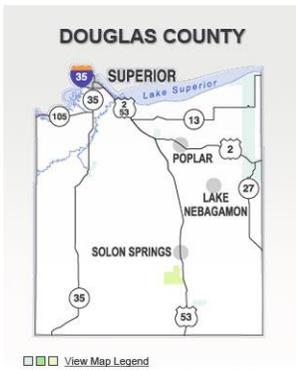


Douglas County, Wisconsin Aquatic Invasive Species Strategic Plan



December 2009

**Prepared by
Amy Eliot, Douglas County AIS
Coordinator
Douglas County AIS Strategic Plan Workgroup**

ACKNOWLEDGEMENTS

DOUGLAS COUNTY LAND CONSERVATION COMMITTEE

Kathryn McKenzie, Chair
Sue Hendrickson, Vice Chair
Bob Browne, Member
Mary Lou Bergman, Member
Mark Liebaert, Member
Larry Luostari, Citizen Member
Amy Colby, Farm Service Representative

DOUGLAS COUNTY BOARD OF SUPERVISORS

Douglas Finn, Chair
Keith Allen, Vice Chair
Susan Sandvick, Clerk
Steve Koszarek, Administrator

DOUGLAS COUNTY AQUATIC INVASIVE SPECIES STRATEGIC PLAN WORKGROUP MEMBERS

Fred & Sandy Anderson, WILCO Whitefish Lake Association
Jack Arthur, Lake Nebagamon Association
Mary Lou Bergman, Douglas County Board of Supervisors
Cameron Bertsch, Douglas County Land & Water Conservation Department
Doug Bush, Minong Flowage Association
Gene Clark, University of Wisconsin Sea Grant
Dan Corbin, Amnicon/Dowling Lake Management District
Robert Erdman, Douglas County Fish & Game League; WI Conservation Congress
Joan Flechsig, Amnicon/Dowling Lake Management District
Jim Heim, Upper St. Croix Lake Association
Josh Horky, Douglas County Assistant AIS Coordinator
Tom Johnson, Douglas County Fish & Game League
Frank Koshere, Wisconsin Department of Natural Resources
Tom Mahoney, Red Lake Association
Megan O’Shea, Wisconsin Department of Natural Resources
Ann Parker, Lake Nebagamon Association
Warren Soule, Douglas County Fish & Game League
Scott Peterson, Friends of the St. Croix Headwaters, Inc.
Matt TenEyck, University of Wisconsin Superior Lake Superior Research Institute
Lorna & Roger Wilson, St. Croix Flowage Association

DOUGLAS COUNTY AQUATIC INVASIVE SPECIES STRATEGIC PLAN WORKGROUP ADVISORS

Amy Eliot, Douglas County AIS Coordinator
Katherine McKenzie, Douglas County Land Conservation Committee
Christine Ostern, Conservationist, Douglas County Land & Water Conservation Department

COVER PHOTO CREDITS

Cover photos by Sue O’Halloran and Amy Eliot

FUNDING

This plan was created in cooperation with the Douglas County Land Conservation Department under a *2008-2009 Aquatic Invasive Species – Education, Prevention & Planning Project* grant provided by the Wisconsin Department of Natural Resources.



Executive Summary

Douglas County’s magnificent lakes and rivers have a “huge positive impact on the quality of life in northern Wisconsin”. And, hunting, fishing and water-based recreation are a major source of revenue for the County along with the “huge economic impact” of the shipping industry.



St. Louis River, Photo by A. Eliot



L. Wilson with EWM St. Croix Flowage, Photo by Frank Koshere

Yet, these water resources are threatened by Aquatic Invasive Species (AIS). Eight aquatic invasive species have been confirmed in eleven inland Douglas County waterways and there are eighty-eight known non-native species in Lake Superior. The potential for these and new invaders to cause serious economic and ecologic problems in Douglas County is here and the County must face the challenges head on.

To help protect its waterways today and for future generations, the Douglas County Aquatic Invasive Species Strategic Plan (DC AIS Strategic Plan) was adopted by the Douglas County



2009 DC Fish & Game League Sport Show, Photo by A. Eliot

Board of Supervisors in December 2009.

The mission statement of the Douglas County Aquatic Invasive Species Strategic Plan Workgroup to “develop a plan of action that creates a legacy for addressing...aquatic invasive species in all Douglas County waterways...” and the values adopted by them to “...work together and care about common goals for Douglas County...” set the tone for drafting a plan that could help the County reach its vision, goals and objectives.

The DC AIS Strategic Plan identifies the following four goals for addressing AIS:



Goal 1: Aquatic invasive species (AIS) infestations already existing in the county are controlled or eradicated and prevented from spreading; new AIS infestations are prevented.

Goal 2: Communication between lake and river residents, watershed groups, visitors, and other waterway organizations is improved and education is provided for all users.



Goal 3: The county and municipalities participate in the protection of water resources and understand how critical the resource is to the county, municipalities, northern Wisconsin and the region.

Goal 4: Sustainable funding for AIS research, monitoring, planning, restoration and education activities are adequately provided by private, local, county, state, federal, and tribal sources.

Twelve objectives are identified that will enable the County to meet those goals. The objectives focus on a watercraft inspection program, volunteer and professional AIS monitoring, assistance and training for early detection and rapid response, education & communication, legislative support, support for other biological, chemical and physical monitoring, support for AIS research, modeling and identification of best management practices, LCC oversight of the AIS Strategic Plan implementation and evaluation, inter-governmental and inter-departmental cooperation and assistance, and funding sources, assistance and partnerships (See goals and objective summary on page 19).

The DC AIS Strategic Plan identifies the need for AIS coordinators to implement most of the activities in the plan and begin marketing the County as an active collaborator in AIS control and prevention. The DC AIS Strategic Plan communicates to citizens, local officials, and the scientific community that it wants to work together on AIS and it provides a framework for the County to lead and assist on projects. If fully funded, the County will hire 40 seasonal workers to monitor landings and lakes for AIS. The effort would not only protect waterways, it would create jobs in our communities and increase our understanding of the waterways that provide the county with its high quality of life.

The DC AIS Strategic Plan also identifies the need for a research specialist that could organize a team of scientists and stakeholders to direct a Douglas County Modeling, Monitoring, and Research Plan. A research planning effort would enable the County to become an active player in identifying and answering questions about the unique AIS challenges it faces. A research group would be able to stay on top of existing and emerging issues known to scientists but not known locally because of the time involved and the general lack of communication between scientific and local communities.

The DC AIS Strategic Plan should be considered a dynamic document that can adapt to a changing environment. A steering committee created under the DC Strategic AIS Plan will help direct and approve implementation and any future changes. Funding will be pursued by the County to implement the DC AIS Strategic Plan over the next 2-3 years.

GLOSSARY OF ACRONYMS

AIS	Aquatic Invasive Species
BMP	Best Management Practice
CBCW	Clean Boats Clean Waters
EWM	Eurasian Water Milfoil
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
GSI	Great Ships Initiative
LCC	Douglas County Land & Water Conservation Committee
LCD	Douglas County Land & Water Conservation Department
LSRI	University of Wisconsin Superior Lake Superior Research Institute
LUGs	Local unit of government
SWIMS	Surface Water Integrated Monitoring System
WAV	Water Action Volunteer
WDNR	Wisconsin Department of Natural Resources
WI	Wisconsin

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	II
EXECUTIVE SUMMARY	IV
GLOSSARY OF ACRONYMS	VI
TABLE OF CONTENTS	VII
INTRODUCTION TO AQUATIC INVASIVE SPECIES IN DOUGLAS COUNTY	1
WHAT IS AN AQUATIC INVASIVE SPECIES?	1
WHERE DO THEY COME FROM AND HOW TO THEY GET HERE?	1
WHY IS EVERYONE CONCERNED?	2
WHY IS DOUGLAS COUNTY CONCERNED?	3
AIS IN DOUGLAS COUNTY DRAINAGE BASINS	6
LAKE SUPERIOR BASIN	6
MISSISSIPPI RIVER BASIN-UPPER ST. CROIX WATERSHED	8
ADDRESSING AIS IN DOUGLAS COUNTY	11
INTRODUCTION	11
THE AIS STRATEGIC PLANNING PROCESS	11
THE DOUGLAS COUNTY AIS STRATEGIC PLAN	12
MISSION	12
VALUES	12
VISION	13
GOALS AND OBJECTIVES SUMMARY	14
ACTIVITIES LIST AND BUDGET ESTIMATE	15
<i>Activities Summary:</i>	15
<i>Budget Summary:</i>	18
HIGHLIGHTS AND OPPORTUNITIES	19
CLEAN BOATS CLEAN WATER PROGRAM	19
CITIZEN LAKE MONITORING NETWORK	20
CITIZEN LAKE AIS MONITORS	20
PROFESSIONAL MONITORING	22
RESEARCH	22
STORING AND RETRIEVING DOUGLAS COUNTY DATA	23
AIS EARLY DETECTION AND RESPONSE ON INLAND LAKES	25
CHEMICAL CONTROL AND ERADICATION POLICY	25
LEGISLATION	26
LOCAL PARTNERSHIPS	26
AIS EDUCATION AND OUTREACH	27
AIS EFFORTS IN DOUGLAS COUNTY	28
AIS PROJECTS IN DOUGLAS COUNTY	30
POTENTIAL FUNDING SOURCES	34
LIST OF APPENDICES	36
LIST OF FIGURES	36
REFERENCES	37

INTRODUCTION TO AQUATIC INVASIVE SPECIES IN DOUGLAS COUNTY



What is an aquatic invasive species?

Non-indigenous species - also known as non-native or exotic species – are organisms that do not occur naturally and have been introduced into a system, either by accident or on purpose. Many non-native species cause little or no problems and are considered beneficial. The non-native rainbow trout stocked in Lake Superior to improve the fishery is an example. Non-native species that reproduce rapidly, out-compete native species, and cause extensive ecological and economic problems are typically termed *invasive*. They have a competitive advantage over native species because they do not have to contend with the natural predators, pathogens and pests that coexist in their native habitats.



Where do they come from and how do they get here?

Modes of Transport



Invasive species can come from other parts of the United States or other parts of the world and the way they get here varies. Rusty crayfish, for example, is from the Ohio River Drainage and was likely released by fishermen using them as bait. Eurasian watermilfoil, on the other hand, originates in Eurasia, North Africa and Australia and was brought here for use in aquariums as a decoration. The majority of non-native species in Lake Superior arrive through ballast water discharge (35%), cultivation (22%), or stocking (13%) (Source: US Army Corps of Engineers- Environmental Laboratory).

Most of the AIS plants found in Douglas County were introduced as garden plants or used in the aquarium trade. Some AIS animals may have come in attached to plants or, as in the case of mystery snails, were originally sold as food. It is also likely that some species migrated naturally through newly built canals and possible that some blew in on the wind. Whatever the mode of transport, however, AIS are spreading to Douglas County waterways and human activities - recreational boating, releases of live bait, and hitchhiking - are the main cause.

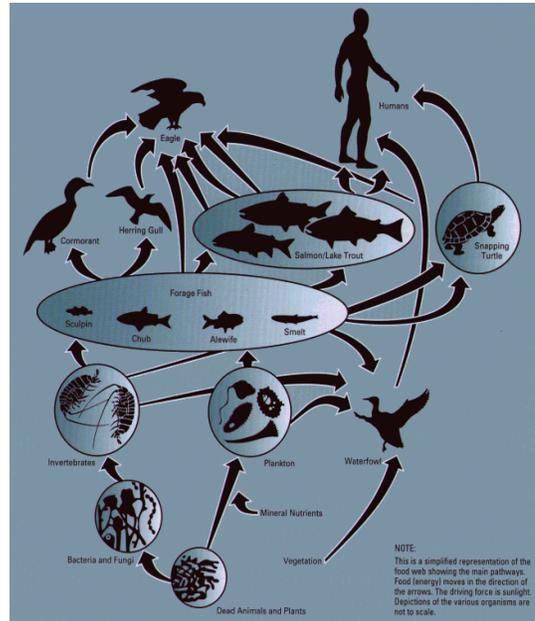
Why is everyone concerned?

Aquatic invasive species have the potential to significantly disrupt the aquatic food web by reducing habitat or food for native species and/or by preying directly upon native species. A food web represents the complex eating relationships between species within an ecosystem that developed over long periods of time. Disruptions to the food web, particularly at the lower eating levels, could have serious consequences for higher organisms. According to the United States Geological Survey, non-indigenous species are ranked second only to habitat loss in the factors that threaten native biodiversity.

