



Aquatic Invasive Species Prevention Plan

St. Louis County, Minnesota



St. Louis County Board approved May 12, 2015

Table of Contents

Introduction..... 2

 What are Aquatic Invasive Species?..... 2

 Pathways of Introduction and Spread..... 2

 Background..... 4

 Plan Purpose..... 4

Actions in St. Louis County 4

Budget 14

Appendix A. St. Louis County Profile 15

Appendix B. Aquatic Invasive Species in St. Louis County..... 15

 Invasive fish 15

 Invasive invertebrates 17

 Invasive plants and algae..... 21

 Invasive pathogens 24

Appendix C. Guidelines for preventing spread..... 25

 ANSTF – Guidelines for recreational water users..... 25

 ANSTF – Guidelines for water gardeners 38

 ANSTF - Guidelines for the classroom 40

Appendix D. State legislation and definitions (2014) 42

Appendix E. Meeting rosters for Duluth and Mt. Iron 43

Prepared for

St. Louis County Board of Commissioners

Prepared by

Marte Kitson, University of Minnesota Sea Grant Program
Douglas A. Jensen, University of Minnesota Sea Grant Program
St. Louis County Planning and Community Development

St. Louis County Commissioners

Frank Jewell, 1st District
Patrick Boyle, 2nd District
Chris Dahlberg, 3rd District
Tom Rukavina, 4th District
Pete Stauber, 5th District
Keith Nelson, 6th District
Steve Raukar, 7th District

Date

5-12-15

Introduction

Aquatic invasive species (AIS) threaten Minnesota waters. These non-native species harm natural resources, fishing and cultural heritage, industries, agribusiness, recreation, and the economy. As the largest county in Minnesota and home to several iconic natural areas, St. Louis County, Minnesota, and its citizens have a lot to protect (Appendix A). By addressing the pathways through which AIS spread, it is possible to prevent, control and minimize impacts of AIS within the county and limit their spread elsewhere. The county will consider supporting implementation of projects that address one or more of the following seven actions:

1. Assess county resources and risks for AIS introduction and spread.
2. Increase resources for county wide education and enforcement.
3. Increase public awareness and participation in prevention.
4. Raise available resources and leverage partnerships.
5. Broaden knowledge of and participation in early detection and rapid response activities.
6. Manage existing populations of AIS.
7. Address specific pathways for AIS introduction.

What are Aquatic Invasive Species?

Information in this and the following sections, Pathways of Introduction and Spread, has been modified from the [Minnesota State Management Plan for Invasive Species](#) to focus on AIS threats relative to St. Louis County.

AIS are harmful non-native aquatic organisms that invade water beyond their natural and historic range. When non-native species cause ecological or economic problems, they are termed “invasive.” Natural resources, fishing and cultural heritage, industries, agribusiness, recreation, and the economy are threatened or harmed by AIS. Examples such as the Zebra Mussel (*Dreissena polymorpha*), Eurasian Watermilfoil (*Myriophyllum spicatum*), and Purple Loosestrife (*Lythrum salicaria*) are relatively well known. New AIS such as Asian Carp, Quagga Mussels, Hydrilla, Red Swamp Crayfish, Parrot Feather, Water Chestnut, Fishhook Waterflea, and Killer Shrimp could become established and spread within St. Louis County if agencies, organizations, residents, businesses, and visitors do not take necessary steps to avoid introducing or spreading them (Appendix B, Appendix C).

Pathways of Introduction and Spread

There are many potential pathways of introduction and spread of AIS. Most species introductions are the result of people’s actions. Some introductions, such as Common Carp (*Cyprinus carpio*) and Purple Loosestrife, were intentional and caused unexpected harm. Many other introductions, however, are unintentional. AIS are often unknowingly carried in or on recreational watercraft, fishing equipment, contaminated water, ballast (recreational and commercial), maintenance equipment, wind, and water.

