as duck hunters. Inspectors distributed 6,600 "Stop Aquatic Hitchhikers!" tags on trailers at boat launches on infested waters. In addition, nine lake association groups and citizen groups worked

cooperatively with the DNR to inspect boats at public accesses on their lakes. The success of this program can be measured by the prevention of the further spread of AIS in the state's lakes and rivers.

Education campaigns have worked to increase boater knowledge of AIS. A Minnesota Sea Grant study of the effectiveness of AIS campaigns on boater awareness and behavior found that:

- Information about exotic species through media sources, such as newspapers and television, was the most effective in reaching boaters
- Continued education would be most effective as signs at boat launches and information in boating and fishing regulation pamphlets
- "A sense of personal responsibility and a desire to keep exotics out of my lake or stream" was noted as biggest influence to take precautions to prevent the spread of exotic species
- 75% of respondents reported that they almost always remove vegetation and mussels from their boat and equipment
- Exotic species ranked in the top three of respondents' answers to the question "what are the greatest threats to lakes and streams?"

Management

There has been a considerable focus by the DNR on managing aquatic invasive plants. In 2006 the DNR gave \$125,000 in grants for well planned and well monitored lake-wide control of curlyleaf pondweed. Seven lakes were treated and control of curlyleaf pondweed was reported to successful by lake residents and DNR staff observations. The curlyleaf pondweed grant program was new for 2006 and \$200,000 was allocated for 2007.

Eurasian watermilfoil control with herbicides and mechanical harvesting was done in 23 lakes statewide. The DNR gave \$85,000 in grants to lakeshore owners, lake associations, and local governments for this program. This invasive plant management is intended to reduce the harmful impacts of AIS on lake ecosystems and improve lake access.

Research

Research on the use of biocontrol methods for AIS is increasing. Three potential organisms for the control of Eurasian watermilfoil are a moth, chironomid midge, and a native weevil. The weevil has proven to be the most promising agent to use in Minnesota. Milfoil weevils have been able to cause a decline in Eurasian watermilfoil in four Minnesota lakes. There were site differences in the effectiveness of control, but in all lakes, weevils had some effect on the Eurasian watermilfoil invasion.

IX. What are the information gaps?

- A clear understanding of species movements and how to prevent them
- Information and case studies on best management practices and the effectiveness of their long term control on AIS
- Information on the operational use of biocontrol agents
- Information on geographic spread and greatest threat at a national as well as local level

X. What best management practices are being used?

Education and awareness campaigns have been shown to affect behavior such as removing aquatic vegetation from boats. Video inspection of Grays Bay, Lake Minnetonka found that 7 percent of boats were launched with attached vegetation and only 3 percent of boaters did visual inspections before launching. After signs were posted about the video surveillance, only 1.7 percent were launched with attached vegetation, and visual inspections increased to 13 percent.

The Minneapolis Parks and Recreation Board (MPRB) does mechanical harvesting of Eurasian watermilfoil in swimming areas and boat launches on lakes Calhoun, Harriet, Isles, Nokomis, and Wirth Lake. In 2006, 2,200 cubic yards or 405 flatbed truck loads of watermilfoil were removed. Since no environmentally safe method has been found to rid lakes of watermilfoil, the MPRB and the University of Minnesota are researching the possible effectiveness of native aquatic weevils for biocontrol.

XI. What is necessary to see real improvements?

Policy

- Treat as a high priority issue with funding for control and enforcement of AIS
- Collaborative efforts of state and local government, tribal government, nonprofit organizations, and citizen groups

Education

- Continued multimedia education efforts
- Support and training for citizen lake monitoring programs

Action

- Monitoring and evaluation of effectiveness of management programs
- Comprehensive prevention, management, and control actions
- Early detection and rapid assessment and response for new AIS
- Restoration and recovery of natural ecosystems
- More research into appropriate biological controls and best management practices

XII. What is the current climate to publicly impact this issue?

In Minnesota there have been public awareness media campaigns on invasive species for quite some time. Have we made a real impact in preventing the spread of AIS and preventing further new AIS introductions? Boater surveys show a high awareness and behavior changes due to media campaigns. Continued educational outreach is necessary to see a real cultural change in behavior.

XIII. For more information

Protect Your Waters

<http://protectyourwaters.net>

Minnesota Sea Grant

<http://www.seagrants.mn.edu>

Minnesota Waters

<http://minnesotawaters.org>

Minnesota Department of Natural Resources

<http://www.dnr.state.mn.us/invasives/index.html>

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