AIS can also negatively affect property values, tourism, utilities, and other industries located on or near water. For example Eurasian water-milfoil, an invasive plant that forms thick masses of tangled vegetation, can hinder boating, swimming and fishing which could lead to a loss of tourism on infested lakes. In the United States, congressional researchers estimated that zebra mussels blocking pipes cost the power industry alone \$3.1 billion between 1993 and 1999. (MN Sea Grant).

Basic Food Web

All energy in an ecosystem originates with the sun. The solar energy is transformed into stored chemical energy by green plants through the process of photosynthesis. Plants are consumed by animals, which are in turn consumed as food. Humans are part of the food web.



ECONOMICS of Invasive Species - *National Biological Invasive Species Website*

The approximately 50,000 non-indigenous species in the United States cause major environmental damage and losses totaling approximately \$137 billion per year. (Pimentel et al., 2000)

"Associated damages and costs of controlling aquatic invaders in the United States are estimated to be \$9 billion annually." (Pimentel, 2003)

"The most serious aquatic invading species based on damages and control, in terms of millions of dollars per year are fishes (\$5400); zebra and quagga mussels (\$500); others (\$3000)." (Pimentel, 2003)

Why is Douglas County concerned?

AIS can be found throughout Douglas County and so it too has a financial and ecological stake in damages associated with AIS. The cultural and economic costs to Douglas County if fishing is harmed or waterfront property values are lowered are of major concern. Douglas County understands it must address the spread of AIS because controlling invasive species once they're here is difficult, expensive and getting rid of them is often impossible.

Most lakes in Douglas County are within five miles of a waterway that contains AIS (see Figure 1). Local WDNR fisheries biologist, Dennis Pratt, identifies New Zealand mudsnail as one of the biggest new threats from the Duluth/Superior harbor because it can clone – So, it only takes one organism to start a colony in the right environment. Mr. Pratt also expresses the need for more study on invertebrates in the St. Louis River to assess AIS status. Sea lampreys are stopped by natural and man-made barriers from traveling upstream to inland drainage lakes, but zebra mussel veligers (the free-swimming, larva stage) can hitch-hike on boats and equipment. According to the WDNR, six inland lakes in Douglas County are capable of supporting zebra mussel populations - Lower Eau Claire Lake, Leader Lake, Lake Nebagamon, Red Lake and Whitefish (Bardon) Lake.



AIS in Superior Bay, Photo by A. Eliot 2009

The local WDNR aquatic plant management specialist, Frank Koshere, is concerned that the AIS plant -- *Phragmites* -- will spread from transportation hubs near Lake Superior to inland lake margins and wetlands. Once introduced, *Phragmites* invades a site it quickly

and can take over a marsh community, crowding out native plants, changing marsh hydrology, and altering habitat. To prevent spread, Douglas County will need to act.

With help from state AIS programs, Douglas County waterway groups have been working independently to prevent AIS from spreading by training volunteers to inspect watercraft, monitoring lakes and streams, controlling existing populations of AIS, and sharing information and materials with the public. But individuals and small groups cannot be expected to monitor Douglas County's 431 lakes and 101 streams on their own.



Solon Springs CBCW Workshop Photo by A. Eliot 2009

As of spring 2009, 184 volunteers were trained to inspect watercraft at landings. In spite of that tremendous effort, however, only 14% of Douglas County waterways with public access had a watercraft inspector. With AIS present in thirteen of Douglas County's inland lakes and with Lake Superior right next door, containment and early detection of AIS will be very difficult if the number of inspectors and monitoring activities are not increased.

Douglas County recognizes it is important to protect its natural resources from the negative effects of AIS and that it must actively participate in a County-wide prevention and protection program. They developed the Douglas County Aquatic Invasive Species Strategic Plan to accomplish this task.



St. Louis River Landing, Photo by A. Eliot 2009

Inset Figure 1 From Cameron

AIS IN DOUGLAS COUNTY DRAINAGE BASINS

Douglas County is situated within two major drainage basins – Lake Superior Basin to the north and the Mississippi River Basin to the south. A drainage basin includes all areas that gather precipitation water and direct it to a particular stream, stream system, lake, or other body of standing water. High quality natural resources are abundant in both basins and both provide a high quality environment for Douglas County citizens and visitors.



Lake Superior Basin

The Lake Superior basin in Wisconsin covers about 3,069 square miles. The northern portion of Douglas County encompasses 753.5 square miles or nearly a quarter of the total Wisconsin portion of the Lake Superior Basin. Lake Superior is the deepest of the Great Lakes and the largest fresh water lake in surface area in the world.

Like many counties across Wisconsin, Douglas County must deal with existing AIS populations and the threat of new infestations from areas outside the County. A unique issue for Douglas County, however, is dealing with the increased AIS threats associated with being directly connected to the largest shipping port in the Great Lakes basin since 30% of all AIS arrived in ballast water.

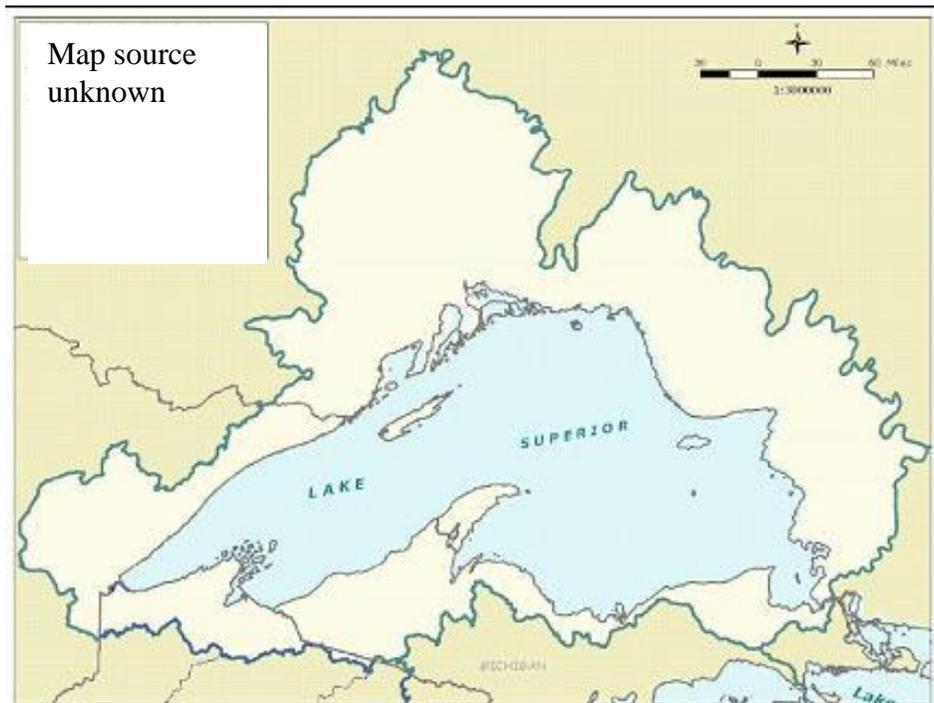
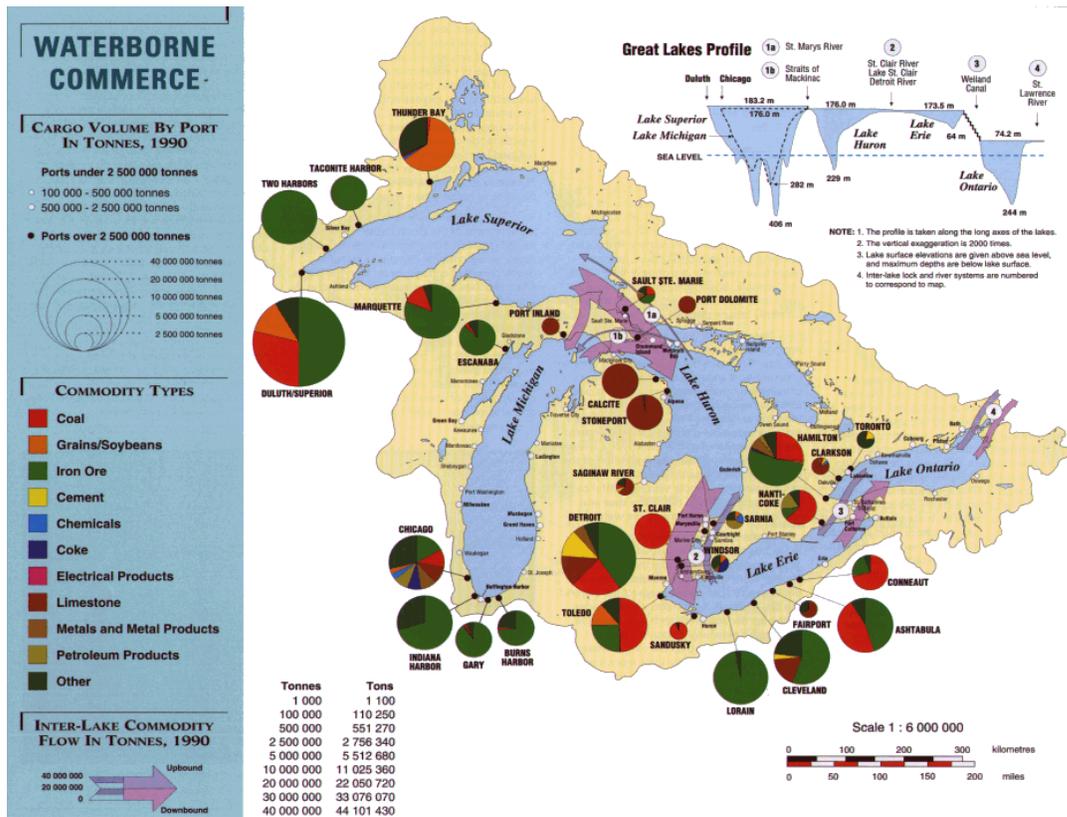


Figure 2 – Great Lakes Cargo Volume by Port in Tonnes, 1990



Map Source: EPA Great Lakes Atlas. Web. <http://www.epa.gov/glnpo/atlas/glat-ch3.html>

Lake Superior contains 21 species of non-native fish and 66 species of non-native aquatic invertebrates, diseases, parasites, and wetland, aquatic and shoreland woody plants (see Appendix K). Some of these non-natives were introduced intentionally, such as Coho salmon or rainbow trout, but others were brought in either by accident or by unknown vectors.

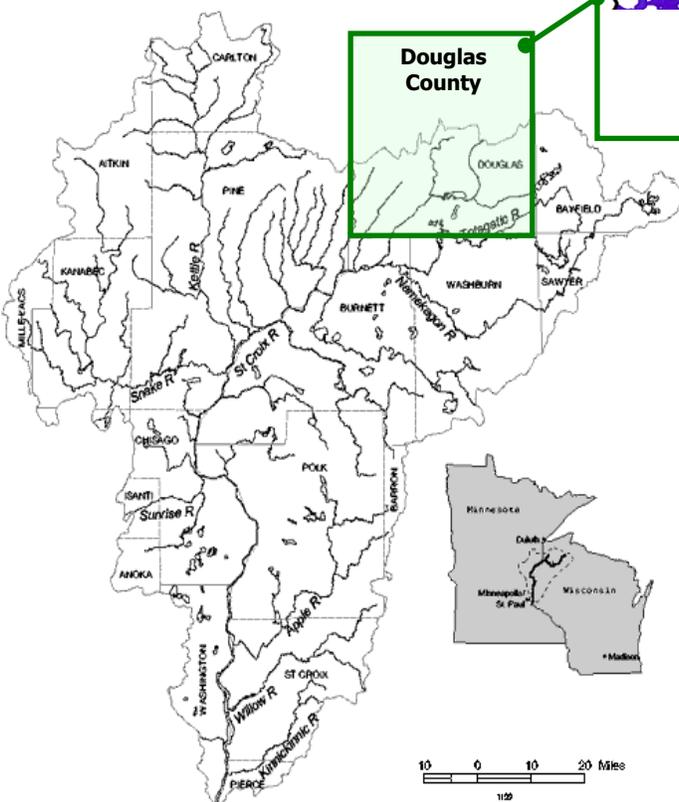
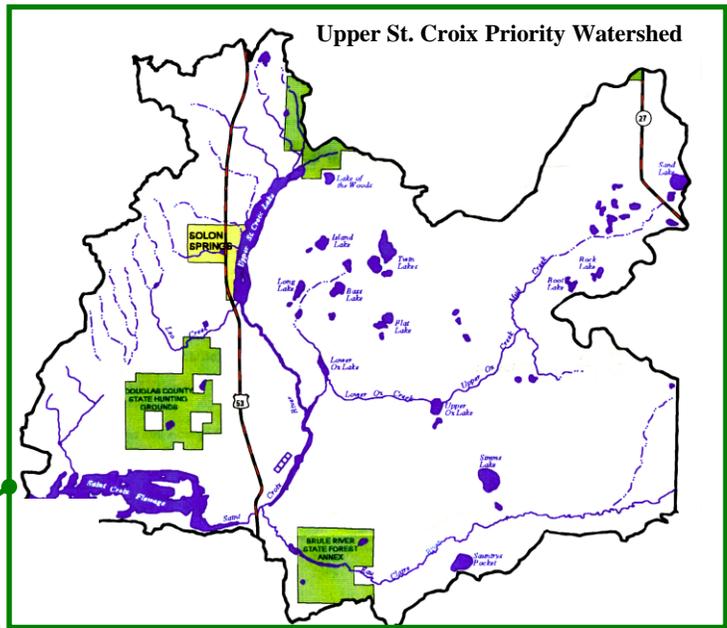
Invasive species such as Eurasian ruffe, fishhook and spiny waterfleas, flowering rush, New Zealand mudsnail, round goby, alewife, and zebra mussels are non-native species that are known to be invasive in nature and pose a serious ecological threat to Douglas County’s inland waters. Transporting AIS from Lake Superior, Superior Bay and the St. Louis River to inland waters is of particular concern. According the DC Fish & Game League, Douglas County fishermen routinely alternate between Lake Superior and inland lakes on a daily basis. Lake Amnicon and Lake Nebagamon are inland lakes in the basin that contain known AIS (See Table 1). Although these lakes are directly connected to Lake Superior by rivers, it is most likely AIS was brought in by boaters.