Historically, ballast water has been the likely primary source for introduction of Zebra Mussel, New Zealand Mudsnail, Round Goby, Ruffe (Eurasian Ruffe), Spiny Waterflea and others, into the Great Lakes. Beginning in 1993, the U.S. Coast Guard issued its final rule to establish a ballast water program for the Great Lakes. In 2005, both the US and Canada have jointly enforced mandatory off-shore (200 miles from shore at depth of 2,000 meters) exchange of ballast from ships seeking to enter the Great Lakes. Joint enforcement has now reached 100% inspection of vessels entering the Seaway. During that 12 year period, average rate of discovery of a ballast water-mediated

species introduction in the Great Lakes was about one per year. Since 2006, the bloody red shrimp was the last ballast water mediated species introduction into the Great Lakes, which is now nine years ago.

While off shore ballast water exchange has apparently made a difference in the rate of new AIS into the Great Lakes system, there is still a significant risk for transfer of AIS from one Great Lakes port to another. The Duluth-Superior harbor receives 40% of ballast water discharges by lakers, and therefore is particularly at risk as a main source of AIS pathways into St. Louis County's inland lakes. St. Louis County is still ground zero for potential new AIS. The shipping industry is adapting to this threat, but complete protection from interlake AIS transfers is not anticipated for at least ten years (*Paragraph added by St. Louis County Board Resolution #15-196*).

According to the 2014 *Lake Superior Aquatic Invasive Species Complete Prevention Plan* from the Lake Superior Binational Program, new AIS are still being found in Lake Superior, including viral hemorrhagic septicemia (VHS) in 2010. The report shows that the threat is real. Potential new invaders of St. Louis County include the bloody red shrimp, which have invaded the lower Great Lakes and present an imminent threat to Lake Superior and its inland waterways (*Paragraph added by St. Louis County Board Resolution #15-196*).

Trailer recreational watercraft and associated equipment are high-risk pathways in Minnesota for the introduction and spread of AIS such as Eurasian Watermilfoil and Zebra Mussel. Movement of boat lifts, docks, and other equipment from infested waters are also potential pathways of spread for Zebra Mussels, plants, and invasive snails. Waders, hip boots, and other fishing and waterfowl hunting gear are pathways for spread of New Zealand Mudsnail, Faucet Snail, Eurasian Watermilfoil, and Zebra Mussel.

Invasive aquatic plants purchased by mail or over the internet for water gardens and other uses are pathways for AIS, either because the plants that are ordered are invasive, or the shipment may be contaminated with AIS. The release of contaminated live bait by anglers and the release of pets, especially from aquaria, are pathways for introducing non-native plants, pathogens, and animals into the environment. Release of live study specimens by students and teachers is another pathway.

Commercial, government, tribal, and research activities and related equipment such as nets, boats, and waders that are used in infested waters are potential pathways for spread in the state. The transport or diversion of water is another pathway for AIS movement, especially for Zebra Mussel, Spiny Waterflea, and pathogens.

Connected waterways can be conduits for AIS to arrive without human assistance, once they have been introduced. The Great Lakes and Mississippi River Interbasin Study (<http://glmrms.anl.gov/glmris-report/>) identifies thirteen AIS of concern that pose risks for spread to from each basin. Of major concern is the potential spread of four invasive carp species (bighead carp, black carp, grass carp and silver carp) in the Mississippi River into the state. Other species could also arrive via interstate waters: Northern Snakehead in Mississippi River tributaries; many species such as Bloody Red Shrimp and Fishhook Waterflea are in the lower Great Lakes, but have not been found in Lake Superior; waters in South Dakota could lead to introduction of Rudd into Minnesota; and introductions of AIS into waters connected to the Red River basin in North Dakota and Manitoba could result in spread to Minnesota waters.

Background

Beginning in 2014, the Minnesota State Legislature authorized funding to all Minnesota Counties to implement plans to prevent, slow and minimize impacts of AIS. In 2014, \$4.5 million was appropriated for 2014 and \$10 million in 2015 annually thereafter (Minnesota State Statute 477A.19, Appendix D). Aquatic invasive species are non-native aquatic organisms that invade water beyond their natural and historic range that may harm economic, environmental or human health and can threaten our natural resources. A list of prohibited, regulated, and unregulated non-native species is available at www.dnr.state.mn.us/invasives/laws.html.

Plan Purpose

1. Define actions for which the allocated funds may be used to prevent spread of AIS.
2. Guide St. Louis County Aquatic Invasive Species Prevention response.