Mississippi River Basin-Upper St. Croix Watershed

The Mississippi River Basin is the largest watershed in the United States. It encompasses the St. Croix River watershed which comprises 7,760 square miles across 10 Minnesota and 9 Wisconsin counties. The river itself forms the border between the two states for much of its length. The upper portion of the St. Croix watershed covers the southern portion of Douglas County.



Ten waterways in the Douglas County portion of the Upper St. Croix basin contain AIS (See Table 1). Six of the ten waterways contain either Eurasian watermilfoil (EWM) or rusty crayfish or both. Containing these invasive species from spreading to nearby lakes is of particular concern for the St. Croix watershed. Many lakes are clustered close to each other and several are connected directly by tributary streams, increasing the chances that AIS could spread.



The warmer climate and high quality waterways in southern Douglas County are likely to attract transient pleasure boaters, fishermen and hunters and AIS hitchhikers. There are also significant AIS problems in the lower basin (See Appendix L for the most troublesome species in the Mississippi River Basin) that could present issues for us in the future.

Table 1 – Douglas County Lakes and Rivers with AIS

Note: This table does not include purple loosestrife which is prevalent in many wetlands and lake margins throughout Douglas County. Figure 2 below shows documented locations of purple loosestrife. Descriptions of AIS can be found in Appendix A.

Waterway Name	Basin	AIS Present
Amnicon Lake	Lake Superior	Curly-leaf pondweed ³ Eurasian watermilfoil ⁴
Amnicon River	Lake Superior	Round goby ¹ , ruffe ¹ , sea lamprey
Bois Brule River	Lake Superior	Alewife ¹ , ruffe ¹ , threespine stickleback ¹ , watercress ¹
Cranberry Lake	Saint Croix	Eurasian watermilfoil
Crystal Lake	Saint Croix	Freshwater jellyfish
Eau Claire River	Saint Croix	Rusty crayfish
Lake Minnesuing	Lake Superior	Rusty crayfish ¹
Lake Nebagamom	Lake Superior	Rusty crayfish
Lake Superior	Lake Superior	Eurasian ruffe, Eurasian watermilfoil, fishhook waterflea, flowering rush, New Zealand mudsnail, round goby, spiny waterflea, zebra mussels, and sea lamprey
Lower Eau Claire Lake	Saint Croix	Rusty crayfish
Middle River	Lake Superior	Ruffe ¹
Minong Flowage	Saint Croix	Curly-leaf pondweed, Eurasian watermilfoil, rusty crayfish
Mud Lake	Saint Croix	Zebra mussels
Saint Croix Flowage (Gordon)	Saint Croix	Curly-leaf pondweed, Eurasian watermilfoil, Chinese and Japanese mystery snails
Saint Croix River	Saint Croix	Chinese mystery snail, Japanese mystery snail, rusty crayfish, curlyleaf pondweed ⁵ , Eurasian watermilfoil ⁵
Saint Louis River	Lake Superior	Curly-leaf pondweed, zebra mussels, alewife ¹ , round goby ¹ , threespine stickleback ¹ , New Zealand mudsnail ¹
Superior Bay, Lake Superior	Lake Superior	Curly-leaf pondweed, Eurasian watermilfoil, quagga ¹
Upper Saint Croix Lake	Saint Croix	Banded mystery snail, rusty crayfish ⁵
Whitefish (Bardon) Lake	Saint Croix	Rainbow smelt ¹ , spiny waterflea ²

Data Source:

1 Great Lakes Indian Fish and Wildlife Commission <http://www.glifwc.org/>

2 Discovered - Sandy Anderson. Personal correspondence. December 3, 2009. Unknown if verified by WDNR.

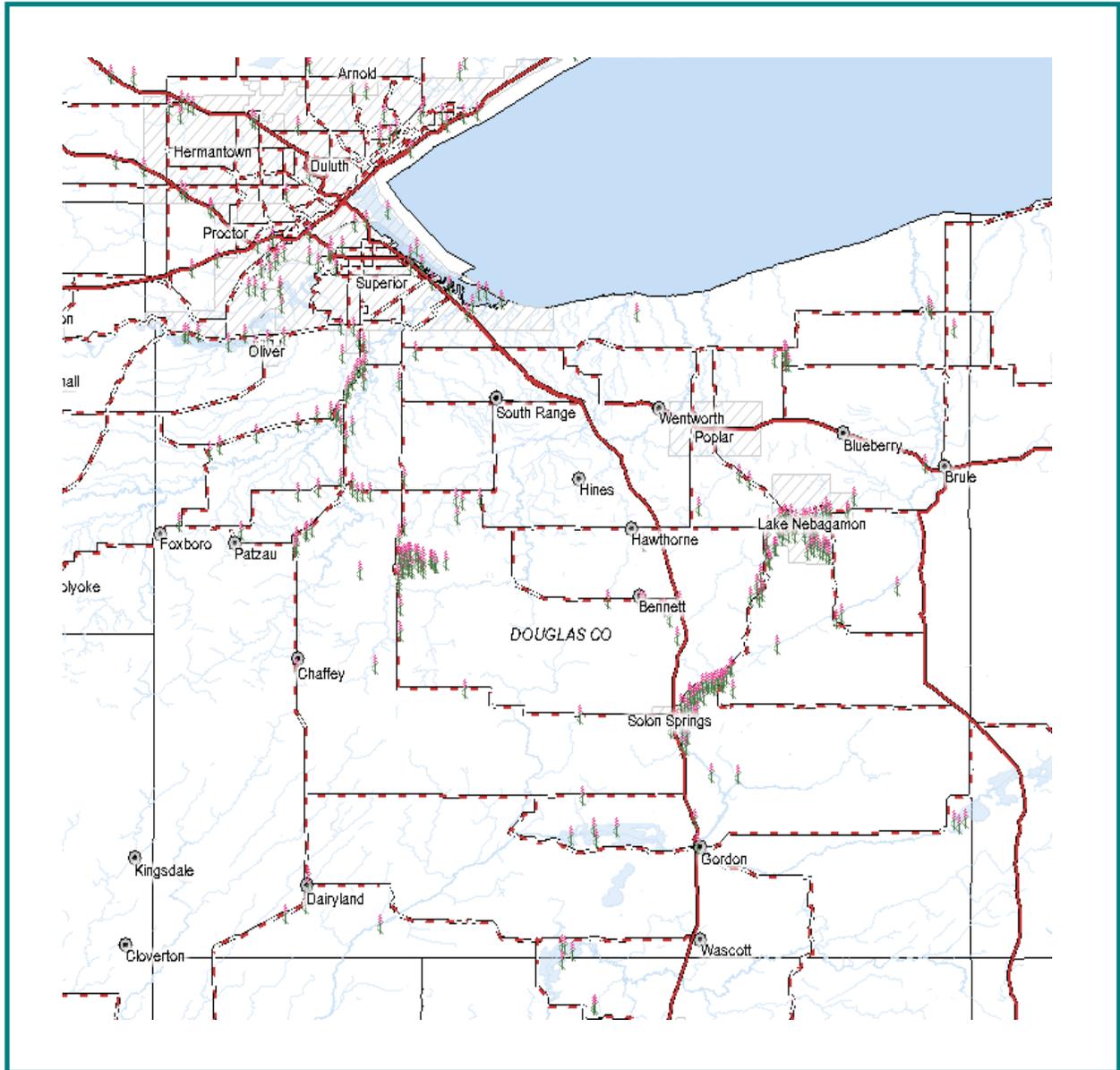
3 Well known established population not shown on WDNR website.

4 Discovered and verified by WDNR in summer 2009.

5 Discovered immediately downstream of Gordon Dam - Scott Peterson. Personal correspondence. December 3, 2009. Unknown if verified by WDNR.

All others verified by WDNR and listed on web. <http://dnr.wi.gov/invasives/aquatic/lakesrivers/index.asp?County=Douglas>

Figure 3 GLIFWC Map of Purple Loosestrife in Douglas County, Wisconsin



Source: (<http://www.glifwc.org/>)

ADDRESSING AIS IN DOUGLAS COUNTY

Introduction

In 2008, the Douglas County Land & Water Conservation Department sought and received a grant from the Wisconsin Department of Natural Resources to embark on a county-wide effort to combat the spread of aquatic invasive species. Citizens were already working on AIS issues and were looking for support from the County. The County proposed to create a network for collaborating and streamlining AIS prevention and control efforts by creating a strategic plan.

The County contracted with an AIS coordinator for one year to lead the planning effort. Citizens with interests in both the Lake Superior and St. Croix basins were invited to participate in a Douglas County AIS Strategic Plan Workgroup (AIS Workgroup). The kickoff meeting was held on August 20, 2008. Twenty-one people representing Douglas County waterways groups, Wisconsin Conservation Congress, Douglas County Fish & Game League, University of Wisconsin, Douglas County Board of Supervisors, and Wisconsin Department of Natural Resources accepted the invitation. Nine workgroup meetings were held to identify priorities for the County and assist in writing the DC AIS Strategic Plan (DC AIS Strategic Plan). The role of the AIS Workgroup was to help direct the DC AIS Strategic Plan by bringing their expertise about AIS into the County process.



EWM, Photo by Frank Koshere

The AIS Strategic Planning Process

“A strategic planning process is merely a way of helping key decision makers think and act strategically” (Bryson 1988).

A strategic plan determines the nature of a project or organization and provides a direction for it to follow over a short time frame. A strategic plan must be dynamic due to a changing, unpredictable environment, it must lead to action and it must be updated frequently.

The AIS Workgroup started off the planning process by brainstorming about issues that were important to them and by answering questions about their wants and needs. Some of the highlights were that they wanted simple “recipes” or templates for dealing with grants and early detection, a “go to” person and website, widespread education and networking, programs for recruiting non-active citizens, programs for monitoring plants, multi-water body or watershed approaches and a message that says we’re all in this together.

When asked what worked and what didn't, some felt the volunteer inspection programs were good and people were motivated, but they were hard to organize. They also felt we lacked one point of contact at the county and state levels which lead to confusion about who to contact about what and when. They didn't think boat washing was feasible because it is too expensive and that photo stations at boat landings didn't work as well as face-to-face inspections since it was also a great opportunity to educate boaters. They thought the Clean Boat Clean Water watercraft inspection program worked great. The quality of collaborating and communicating with agencies was mixed and some thought there was room for improvement in some areas.

Armed with their own experiences and commitment to protecting natural resources in the County, the Douglas County AIS Strategic Plan Workgroup members drafted the following mission, values, goals, objectives, activities and implementation budget and timeline which constitute the Douglas County AIS Strategic Plan.

THE DOUGLAS COUNTY AIS STRATEGIC PLAN



Bois Brule River, Photo by A. Eliot

Mission

States the purpose of the workgroup.

To develop a plan of action that creates a legacy for addressing the introduction, control and spread of aquatic invasive species in all Douglas County waterways.

Values

States the unique principals that underlie and guide the workgroup.

We all work together and care about common goals for Douglas County. The Public Trust Doctrine is promoted and we understand that waters of the State belong to everyone. Our actions benefit everyone and are not for personal interests. We strive to be stewards of the resource and connected ecosystems by acting locally but thinking on a watershed level. We promote open access and participation by opening our meetings to the public, keeping our actions transparent, and having an open door policy to committee members and the AIS coordinator.



Upper St. Croix Lake, Photo by A. Eliot

Vision



Allouez Bay, Photo by A. Eliot

States the workgroup's vision for the county.

In Douglas County:

Aquatic invasive species (AIS) are not spread across Douglas County lines or between County waterways;



Existing AIS infestations are eradicated or controlled and are not negatively impacting the ecological health of our waterways;



Awareness is raised in the general public about the ecological, recreational, and private and public economic impacts of AIS;



All waterway users understand how AIS is dispersed and what best management practices they should use to prevent its spread;



AIS research is supported and encouraged;



All citizens recognize that protecting and restoring healthy ecosystems can minimize AIS impacts;



All citizens understand that using best management practices along the shoreline and in the watershed will help support a healthy ecosystem;



Information provided by the County is widely accessible and easy to understand;



Education and monitoring activities are open to all users and encourage connections between riparian owners and visitors;



Users can identify AIS and know who to notify when AIS is found;



The county, towns, and villages participate in the protection of water resources and understand its ecological, recreational, and economic importance to the County, northern Wisconsin and the region.

Goals and Objectives Summary

Goals – Describes the final state desired.

Objectives – Describe how to reach the goal or final state.



Goal 1: Aquatic invasive species (AIS) infestations already existing in the county are controlled or eradicated and prevented from spreading; new AIS infestations are prevented.

- Objective 1a: Support and encourage watercraft inspection programs at landings in the county.
- Objective 1b: Provide AIS education at boat landings.
- Objective 1c: Promote citizen action and assistance to detect, control or, where possible, eradicate known AIS infestations. Promote and support early detection and rapid response.
- Objective 1d: Support federal, state or county legislation that strengthens AIS transport laws.
- Objective 1e: Use current research, best management practices, and best technologies to minimize AIS threats, control and manage infestations, and restore biodiversity in aquatic communities.
- Objective 1f: Support and encourage biological and water quality monitoring on county waterways.

Goal 2: Communication between lake and river residents, watershed groups, visitors, and other waterway organizations is improved and education is provided for all users.

- Objective 2a: Promote and support AIS education to raise awareness about AIS issues in the county with all audiences.

Goal 3: The county and municipalities participate in the protection of water resources and understand how critical the resource is to the county, municipalities, northern Wisconsin and the region.

- Objective 3a: The DC Land and Water Committee assumes responsibility and provides supervision and direction for implementation of the strategic plan.
- Objective 3b: Seek inter-governmental cooperation and assistance.
- Objective 3c: Seek inter-departmental cooperation and assistance from Douglas County departments, such as forestry, highway, tourism, chambers, economic development, law enforcement, planning and zoning, county extension, etc.

Goal 4: Sustainable funding for AIS research, monitoring, planning, restoration and education activities are adequately provided by private, local, county, state, federal, and tribal sources.

Objective 4a: Pursue potential funding sources and partners to implement and meet the goals and objectives in the strategic plan.

Objective 4b: County participation improves the likelihood of getting AIS funding.

Activities List and Budget Estimate

The Douglas County AIS Strategic Plan: Activities List and Budget Estimate (AIS Activities and Budget) table was created to provide details on how the County will achieve its AIS goals. The table identifies activities, benchmarks (or steps to follow), timelines, lead executors, potential partners, and cost estimates for each objective. The AIS Activities and Budget table should be considered an approximation of what needs to be done. Although an attempt was made, a list alone cannot capture all of the nuances or ideas discussed by AIS Workgroup. Since the DC AIS Strategic Plan will rely on funding sources outside of the County, it may be necessary to adapt the activities, timelines or cost estimates to meet grant or funder requirements. It may also be necessary to adjust the benchmarks to be in line with new information that becomes available. The AIS steering committee that would be created under the DC AIS Strategic Plan would be able to direct the project as needed.

Activities Summary:

Objective 1a: Support and encourage watercraft inspection programs at landings in the county.

1. Develop a Watercraft Inspection Plan for waterbodies and landings in the county.
2. Develop and maintain a County watercraft inspection/monitoring program.
3. Coordinate landing inspections with neighboring counties, City of Superior, WI DNR, WI Sea Grant watercraft inspectors, and DNR Boat Ambassadors.
4. Maintain an inventory of annual activity at landings both in and outside Douglas County.
5. Develop a simple procedure for sharing AIS landing reports.

Objective 1b: Provide AIS education at boat landings.

1. Provide appropriate AIS signs/kiosks at all landings. Signs should indicate who to contact if AIS is found.
2. Develop and distribute information that shows which County waterways contain AIS.
3. Provide training to volunteer CBCW landing inspectors.

Objective 1c: Promote citizen action and assistance to detect, control or, where possible, eradicate known AIS infestations. Promote and support early detection and rapid response.

1. Provide AIS volunteer monitoring training using existing WDNR protocols.
2. Monitor county waterways and wetlands to detect and control AIS.
3. Develop an easy-to-follow, uniform county policy on control & eradication strategies for known AIS infestations.
4. Provide education and information about the County's AIS policies.
5. Assist lake groups with rapid response and established population control projects.

Objective 1d: Support federal, state or county legislation that strengthens AIS transport laws.

1. Encourage the Douglas County Land & Water Conservation Committee to sponsor local resolution to prohibit transport of all plants and animals in Douglas County.
2. Draft/introduce a bill that would go before the Wisconsin Conservation Congress to revise/amend state law.
3. Encourage citizens to contact their county board supervisors to discuss and support the local AIS transport resolution.

Objective 1e: Use current research, best management practices, and best technologies to minimize AIS threats and manage infestations.

1. Review and compile information on scientific literature in order to better understand how AIS is spread and how it impacts county waters.
2. Develop and begin implementation of a Douglas County AIS Research, Monitoring, and Restoration plan, including best management strategies.

Objective 1f: Support and encourage biological and water quality surveys on county waterways.

1. Continue Implementation of the research, monitoring, and restoration plan.
2. Address data storage in the county.
3. Support and encourage professional surveys proposed by scientists at universities, agencies, and other organizations.
4. Partner with existing area Self-help and Water Action Volunteer lake and stream volunteer monitoring programs.
5. Partner with colleges and high schools to develop student (capstone) monitoring projects.

Objective 2a: Promote and support AIS education to raise awareness about AIS issues in the county with all audiences.

1. Develop and conduct an education campaign to disseminate county AIS information.
2. Invite news organizations to county sponsored workshops and presentations.
3. Collaborate with Douglas County Fish and Game League, UWEX, DCALS, lake districts, FOTSCH, DNR, and other local groups on education and distribution of information and materials.
4. Recruit new lakes to form waterway associations
5. Participate in and broaden existing networks sharing information about AIS in our region

Objective 3a: The DC Land and Water Committee assumes responsibility and provides supervision and direction for implementation of the strategic plan.

1. The DC Land and Water Committee convenes an AIS steering committee to advise, periodically review, and help achieve the goals, objectives and activities in the strategic plan.
2. Contract with an AIS coordinator to implement the plan.

Objective 3b: Seek inter-governmental cooperation and assistance.

1. Encourage local units of government to identify AIS as a topic for Superior Days.
2. Demonstrate to the towns the importance of healthy lakes and streams to the local economy.
3. Encourage towns to direct ATC and other funding and efforts toward water resources and AIS.

Objective 3c: Seek inter-departmental cooperation and assistance from Douglas County departments, such as forestry, highway, tourism, chambers, economic development, law enforcement, planning and zoning, county extension, etc.

1. Identify ways to collaborate and interact with other county departments.

Objective 4a: Pursue potential funding sources and partners to implement and meet the goals and objectives in the strategic plan.

2. Seek annual funding to contract with an AIS coordinator.
3. Identify funding sources and seek partners/sponsors to install and maintain custom AIS boat landing signs/kiosks.
4. Identify funding sources to support education, restoration, research, and monitoring efforts.
5. Identify funding sources for long-term watercraft inspection programs.

Objective 4b: County participation improves the likelihood of getting AIS funding.

1. County coordinates fund seeking efforts among waterway groups.

2. County maintains a list of grant sources and the requirements for do-it-yourselfers
3. County is involved in the grant writing process through grant writing assistance

Budget Summary:

If the entire DC AIS Strategic plan was funded, two AIS Coordinators, one AIS Research Coordinator, and forty seasonal landing inspectors would be hired under contract to work with local, state and regional partners to accomplish the following activities. The estimated cost to complete the entire DC AIS Strategic Plan over three years is \$980,775.00. Total estimated costs for each year includes expenses for labor, materials and travel.

Total Year 1 =	\$547,075
Total Year 2 =	\$218,150
Total Year 3 =	\$215,550
Total Plan Cost =	\$980,775

Forty-nine percent (\$480,000) of the budget would pay for seasonal landing and lake inspectors at forty Douglas County public landings for three years. Thirteen percent (\$127,200) of the budget would be used to fund a Douglas County focused research and monitoring project for one year. The AIS Research Coordinator would be expected to find additional funding to support future research. The remaining thirty-eight percent of the budget (\$373,575) would cover all of the other activities and materials over three years.

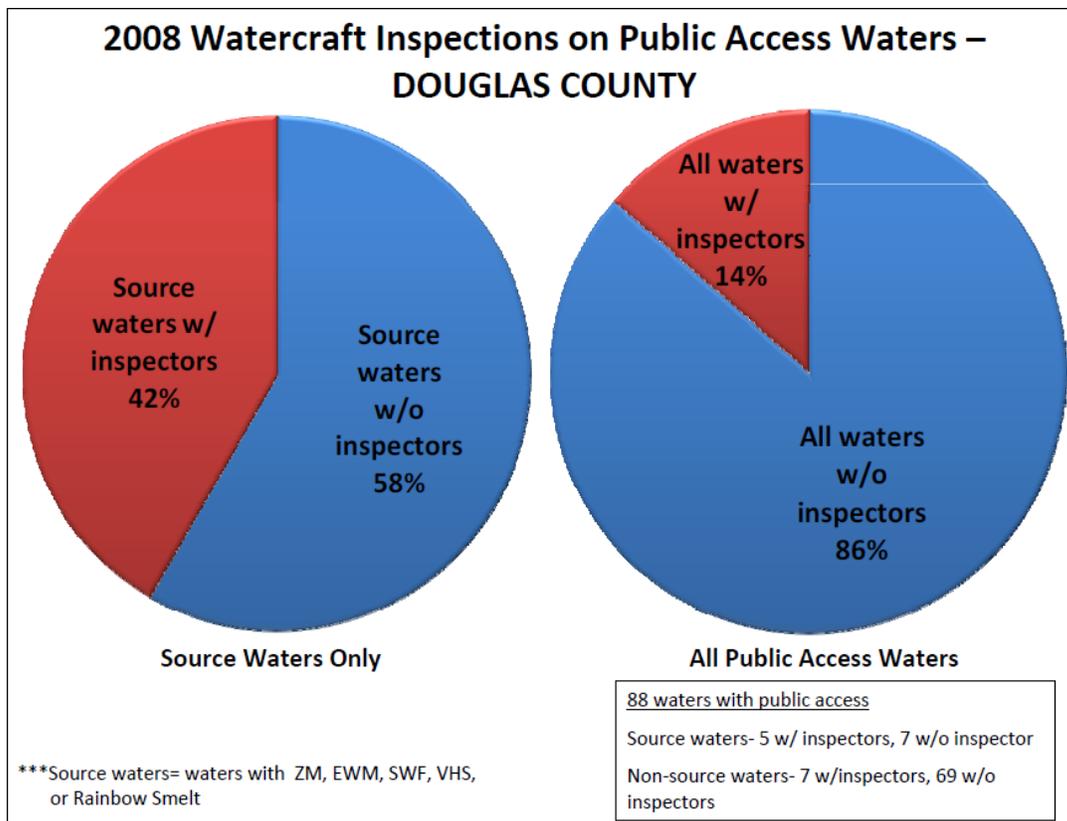
*The complete Douglas County AIS Strategic Plan: Activities List and Budget Estimate can be found in Appendix B

HIGHLIGHTS AND OPPORTUNITIES

Clean Boats Clean Water Program

Research has shown that watercraft inspections play an important role in helping contain AIS in affected waterways and preventing the spread of invasive species to new waters. Since 2004, watercraft inspection has been a significant part of Wisconsin’s aquatic invasive species (AIS) prevention efforts. The University of Wisconsin Cooperative Extension Clean Boats, Clean Waters (CBCW) is a volunteer watercraft inspection program designed to prevent the spread of aquatic invasive species by visually inspecting equipment and by educating boaters about AIS at boat landings. The CBCW is used successfully by active lake groups and to date, 184 volunteers have been trained to inspect landings on those active lakes. With funding assistance from the WDNR six Douglas County waterways have hired boat inspectors. In spite of this effort, however, 86% of all waters in Douglas County with public access do not have a watercraft inspector.