Actions in St. Louis County

Two public meetings were held in early February 2015 to gather recommended actions from stakeholders for the *St. Louis County Aquatic Invasive Species Plan*. There were 63 participants (Appendix E). Recommendations were compiled and incorporated into the action table below. The following are actions that the county may support to prevent the spread of AIS. This table, based on the MNDNR Local AIS Plan Framework, cross-references actions and elements from [A Minnesota State Management Plan for Invasive Species](#).

Action	How action supports AIS prevention	Element in state plan	Action in state plan
1. Assess county resources and risk of AIS introduction and spread			
1.1 Understand the variety of pathways of introduction to local waters.	Knowing the common pathways by which AIS can be spread is essential to effective prevention.	Prevention – Understand Risks	I-1-c
1.2 Using MNDNR’s list of water bodies that are designated as infested in the county, identify linkages to other water bodies.	Some AIS may travel or be more easily transported between infested waters and other connected water bodies; knowing these linkages will help prioritize prevention resources.	Prevention – Understand Risks	I-1-c
1.3 Understanding and managing pathways for spread of AIS via commercial trade and operations.	Identifying use and spread of AIS through commercial settings may require new or innovative approaches for effective prevention.	Prevention – Understand Risks	I-1-c
1.4 Gather boat launch data at select public or private accesses.	This action will help the county prioritize resources in the future by quantifying the use at different water bodies.	Prevention – Understand Risks	I-1-c

2. Increase resources for county wide education and enforcement			
2.1 Train an enforcement officer to specialize in AIS laws and serve as a point of contact subject matter expert for other county staff.	This action will increase the ability of local enforcement to ensure compliance with AIS laws.	Prevention – Enforcement	I-6-b
2.2 Ensure that county staff have been trained to enforce AIS laws.	This action will increase the capacity of county and local enforcement to ensure compliance with AIS laws.	Prevention – Enforcement	I-6-b
2.3 Work with county sheriff and local law enforcement to find resources to patrol roadways near infested lakes to issue compliance checks with AIS laws.	Compliance checks away from boat launches can be effective at communicating the presence of law enforcement and help to educate lake users on the seriousness of AIS laws and the penalties for infractions.	Prevention – Enforcement	I-6-b
2.4 Increase watercraft inspections within the county.	Watercraft inspectors can help spread accurate messages to boaters and help prevent the spread of AIS.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-a
2.5 Ensure that local authorities and other agencies are aware of state regulations that prohibit transport of prohibited invasive species, aquatic plants, and water.	Consistent enforcement of AIS regulations aimed at containment will help to prevent the further spread of AIS.	Early Detection, Rapid Response, and Containment – Enforcement	II-10-c
2.6 Support efforts at state and federal level for emergency ballast water treatment systems. <i>(Item added by St. Louis County Board Resolution #15-196)</i>	This action will provide St. Louis County’s many inland lakes with a frontline defense against possible new AIS introductions via the harbor.		

3. Increase public awareness and participation in prevention			
3.1 Train field staff (e.g., SWCD’s zoning, septic system, land management) on practices to avoid spreading AIS.	County staff can take simple steps to prevent spread of AIS or new AIS introductions, and can also set an example for business, industry, agency, non-profits and residents in the county.	Prevention – Research and Technologies	I-7-d
3.2 Provide resources to local businesses that help reduce the risk of AIS spread via their operations.	The day-to-day operations and products of some businesses, whether regulated or not, can pose risks of AIS spread.	Prevention – Research and Technologies	I-7-d
3.3 Adapt, adopt or develop new tools including local training to reduce risks for spread of AIS through agency and business operations.	Help prevent AIS spread by developing and sharing new risk-reduction methods, and by identifying actions and operations that could contribute to AIS spread.	Prevention – Research and Technologies	I-7-d
3.4 Extend AIS outreach to county employees to improve awareness and provide educational materials for distribution.	Providing resources and training for county staff can better equip them to field questions from the public regarding AIS prevention.	Prevention – Public Awareness Early Detection, Rapid Response, and Containment – Public Awareness	I-8-a I-8-e II-8-f
3.5 Participate in evaluation efforts of priority audiences to determine effectiveness of outreach efforts.	Assessment improves outreach plans and actions.	Prevention – Public Awareness	1-8-b
3.6 Adopt or develop and promote AIS prevention messages targeting riparian landowners who launch watercraft from private access(es).	Many watercrafts enter lakes and rivers from private residential property and may not be reached by outreach conducted at public accesses and cooperating private non-residential accesses.	Prevention – Public Awareness	I-8-a & e
3.7 Adapt, adopt, or develop new curricula and tools for K-12 schools, informal, non-formal, and place-based education events such as county fairs to support youth education about AIS.	Youths can help prevent the spread of AIS through their own actions and by modeling their knowledge and actions to their families and others.	Prevention – Public Awareness	I-8-g

<p>3.8 Identify and support local government units, lake associations, conservation organizations, non-profits and others who are successfully working on AIS education.</p>	<p>Providing support to these organizations expands and improves efforts.</p>	<p>Prevention – Public Awareness</p>	<p>I-8-g</p>
<p>3.9 Collaborate with other counties, watershed groups, and/or adjacent jurisdictions to develop regional approaches to AIS prevention.</p>	<p>Because AIS and the individuals who could transport them do not stay inside county borders, strategic coordination is necessary to prevent AIS spread.</p>	<p>Prevention – Regional Approaches</p>	<p>I-9-a</p>
<p>3.10 Train field staff (e.g., SWCD’s zoning, septic system, land management) on management practices that will maintain and/or create diverse, native landscapes that are more resilient to AIS.</p>	<p>Making the environment more resistant to AIS can help prevent AIS infestations.</p>	<p>Prevention – Manage for Prevention</p>	<p>I-10-a</p>
<p>3.11 Train existing full-time and seasonal educators about AIS so they can distribute educational materials at selected public access points. Enlist additional volunteers to support this effort, particularly at high priority landings during peak usage times such as holidays and weekends.</p>	<p>Targeted educational efforts to specific users of water bodies can help prevent AIS spread from and into that water body.</p>	<p>Early Detection, Rapid Response, and Containment – Public Awareness</p>	<p>II-8-a</p>
<p>3.12 Provide expertise, presentations, trainings, and assistance to lake associations and other organizations interested in setting up access awareness, inspections and other events.</p>	<p>Targeted training and education efforts to lake associations and other stakeholders increases capacity to raise awareness, take action against spread, and participate in monitoring.</p>	<p>Early Detection, Rapid Response, and Containment – Public Awareness</p>	<p>II-8-b</p>

3.13 Encourage, use, and support local awareness events and private access awareness activities throughout the county and Arrowhead region.	Provides opportunity to implement training and education objectives for raising awareness and changing behavior to prevent spread.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-c
3.14 Join and support the <i>Stop Aquatic Hitchhikers!</i> and <i>Habitattitude</i> campaigns to improve awareness and provide consistent messaging about preventing the spread of AIS.	Consistent messaging will help educate people about their role in AIS prevention.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-d
3.15 Use existing and create new partnerships to capitalize on outreach efforts developed by the MNDNR and the Minnesota Sea Grant Program.	Leveraging existing communication and outreach materials ensures that the public receives accurate and consistent messages about rules and best practices for AIS prevention.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-d
3.16 Create AIS prevention messaging with local appeal that targets residents and non-residents who use area waters using mass and social media.	Ensuring that residents and non-residents are aware of AIS prevention measures they can take to prevent the risk of AIS spread.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-d
3.17 Adopt, adapt or develop new educational tools aimed at buyers and sellers of aquatic plants and animals.	Targeting AIS prevention messages to activities that may present a risk of AIS spread may be more effective than generic public awareness messages.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-e
3.18 Develop tailored AIS prevention messages aimed at lake-related businesses (e.g., home builders, developers) and local government staff (e.g., county and zoning planners).	Ensure that individuals and stakeholder groups are aware of AIS prevention measures that they can take in the course of their daily work that will help to prevent the spread of AIS.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-f
3.19 Create and distribute AIS maps.	Knowledge about known infestations raises awareness aimed at preventing, containing spread, and minimizing impacts.	Early Detection, Rapid Response, and Containment – Public Awareness	II-8-g

<p>3.20 Coordinate with MNDNR, Minnesota Sea Grant and others to publicize new infestations at access sites, in lake association newsletters, and other local publications.</p>	<p>Timely and accurate reporting of new AIS infestations empowers the public to help prevent the further spread of AIS.</p>	<p>Early Detection, Rapid Response, and Containment – Public Awareness Early Detection, Rapid Response, and Containment – Risk Reduction</p>	<p>II-8-i II-15-c</p>
<p>3.21 Establish “one-stop shop” for educational materials.</p>	<p>Helps generate consistent, clear messaging.</p>	<p>N/A</p>	<p>N/A</p>