Figure 4 – 2008 Watercraft Inspections on Public Access Waters in Douglas County



In 2009 a state partnership with Workforce Development created a "green jobs" pilot program and allowed Douglas County to hire an inspector to rotate between twenty-one landings in 2009. Fifteen of those landings did not have an organized CBCW program. Placing inspectors at new landings helped reach many people who had never heard of AIS before (Appendix F - CBCW Behavior Trends 2004-2009). Workforce Development paid the inspector and there was no cost to the County.

Statewide watercraft inspections are conducted by nine Wisconsin Water Guards. WI Water Guards are deputy wardens hired exclusively by the WDNR to help stop the spread of invasive species. The program started in May 2008 to focus solely on educating and enforcing rules to prevent boaters and anglers from accidentally spreading invasive species and diseases. The University of Wisconsin Sea Grant Institute also hires inspectors to work on the great lakes landings.

Maintaining CBCW inspection programs at all landings with public access was identified as a very high priority by Douglas County. There are fifty-three state-owned landings on lakes and rivers in Douglas County (See Figure 1). Coordinating schedules with WI Water Guards, UW Sea Grant and volunteers is also very important.

Citizen Lake Monitoring Network

The Citizen Lake Monitoring Network (CLMN) teaches citizen volunteers how to monitor lakes. Volunteers in this program are shown how to monitor one or more physical, chemical or biological parameters that can provide information about the health of their lake. Volunteers can choose to monitor water clarity (using a Secchi disk); collect chemistry, temperature, and dissolved oxygen data; or identify and map native plants. Thirty-one volunteers have been trained to monitor water quality in Douglas County lakes. The information collected by the volunteers is used by WDNR biologists, lake associations and other interested individuals. WDNR and UWEX staff provides volunteers with the necessary equipment and training.



Citizen Lake AIS Monitors

A relatively new program in the CLMN is teaching Citizens Lake AIS Monitors how to use standard protocols to identify and map aquatic invasive species across their entire lake. This program teaches how to identify and look for EWM, curly leaf pondweed, rusty crayfish, freshwater jelly fish, mystery snails, adult zebra mussels and spiny waterfleas. This program is intended to go beyond the inspections done by



CBCW volunteers, who are taught to watch for AIS at landings. The Citizen Lake AIS Monitor program is designed for individual lake owners who want to monitor in front of their lake homes or for groups who want to adopt and monitor all or part of a lake. Citizen Lake AIS Monitors can borrow crayfish traps, plankton nets and other equipment purchased under the current grant for Douglas County. WDNR and UWEX staff assist with providing other necessary equipment, training manuals and datasheets. In 2009, eight new AIS volunteers were trained at a Douglas County workshop held in Solon Springs. Monitoring lakes for AIS is essential for detecting and controlling new populations early, before they have had a chance to spread. Recruiting, training and maintaining a Citizen Lake AIS Monitoring Program is a priority identified in the DC AIS Strategic Plan.

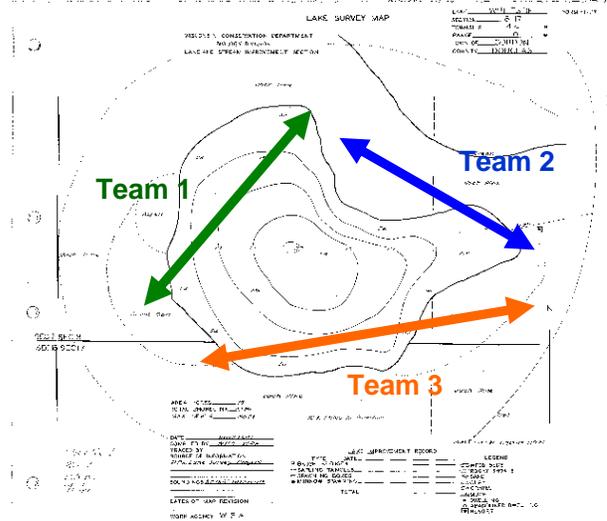
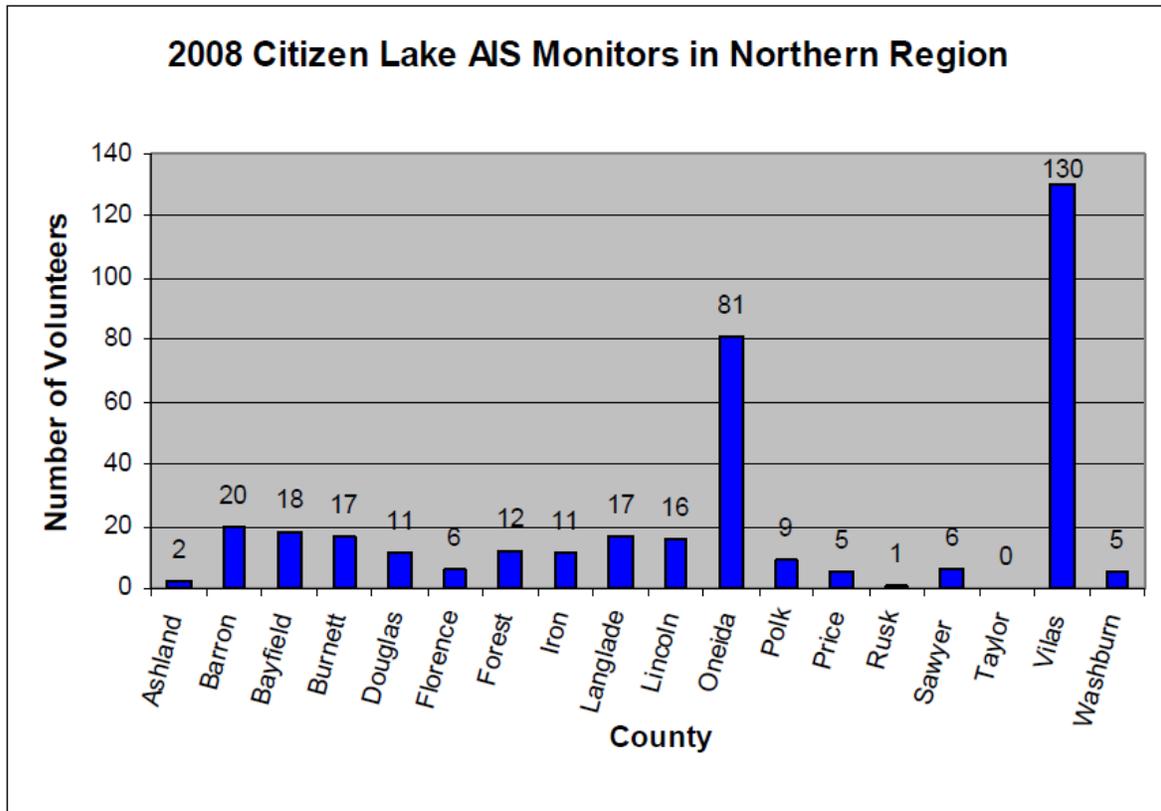


Figure 5 – 2008 Citizen Lake AIS Monitors in Northern Region



Professional Monitoring

Since change is rapid and scientists do not fully understand all of the factors that threaten waterways, it is critical for Douglas County to encourage monitoring within County lakes. Under the current WDNR grant, Douglas County was able to conduct AIS surveys on eight lakes in 2008 (See Appendix C) and eight lakes in 2009 (See Appendix M). In 2009, Douglas County used priorities outlined by WDNR and proximity to AIS source lakes to generate a list of lakes to monitor. WDNR and Citizen AIS Monitoring protocols were used and no new AIS were observed.

Routine AIS monitoring provides information about the status of AIS in the County, however, the State does not have the staff resources to monitor large numbers of lakes. The DC AIS Strategic Plan will enable the County to continue to increase AIS monitoring on lakes in the County.



2009 plankton samples from Douglas County Lakes,
Photo by J. Horky

Research

Research conducted in other areas may or may not pertain directly to the situation that exists in Douglas County. In particular, does existing science inform us about how to prevent new AIS from spreading to inland waters from Lake Superior? It only took 4 years for spiny waterflea to spread throughout the Great Lakes and round gobies have adapted to living in all of the Great Lakes and the Chicago River. How fast can AIS spread; how vulnerable are Douglas County waterways to new AIS; which AIS pose the greatest risks to County lakes; what environmental conditions favor those AIS species; is there effective non-chemical AIS control strategies that we can promote in the County? These are all important questions the County is asking. The County does not have the resources to search the literature to identify and answer their most important questions or to design research projects themselves, but they can encourage and support researchers who will conduct work in the County. The DC AIS Strategic Plan will



2009 DC Plankton Sampling,
Photo by A. Eliot

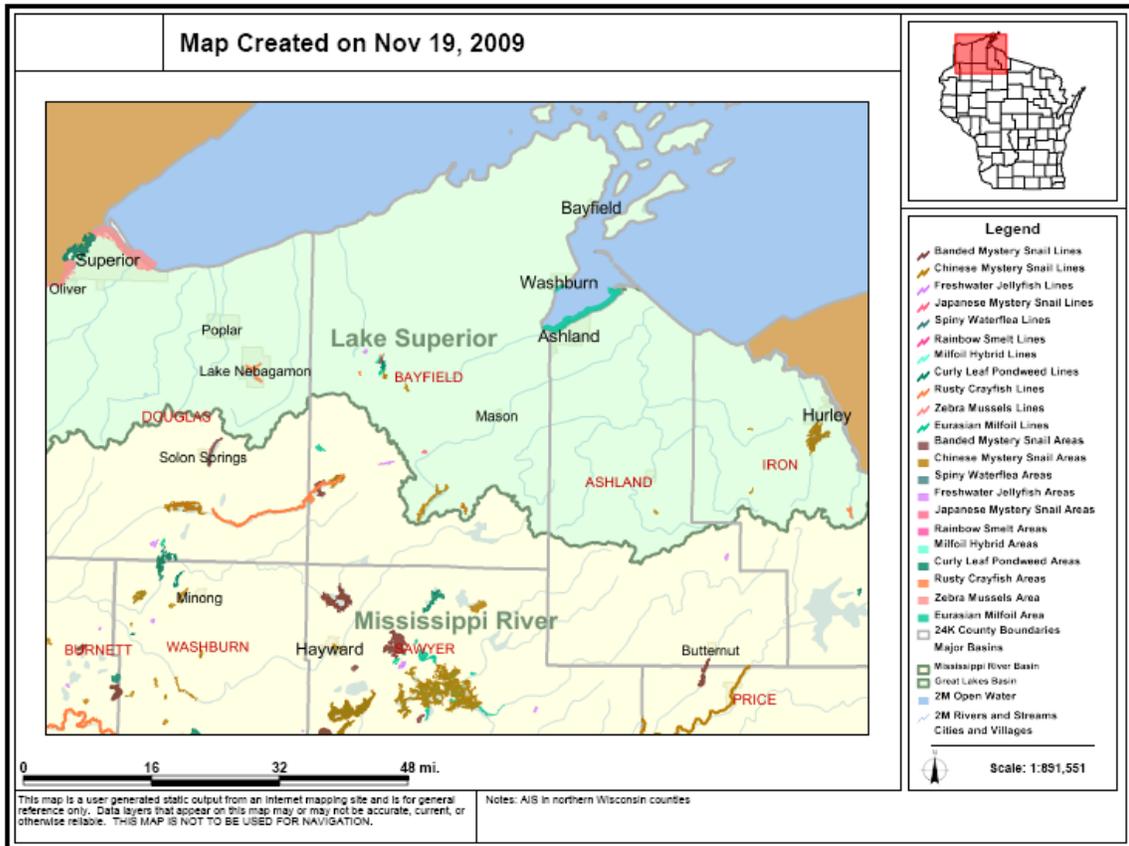
allow for a full literature review so that local research will mesh with larger projects such as the Great Lakes Panel on Aquatic Nuisance Species - Aquatic Invasive Species Research Priorities for the Great Lakes – 2009 (See Appendix I).