4. Increase available resources and leverage partnerships			
4.1 Seek additional funds to implement unfunded actions in county prevention plan.	Effectiveness of AIS prevention actions can be limited by inadequate financial resources.	Prevention – Funding	I-11-a
		Early Detection, Rapid Response, and Containment – Funding	II-11-a II-11-b
4.2 Assist with funding local outreach and monitoring efforts by entities other than the county.	AIS prevention efforts can be strengthened by supporting the capacity of local organizations to conduct AIS outreach and monitoring activities.	Early Detection, Rapid Response, and Containment – Detection	II-1-h
4.3 Develop and maintain contacts with other local organizations, businesses, and government entities.	Participation by local partners is necessary for the county’s AIS prevention plan to be effective.	Leadership and Coordination - Local	IV-3-a
4.4 Facilitate establishment of local organizations such as Coalitions of Lake Associations (COLAs) to partner in implementing the county’s AIS prevention plan.	Additional partnerships among local organizations will increase the county’s capacity to implement its AIS prevention plan.	Leadership and Coordination - Local	IV-3-b
4.5 Establish a grant program to support local efforts to prevent the spread of AIS.	By leveraging existing capacity of other local organizations, the county can maximize the effectiveness of its AIS prevention funds.	Leadership and Coordination - Local	IV-3-c
4.6 Create a list of funding sources. Maintain and post list on website.	By leveraging existing capacity of other local organizations, the county can maximize the effectiveness of its AIS prevention funds.	N/A	N/A
4.7 Establish a match program to foster local efforts.	By leveraging existing capacity of other local organizations, the county can maximize the effectiveness of its AIS prevention funds.	N/A	N/A

5. Broaden knowledge of and participation in early detection and rapid response activities			
5.1 Obtain and distribute Watch ID cards and other resources from the Minnesota Sea Grant Program.	Finding new AIS infestations early is key to preventing further spread. Ensuring that people who use water resources know what AIS to look for maximizes the chance of early detection.	Early Detection, Rapid Response, and Containment – Detection	II-1-b
5.2 Develop an app for AIS identification and reporting.	Ensuring that local discoveries of AIS are quickly reported to the MNDNR or Minnesota Sea Grant will maximize prevention efforts related to new infestations.	Early Detection, Rapid Response, and Containment – Detection	II-1-c
5.3 Encourage agencies, organizations, businesses, and individuals to submit samples of suspected AIS to the MNDNR or an approved drop off spot.	The county can support early detection and prevention efforts by helping the MNDNR to quickly confirm new infestations of AIS.	Early Detection, Rapid Response, and Containment – Detection	II-1-d
5.4 Approve an early detection and rapid response program.	This program will ensure that new infestations are properly reported and rapid response is deployed, if required.	Early Detection, Rapid Response, and Containment – Detection	II-1-d
5.5 Augment communication and reporting mechanisms for citizen monitoring of lakes and rivers.	Ensuring that local discoveries of AIS are quickly communicated to the MNDNR or Minnesota Sea Grant will maximize prevention efforts related to new infestations.	Early Detection, Rapid Response, and Containment – Detection	II-1-j
5.6 Use MNDNR’s list of water bodies that are designated as infested as well as other sources of information to determine where populations of AIS are located to help prioritize spread prevention efforts.	Identifying existing AIS populations helps focus spread prevention efforts.	Early Detection, Rapid Response, and Containment – Detection	II-3-a
5.7 Tie early detection and rapid response to risk assessment.	Helps guide allocation of existing resources for spread prevention efforts.	Early Detection, Rapid Response, and Containment – Prioritize	II-3-a

<p>5.8 Cultivate partnerships with organizations interested in AIS prevention (e.g., lake associations) to provide training and support AIS surveys in water bodies (infested and non-infested) and on docks and lifts.</p>	<p>Leveraging the resources of existing organizations will help to find new AIS infestations more efficiently and to prevent further spread of those AIS.</p>	<p>Early Detection, Rapid Response, and Containment – Prioritize</p>	<p>II-3-b</p>
<p>5.9 Develop new, practical tools for assessing the early presence and identification of invasive species.</p>	<p>Early detection of invasive species increases chances of eradication and decreases likelihood of spread.</p>	<p>Early Detection, Rapid Response, and Containment – Research and Technology</p>	<p>II-4-a</p>
<p>5.10 Develop incentives/awards to encourage participation in early detection and rapid response activities.</p>	<p>Early detection of AIS increases chances of eradication and decreases likelihood of spread.</p>	<p>N/A</p>	<p>N/A</p>

6 Manage existing populations of aquatic invasive species			
6.1 Use risk assessment to prioritize management efforts. Monitor existing populations and reassess for future re-prioritization.	AIS infestation characteristics vary from site to site and may need different management approaches.	Management of Invasive Species – Prioritize	III-1-a
6.2 Contract with companies that possess the equipment, knowledge, and expertise to facilitate management of AIS in water bodies the county deems impaired or damaged by aquatic invasive species.	Effective management of existing AIS populations may help prevent further spread.	Management of Invasive Species - Implement IPM Plans	III-3-a
6.3 Where appropriate, use integrated pest management to control populations of high priority AIS (e.g., Eurasian Watermilfoil, Curlyleaf Pondweed, Flowering Rush, non-native Common Reed, Purple Loosestrife).	Effective management of existing AIS populations may help prevent further spread.	Management of Invasive Species - Implement IPM Plans	III-3-a
6.4 Coordinate with the MNDNR for information on management of AIS, and adopt control plans utilizing safe and cost-effective techniques.	Effective management of existing AIS populations may help prevent further spread.	Management of Invasive Species - Coordination/ Communication	III-4-b
6.5 Evaluate AIS prevention efforts and cooperative relationships for possible improvements.	Participants at all levels can share input and new ideas to continuously improve local AIS prevention plans.	Management of Invasive Species - Evaluation	III-6-a, b, c
6.6 Design and manage water accesses in a way that better controls the spread of AIS.	Effective management of existing AIS populations may help prevent further spread.		

7. Address specific pathways for AIS introduction			
7.1 Investigate the cost and feasibility of purchasing permanent and portable watercraft decontamination units for use in cleaning boats and equipment used in infested lakes within the county.	Decontamination of watercraft is a key tool in preventing AIS spread.	N/A	N/A
7.2 Encourage the development of a boat decontamination service or partner with existing businesses like car washes that could provide such services.	Decontamination of watercraft is a key tool in preventing AIS spread.	N/A	N/A

Budget

St. Louis County received \$306,356 in 2014 and is scheduled to receive \$680,790 in years thereafter. Funding is apportioned to counties using a formula based on the number of public boat accesses and the number of watercraft trailer parking spaces in each county. Funding comes from the Department of Revenue from existing General Funds. The statute does not require matching funds. To be eligible for funding, the county must establish by resolution or approval of a plan guidelines for the use of funding. Guidelines for use of the funding must be submitted to the Minnesota Department of Natural Resources by December 31 of the year the funding was received. While state statute allocates funding beyond 2014, funding beyond 2014 is not guaranteed.

Use of proceeds has very few limitations allowing the county to decide the best use for preventing the spread of AIS. Activities suggested include providing oversight, management (directly, contract, or request for proposals), county wide public awareness, monitoring, and ways to enhance compliance. Funding guidelines state that counties are to use the funds to prevent or limit the spread of AIS at all accesses within the county and must use the funds consistent with an approved resolution or plan. Counties may appropriate funds directly or provide any portion to local government units, park districts, joint powers boards, watershed districts and lake associations.

The St. Louis County Board approved funding by resolution. St. Louis County will retain ten percent of funds are dedicated to administrative costs incurred by the county. Remaining funding will be awarded to organizations that successfully complete a request for proposal (RFP) application, review, and recommendation for funding, with county board approval.

Appendix A. St. Louis County Profile

Located in Northeastern Minnesota, St. Louis County, with total area of 7,092 square miles, is the largest county in Minnesota. It is known for its spectacular natural beauty, including Voyageurs National Park, Superior National Forest, the Boundary Waters Canoe Area Wilderness, and four state parks. It has 1,168 lakes within its borders and hundreds of miles of rivers, many of which are trout streams. St. Louis County is home to the headwaters of the St. Louis River, the second largest of Lake Superior's tributaries (the largest is the Nipigon River in Ontario, Canada). St. Louis County also boasts the Duluth-Superior port, the furthest inland port in the Great Lakes system and is the entryway to Lake Superior's North Shore.