Storing and Retrieving Douglas County Data

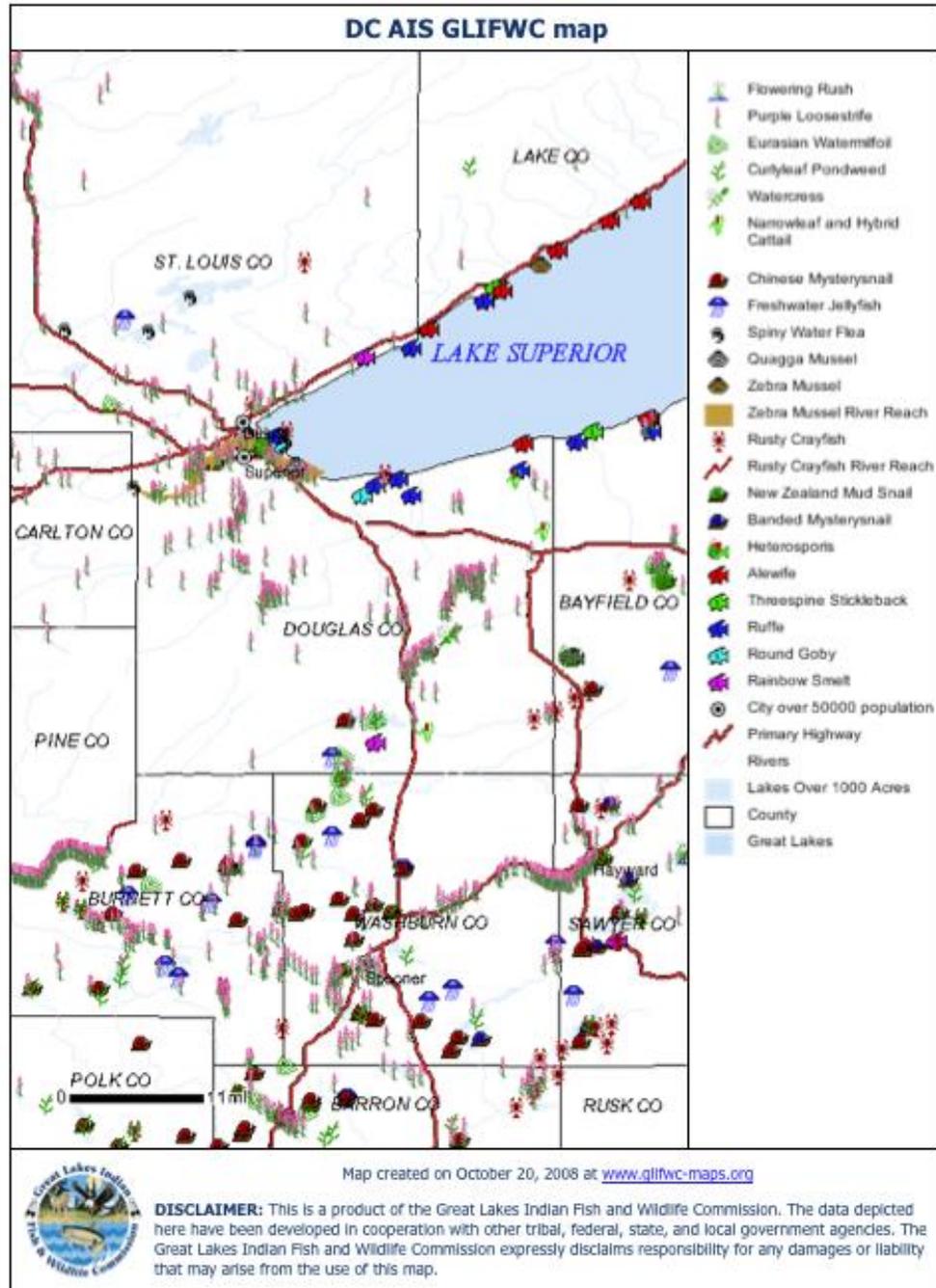
Currently, Douglas County does not have its own AIS database. Data collected using CBCW or AIS monitoring protocols are entered in the WDNR Surface Water Integrated Monitoring System (SWIMS) database system. AIS data collected by Douglas County AIS coordinators in 2009 was completed using volunteer methods therefore it could also be entered into the SWIMS database. A user ID and password is required to enter data so, as a result, only trained volunteers have access to SWIMS. The SWIMS database is mainly used by WDNR staff to store surface water, sediment and aquatic invasive species data for use in its management decisions. A DC AIS Strategic Plan activity is to explore the feasibility of creating a Douglas County AIS database in order to store and provide all of the AIS data for the county in one place. The DC AIS Strategic Plan does not want to create a database if data can be stored in and accessed from an existing database.

The following AIS databases or map viewers are available to the public over the web.

- The WDNR Surface Water Data Viewer Web Mapping Application (http://www.dnr.state.wi.us/org/water/data_viewer.htm) is an interactive mapping tool providing primarily water-related data that includes AIS.



- The Great Lakes Indian Fish & Wildlife Commission (GLIFWC) also maintains a website for viewing invasive species in Michigan, Minnesota and Wisconsin (<http://www.glifwc.org/>). The objective of the GLIFWC website is to “provide a communications infrastructure to facilitate and enhance regional coordination of natural resource management efforts, with an emphasis on invasive species”. Data on the website is contributed by GLIFWC, Lac Courte Oreilles Natural Resource Department, Wisconsin DNR, Michigan DNR, Minnesota DNR, Minnesota Department of Agriculture, National Park Service, Sea Grant, The Nature Conservancy, U.S. Forest Service, and U.S. Geological Survey.



AIS Early Detection and Response on Inland Lakes

The St. Croix (Gordon) Flowage and Cranberry Lake/Flowage detected Eurasian watermilfoil (EWM) at their public landings in 2007. Citizens acted quickly to monitor and control the pioneering populations. They remain committed to locating and controlling EWM and have received funding for their efforts (see Douglas County AIS Projects below). In 2009, a fragment of EWM was found floating near Amnicon Lake's boat landing.



Photo by Frank Koshere

EWM was not detected in two follow up random surveys of the lake, but additional monitoring will be needed to determine if EWM populations are present. It is possible the fragment was carried in on a boat or trailer using the landing. WDNR grants are available for identifying and removing small pioneer populations of aquatic invasive species in the early stages of colonization, or re-colonization. Assisting waterway groups with the grant process, contracts, surveys and control efforts was identified as a high priority for the Douglas County AIS Coordinator. The AIS coordinator will also need to be able to lead these efforts when new populations of AIS are found on waterways without organized waterway groups.

Chemical Control and Eradication Policy

The Douglas County Board of Supervisors adopted a Pesticide Ordinance that requires the County to refrain from using pesticides on its own property (See Appendix J). The County recognizes that the use or misuse of pesticides may have profound affects upon indigenous flora and fauna, surface and ground water, as well as unintended effects upon persons frequenting treated areas for recreational or other purposes.



Mechanical removal of EWM, Photo by Frank Koshere

The use of chemicals to control AIS seems to be a standard tool permitted throughout the State and recent projects in the County have included some aspect of chemical control as well.

Projects on non-county property are allowed to use chemicals as permitted by the State. However, as a general rule, the County does not support or encourage the use of chemicals and does not provide assistance for chemical control projects from its Environmental Reserve Fund. The DC AIS Strategic Plan will enable the County to fully develop a clear policy for dealing with controlling AIS. The guidance will identify best available technologies and methods for AIS control that also meet the intent of the County's policy to limit chemical use. The County will review current research, including a study conducted on the Eagle River Chain of Lakes in Vilas County evaluating the toxicity risk of using 2, 4-D to control EWM (See Appendix F).

Legislation

The Wisconsin Chapter NR 40 rule classifies invasive species into 2 categories: "Prohibited" and "Restricted". With certain exceptions under each category, the transport, possession, transfer and introduction of Prohibited or Restricted species is banned. The County supports this rule and other legislation that strengthens AIS transport laws.



Wisconsin will start regulating oceangoing ships arriving in its Great Lakes waters at the start of the next shipping season, Feb. 1, 2010, to stop the flow of invasive species arriving in their ballast water. Douglas County adopted a resolution in 2008 (See Appendix G) to support federal regulation of ballast water.

Due to the unique AIS threat the Great Lakes poses to Douglas County's Lake Superior basin and inland resources, the County also passed a resolution in 2008 requesting that Wisconsin create an AIS mitigation fund to help them deal with AIS threats (See Appendix I).

The DC AIS Strategic Plan would enable the County to meet with local enforcement and other counties with transport laws to explore the feasibility of having a local AIS transport law in Douglas County. It would also enable them to continue seeking the creation of an AIS mitigation fund by the State.

Local Partnerships

Douglas County recognizes that it will take strong partnerships with local units of government, local and state organizations, schools, and its own departments to achieve its AIS goals. They also know that working on AIS issue together will help the County raise its capacity for protecting resources while at the same time creating jobs for its citizens. They want to engage others by establishing regular contacts and supplying important information about AIS and its

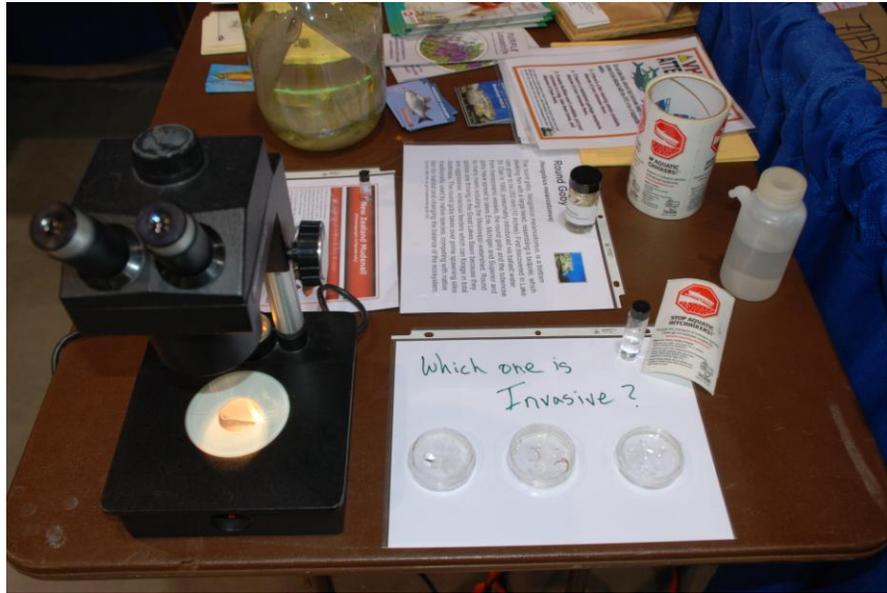


impact on the ecology and economy of Douglas County. The DC Strategic Plan will allow the County to form special task groups and begin making important connections with other stakeholders in the County.

AIS Education and Outreach

Monitoring and controlling AIS is needed to protect County waterways, however, the County places a strong emphasis on prevention. It is here that citizen's play a key role in preventing invasive species from arriving in the first place. A strong

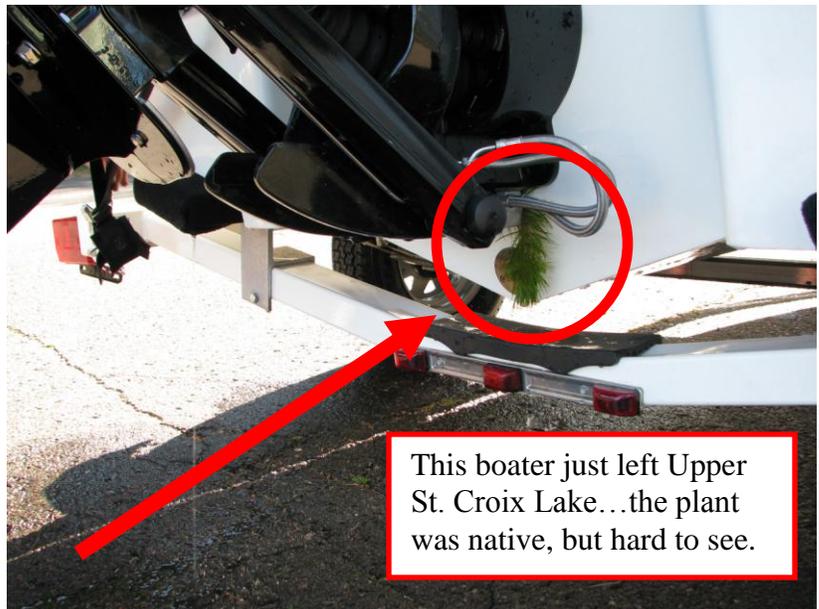
outreach and education campaign will be needed to prevent AIS from spreading. There are many partners, programs and resources available to help the County with this effort. The County will use and adapt existing materials, campaigns and venues to help educate all Douglas County audiences about AIS. It will also participate in the State AIS Prevention Strategy and help provide messages to targeted groups in the County, such as the ones identified by the WDNR below.



AIS Display 2009 DC Fish & Game League Sport Show, Photo by A. Eliot

Boaters, Paddlers, and Anglers

- INSPECT your boat, trailer, and equipment and
- REMOVE any attached aquatic plants or animals (before launching, after loading, and before transporting on a public highway).
- DRAIN all water from boats, motors and all equipment
- DON'T MOVE live fish away from a waterbody.
- DISPOSE of unwanted



bait in the trash.

- BUY minnows from a Wisconsin bait dealer. Use leftover minnows only under certain conditions*

Seaplane Pilots

- INSPECT your seaplane and equipment
- REMOVE any attached aquatic plants or animals (before landing or taking off)
- DRAIN all water from seaplane or equipment.

Water Gardeners or Pond Owners

- Never transplant water garden plants into lakes, streams, wetlands or stormwater ponds.
- Never release crayfish, fish or other animals into lakes or streams.
- Do not purchase prohibited and restricted species and whenever possible purchase native plants and animals.*
- Check your plant orders for unwanted and potentially invasive hitchhikers (seeds, plant fragments, snails, insects, or fish).
- Be aware of the regulations regarding possession, transport and sale of invasive plants and animals.
- Properly dispose of unwanted plants and animals.



Nursery owners

- Do not purchase or sell invasive plants or animals that are restricted or prohibited in Wisconsin.*

Aquarium Enthusiasts or Teachers

- Do not purchase invasive plants or animals that are restricted or prohibited in Wisconsin.
- Never transplant aquarium plants into lakes, streams, wetlands or stormwater ponds.
- Never release live crayfish, fish or other animals into lakes and streams.
- Properly dispose of unwanted plants and animals.

*See: <http://dnr.wi.gov/invasives/aquatic/action/> for detailed information.

AIS EFFORTS IN DOUGLAS COUNTY

Local waterway groups have been independently working on lake protection projects for many years in Douglas County and six have received WDNR grants to work on AIS issues in the County. A sponsoring organization must provide funding or volunteer services or both to be eligible for the grants. Sustaining volunteers and funding can be difficult for small organizations, particularly because often only a handful of people lead the effort. The number of waterway organizations in the state is growing; however Douglas County has fewer lake groups than some of its neighboring counties.

In spite of the relatively low number of organizations, Douglas County has a high number of trained CBCW watercraft inspectors compared to other counties throughout the state. This demonstrates the commitment by local citizens to protect Douglas County lakes from AIS.

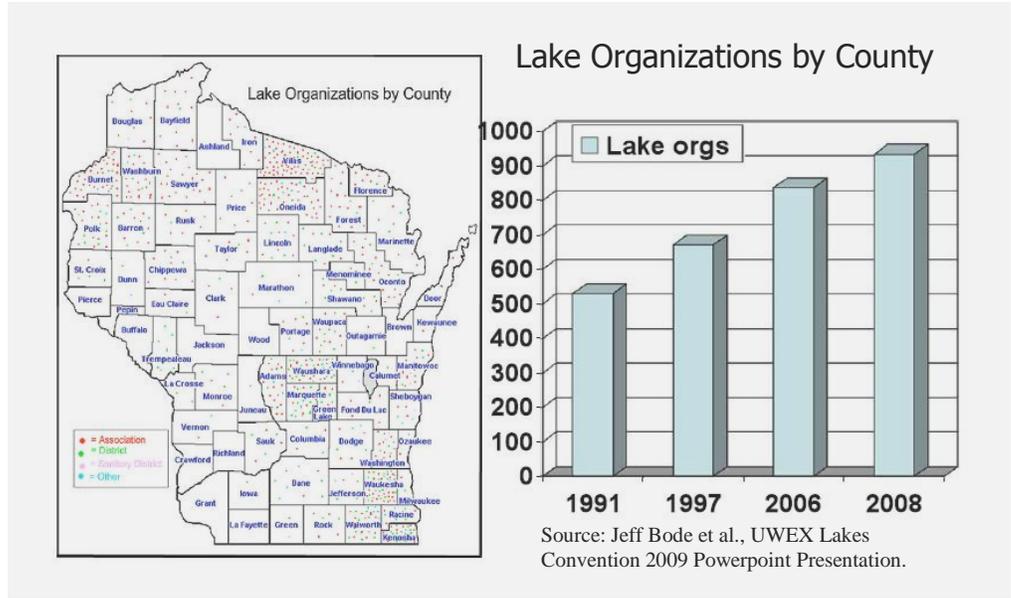
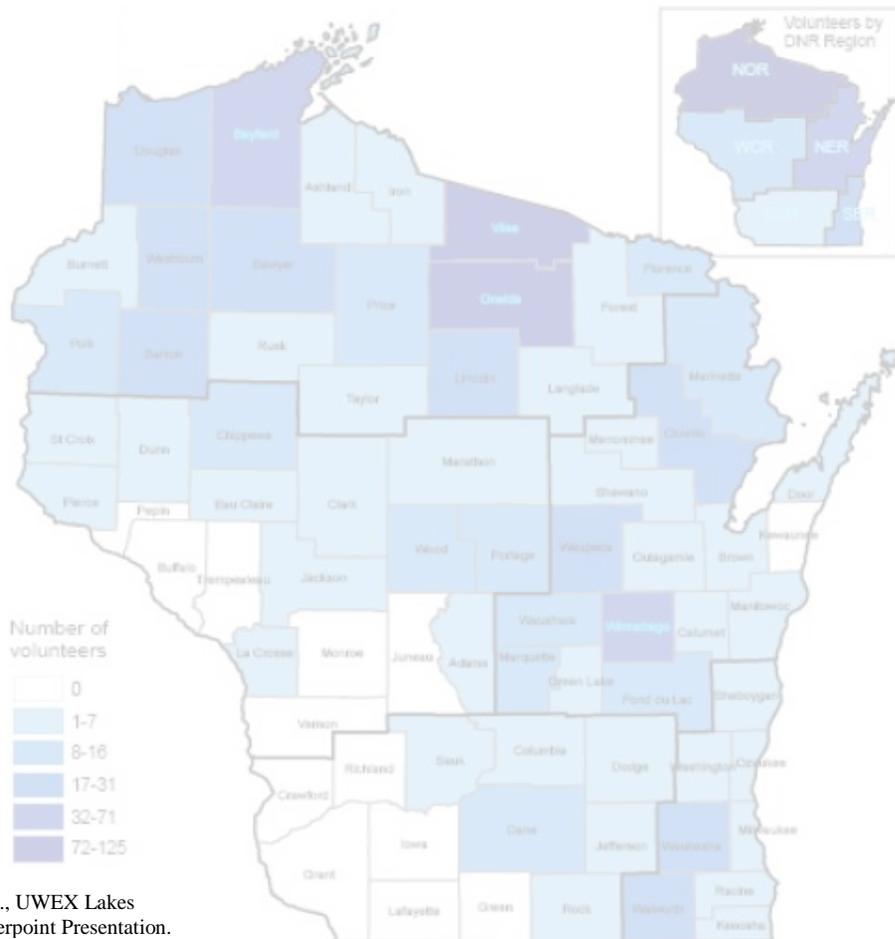


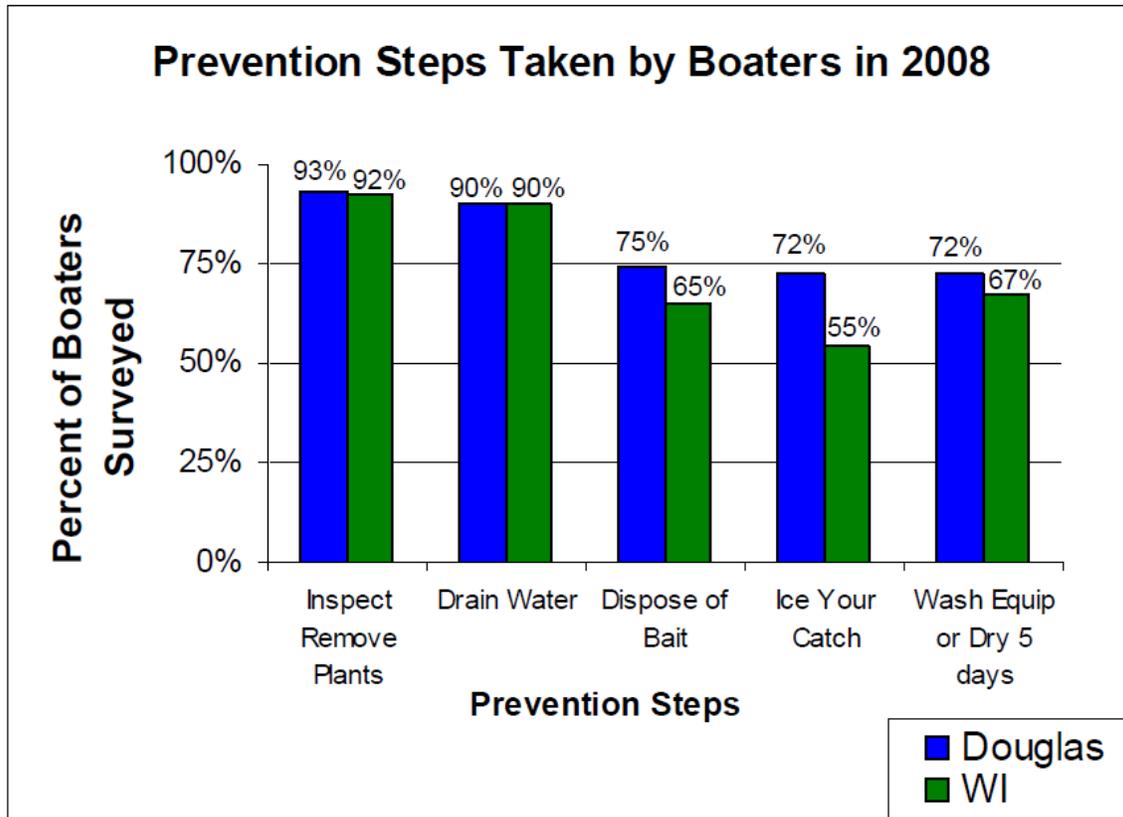
Figure 6 - Number of Volunteers in Wisconsin Counties



Source: Jeff Bode et al., UWEX Lakes Convention 2009 Powerpoint Presentation.

Watercraft inspector surveys show that the percentage of Douglas County boaters taking action steps to prevent the spread of AIS is equal to or higher than the percentage of boaters statewide. This is another indicator of the success of local watercraft inspection and education activities in the county.

Figure 7 – Prevention Steps Taken by Boaters in 2008



Source: Clean Boats, Clean Waters: 2008 Watercraft Inspection Data Report

AIS Projects in Douglas County

Recovery-funded "green jobs" pilot program: The Wisconsin Office of Recovery and Reinvestment, the Department of Workforce Development, and the Department of Natural Resources provided funding to employ 55 young adults at boat landings across the state to combat invasive species in 2009. Douglas County was able to participate in the Invasive Species Demonstration Project in 2009 with the help of its AIS Coordinator who supervised the watercraft inspector. Douglas County's watercraft inspector rotated between landings on 17 lakes and 3 rivers in the County. He also informed the public about aquatic invasive species, inspected boats, observed boater behavior and entered the information into an online database. Douglas County applied for and received additional

funding from the Northwest Wisconsin Concentrated Employment Program (NWCEP) in Superior, Wisconsin to extend the watercraft inspector's hours. The NWCEP application also enabled the Red Lake Lake Association to hire a youth inspector for Red Lake. Red Lake volunteers supervised the youth over the summer.

Cranberry Lake/Flowage Association was awarded a WDNR grant to sponsor a second Aquatic Invasive Species Rapid Response (RR) project in 2009-2011. They were awarded the first WDNR grant in 2007. The project will monitor and manage a pioneering population of Eurasian water milfoil scattered throughout the lake. Project activities include: aquatic plant monitoring, manual removal of Eurasian watermilfoil, possible chemical treatments with guidance from WDNR, and completion of an Aquatic Plant Management Plan.

Friends of the St. Croix Headwaters was awarded two WDNR grants and started work in 2009 to map invasive species in four AIS corridors (pathways) in Douglas County: St. Croix River from Upper St. Croix Lake to the Gordon/St. Croix Flowage, Lower Ox Creek from Upper Ox Lake to the confluence with the St. Croix River, Eau Claire River from Lower Eau Claire Lake to the confluence with the St. Croix River, and upper segment of the St. Croix River immediately downstream from the Gordon Dam. Purple loosestrife and Curlyleaf pondweed were found in the St. Croix River between Upper St. Croix Lake and the Gordon/St. Croix Flowage; Rusty crayfish were found in the Eau Claire River and several tributaries of Upper St Croix Lake, and Eurasian watermilfoil and Curlyleaf pondweed were found in the St. Croix River at and immediately below the Gordon Dam. Rusty crayfish are suspected to be in the St. Croix River immediately downstream from the outlet of Upper St. Croix Lake, but this has not yet been verified.

Gordon/St. Croix Flowage Association was awarded a WDNR AIS Prevention, Education & Planning grant in 2007 to monitor boat landings, conduct an aquatic plant survey and construct a kiosk. They also administered a WDNR grant awarded to the County in 2007. The 2007 grant funded a rapid response project that focused on eliminating a pioneering population of Eurasian watermilfoil at the Gordon Dam-Douglas County Park boat landing. In 2008, they received an AIS Prevention, Education, & Planning Project WDNR grant to sponsor a continuing AIS prevention and education project including a boat inspection program; training boat monitors; educating public about AIS and prevention; surveys for invasive aquatic plants; conduct a flowage management survey, and a cooperative effort with outside organizations for kiosk support.

The **Lake Minnesuing Sanitary District** was awarded a WDNR grant in 2005 to conduct a watercraft inspection program in accordance with the Wisconsin state "Clean Boats- Clean Waters" program at three landings on the lake and build informational kiosks at each of these landings.

The **Nebagamon Lake Association** in partnership with the **Village of Lake Nebagamon** and Ashland, Bayfield, Douglas, Iron Land and Water Conservation received a WDNR grant to sponsor a one-year watercraft inspection project on Nebagamon Lake.

The Village of Solon Springs was awarded a WDNR grant in 2007 to sponsor an AIS project on Upper St. Croix Lake which includes monitoring of boat launches by boat inspectors; educating boaters about AIS and prevention; public education through the use of trained volunteers going door to door informing lakeshore property owners about AIS; placing articles in newsletters and local newspapers; and presenting AIS information at local meeting of civic and government groups.

Whitefish Lake Conservation Organization was awarded a 2007 WDNR grant to sponsor an AIS prevention education project including a boat inspection program at the public boat landing; to educate boaters about AIS prevention; to further develop an Adopt a Shore Line program; to hold an AIS workshop; to place AIS educational articles in the lake association's newsletter and website; to develop and distribute a local AIS brochure; maintain educational materials at boat landing kiosks; and propose recommendations or regulations to protect the lake resources to the Town of Wascott Comprehensive Planning Committee. They were also awarded WDNR grants in 2004 and 2006 to conduct a Clean Boat Clean Waters (CBCW) watercraft inspection program and increase Aquatic Invasive Species (AIS) education and outreach in the local area.

The Great Ships Initiative (GSI) is an innovative collaboration of top-level officials and key stakeholder groups whose objective is to end the problem of ship-mediated invasive species in the Great Lakes-St. Lawrence Seaway System. The near-term objective of the GSI is to significantly accelerate research, development and implementation of effective ballast treatment systems for ships that visit the Great Lakes from overseas. The University of Wisconsin-Superior's Lake Superior Research Institute and the University of Duluth-Minnesota's Natural Resources Research Institute are among other research groups providing critical expertise and implementation services to GSI's research activities. The research facility is located in Superior, Wisconsin.

There is an increased risk of spreading AIS to Douglas County inland waters because of their proximity to the Duluth-Superior port; however, Douglas County also benefits from the transportation industries jobs. Research and development for the shipping industry is far beyond the scope of Douglas County and therefore it supports the GSI efforts to prevent AIS from entering Lake Superior and the other Great Lakes.

Figure 8 - Shipping and Ballast Water Issues, Monitoring and Research

Ballast Water

In the past ships used soil and rock as ballast, today they use water because it is easier to load and unload. Prior to the early 1970's ballast water was less of a concern because our harbors were so polluted. Neither native species nor alien species could survive in many US industrial harbors. Similarly, European harbors had poor water quality so there were fewer organisms to be picked up in ballast. As regulations were imposed to clean up our harbors and rivers, these areas became more hospitable for both native and non-native species. Other factors influencing the spread of nonindigenous species were increased trade with countries in the Baltic region and the use of faster, larger ships. Today, many ships can cross the Atlantic in 10 to 14 days.

Ships use ballast to minimize hull stress and to provide proper stability and trim. Ballast helps level out the ship to aid in propulsion efficiency and to aid or allow maneuvering. Ships take on ballast to compensate for fuel consumption or to allow vessels to maintain the same draft when unloading. Taking on ballast also help the vessel ride lower in the water so they can pass under loading rigs or chutes and to reduce rolling and pitching of a ship a seaway. Ballast water is taken up using openings in the hull called sea chests that are located near or on the bottom of the ship. Some ships have higher sea chests to prevent sucking up sediments when pumping on ballast. Piping from the sea chest goes to ballast pumps in the lower part of the ship. Valves control whether the ballast is pumped in or out of the ship. The ballast water is pumped into large cavities within the hull of the ship. On some ships these lie between the cargo hold and the outer hull. Depending on the position of the ballast tank filling or emptying of the tanks may be accomplished using gravity flow. Ships are able to reduce the risk of taking on nonindigenous species, particularly bottom dwelling species by taking on ballast when floating high in the water, well off the bottom. If properly equipped, they can use a sea chest located above the bottom of the vessel. The ship can take on a minimal amount of ballast in order to leave port and similarly, can enter port with the minimum amount of ballast needed for safe navigation. Species or life stages like zooplankton and zebra mussel larvae that live higher in the water column could still be taken onboard through the higher intakes.

There are differences in the way that ocean and great lakes vessels deal with ballast water and cargo. Ocean vessels usually carry cargo on both legs of their trip, and so are designed to carry minimal amount of ballast. They control their draft using cargo as well as ballast. The ballast capacity of oceangoing vessels ranges from 20-40% of their cargo capacity. Ocean going vessels may spend 1-2 days unloading cargo, so there is ample time to pump ballast onto the ship. Great Lakes vessels often carry cargo in only one direction; carrying ballast in the other. Since these ships are not carrying cargo, they have to be able to carry more ballast; they can carry up to 90% of their cargo capacity in ballast water. Great lakes vessels may have very short unloading times (4 hours) and may have, as a result, very high ballast pumping rates. Lower pumping rates would delay the ship from leaving port.

Source: University of Wisconsin Sea Grant - Aquatic Invasive Species. Web. Accessed on November 30, 2009. <http://seagrant.wisc.edu/ais/Default.aspx?tabid=396>

POTENTIAL FUNDING SOURCES

Wisconsin DNR

The WDNR awards cost-sharing grants to public and private entities for up to 75% of the costs of projects to control invasive species. Projects fall under one of the five following categories.

1. Education, Prevention and Planning Projects

Eligible Projects: Educational programs including conducting workshops, training or coordinating volunteer monitors; Development of prevention and control plans for AIS; Monitoring, mapping, and assessing waterbodies for the presence of AIS or other studies that will aid in the prevention and control of AIS; Watercraft inspection and education projects following the guidelines of the Department's Clean Boats, Clean Waters program.

2. Early Detection and Response Projects

Eligible Projects: Identification and removal by approved methods, of small pioneer populations of aquatic invasive species in the early stages of colonization, or re-colonization.

3. Established Population Control Projects

Eligible projects include: Department approved control activities recommended in a control plan; Experimental or demonstration projects following a DNR approved plan; Purple Loosestrife bio-control projects (no plan approval required).

4. Research and Demonstration Projects

Eligible Projects: Grants awarded under this subchapter are intended as a cooperative research or demonstration activity between sponsors and the DNR. Eligible projects shall be designed to increase scientific understanding of the ecological and economic implications of aquatic invasive species and their management. Projects will assess experimental and innovative techniques for their prevention, containment and control.

5. Maintenance and Containment Projects

Eligible Projects: Grants awarded under this subchapter are intended for waters that are being managed under a Department-approved plan where management activity has achieved a desired level of aquatic invasive species control but complete eradication is not achievable. Ongoing maintenance is needed to contain these populations so they do not re-establish throughout the waterbody, spread to other waters, and impair navigation or other beneficial uses of the waterbody.

See <http://dnr.wi.gov/org/caer/cfa/grants/Forms/AISApplicationInstructions.pdf> for detailed information about the WDNR 2009 grant requirements and application forms.

National Oceanic and Atmospheric Administration's (NOAA) National Sea Grant College Program

The National Sea Grant program works closely with the 30 state Sea Grant programs located in every coastal and Great Lakes state and Puerto Rico. These programs are a

university-based network of over 300 institutions involving more than 3,000 scientists, engineers, educators, students and outreach experts. The National Sea Grant College Program sponsors a variety of research, outreach and education projects, most through the state Sea Grant Programs. Each program announces the availability of funding on an annual or biannual basis. Contacts should be made to the state programs for information about funded projects and the possibility for receiving funding.

See: <http://www.seagrant.noaa.gov/funding/fundingfellowships.html> for more information.

The United States Department of Agriculture National Agriculture Library – National Invasive Species Information Center

The USDA website contains a Manager's Tool Kit page that lists resources for general grants and funding information for invasive species. A listing of requests for proposals is available on the Request for Proposals page. Information for grants that have been awarded is also available on the Funds Awarded page.

See: <http://www.invasivespeciesinfo.gov/toolkit/grants.shtml> for more information.

The Great Lakes Restoration Initiative

The President's 2010 Budget provides \$475 million in EPA's budget for a new Environmental Protection Agency-led, interagency Great Lakes restoration initiative, which will target the most significant problems in the region, including invasive aquatic species, non-point source pollution, and contaminated sediment.

See: <http://www.epa.gov/glnpo/glri/> for more information.

LIST OF APPENDICES

- Appendix A Description of Aquatic Invasive Species of Concern to Douglas County
- Appendix B Douglas County AIS Strategic Plan-Activities List and Budget
- Appendix C Trends in Boater Behaviors - 2004-2009 Watercraft Inspection Data, University of Wisconsin Extension, Clean Boats, Clean Waters Program, 2009.
- Appendix D 2008-2009 Douglas County Lake AIS Survey Report, Horky
- Appendix E Freshwater Jellyfish in Wisconsin: Their Biology and Spread by Sandy Engel, November 2006.
- Appendix F Evaluating the Toxicity Risk of Navigate (2, 4-D) to Control Eurasian Water Milfoil in the Eagle River Chain of Lakes
- Appendix G Douglas County Resolution #20-08 Federal Ballast Regulation
- Appendix H Douglas County Resolution #23-08 AIS Mitigation Fund
- Appendix I AIS Research Priorities for the Great Lakes
- Appendix J Douglas County Pesticide Ordinance
- Appendix K List of Non-Native Species in Lake Superior Since 1883
- Appendix L Aquatic Nuisance Species Considered the “Most Troublesome” or “Potentially Troublesome Should They Become Established” in the Mississippi River Basin States.
- Appendix M 2009 Douglas County Lakes Monitored for AIS

LIST OF FIGURES

- Figure 1 Map of Waters within Five-Miles of Waters with Known AIS
- Figure 2 Great Lakes Cargo Volume by Port in Tonnes, 1990
- Figure 3 GLIFWC Map of Purple Loosestrife in Douglas County, Wisconsin
- Figure 4 2008 Watercraft Inspections on Public Access Waters in Douglas County
- Figure 5 2008 Citizen Lake AIS Monitors in Northern Region
- Figure 6 Number of Volunteers in Wisconsin Counties
- Figure 7 Prevention Steps Taken by Boaters in 2008
- Figure 8 Shipping and Ballast Water Issues, Monitoring and Research

REFERENCES

Engel, Sandy. 2006. *Freshwater Jellyfish in Wisconsin: Their Biology and Spread*. Web. Accessed 20 November 2009. <http://dnr.wi.gov/lakes/topics/JellyfishEssayWisconsin.pdf>

Minnesota Sea Grant. Web. Accessed 18 November 2009.
http://www.seagrant.umn.edu/ais/superior_nonnatives

Mississippi River Basin Panel. Web. Accessed 19 November 2009.
<http://www.waux.cerc.cr.usgs.gov/MICRA/MRB%20Panel%20on%20ANS.htm>

National Biological Invasive Species. Web. Accessed 18 November 2009.
<http://invasivespecies.nbio.gov/portal/server.pt>

Shuter, Brian J. and Doran M. Mason. 2001. *Exotic Invertebrates, Food-Web Disruption, and Lost Fish Production: Understanding Impacts of Dreissenid and Cladoceran Invaders on Lower-Lakes Fish Communities and Forecasting Invasion Impacts on Upper Lakes Fish Communities*. Prepared for the Board of Technical Experts Great Lakes Fishery Commission with support from the Great Lakes Fishery Trust & Ohio Sea Grant.

US Army Corps of Engineers Environmental Laboratory. Web. Accessed November 18, 2009
http://el.erdc.usace.army.mil/zebra/zmis/zmishelp/economic_impacts_of_zebra_mussel_infestation.htm

University of Wisconsin Water Resources Cooperative Extension - St. Croix Basin. Web.
<http://basineducation.uwex.edu/stcroix/>