St. Louis County is home to 200,540 people, living in small mining towns, farm communities, busy cities, and on reservations. The county's population is concentrated along the Mesabi and Vermilion Iron Ranges and in the Duluth area on the western tip of Lake Superior. Major industries are mining, wood and paper products, aviation, higher education, shipping and transportation, health care, and tourism.

Two reservations, the Fond du Lac Band of Lake Superior Chippewa and the Bois Forte Band of Chippewa are partially in St. Louis County. Both of these bands along with the Grand Portage Band have off-reservation treaty rights in the 1854 Ceded Territory which includes most of St. Louis County. The 1854 Treaty Authority protects and enhances the off-reservation treaty rights and resources within the 1854 Ceded Territory on behalf of the Bois Forte and Grand Portage bands.

Appendix B. Aquatic Invasive Species in St. Louis County

There are 23 high priority AIS found in the waters of St. Louis County, which can be addressed through the county's AIS Plan. These "high priority" aquatic invasive species (AIS) are identified because they:

- Harm fish, plants, invertebrates and fish diseases that are at high risk for spread, are
- Highly populous where they occur, and/or
- They are species that can be controlled through management.

Invasive fish

Ruffe (Gymnocephalus cernuus)

Means of Spread: Potential illegal introduction or use as live bait.*

Ruffe, or Eurasian Ruffe, is a small, perch-like fish that may pose a serious threat to aquatic ecosystems and to sport and commercial fishing. This invader competes with native fish for food and habitat. The potential for Ruffe to expand their range in North American waters is causing concern. Anglers can be the first to discover them because these fish are commonly caught by hook and line. Eradicating infestations is nearly impossible, but early detection of isolated populations may help slow or prevent their spread.

Ruffe were first detected in the in the St. Louis River estuary in 1986. Ruffe populations rapidly increased in the St. Louis River at Duluth-Superior and spread to other rivers and bays along the south shore of western Lake Superior. They have also spread to Thunder Bay, Ontario on Lake Superior, and the Thunder Bay River, Michigan on Lake Huron. As of February 2015, they have not been detected in any inland waters in Minnesota.

Regulations: Prohibited species illegal to possess, use or sell in Minnesota.

County Supports: Management through policy, enforcement, monitoring and education.

**As part of federal Ruffe Control Plan, bait harvest was banned in Duluth-Superior harbor upstream to the Fond du Lac Dam in the late 1980's.*

Round Goby (Apollonia melanostomus)

Means of Spread: While larvae are pelagic (live in open water), likelihood for transfer in contaminated water is extremely low.*

The Round Goby is a bottom-dwelling fish that poses a serious threat to North American aquatic ecosystems, with potential impacts on sport and commercial fishing. This bottom-dwelling fish has rapidly spread to many areas of the Great Lakes. Once established, populations typically increase quickly. Round Goby can displace native fish, eat their eggs and young, take over optimal habitat, spawn multiple times a season, and survive in poor quality water – giving them a competitive advantage. Anglers, commercial fishermen, and fishery professionals should know how to identify the Round Goby. Often, anglers are the first to discover Round Gobies because these aggressive fish are commonly caught by hook and line. Eradicating infestations is nearly impossible, but early detection of isolated populations may help slow or prevent the spread.

Round Goby were first discovered in the St. Clair River in 1990, and they were reported in the lower Duluth-Superior Harbor in 1995. Since then, they have spread through the St. Louis River Estuary northward to the Fond du Lac Dam. As of February 2015, they have not been detected in any inland Minnesota waters.

Regulations: Prohibited species illegal to possess, use or sell in Minnesota.

County Supports: Management through policy, enforcement, monitoring and education.

Rainbow Smelt (Osmerus mordax)

Means of Spread: Potential illegal stocking and harvest, use and release of live bait, cleaning of smelt bearing eggs near other waters, and connected waterways. Fertilized eggs can stick to boats, gear and equipment.

Rainbow Smelt is a small soft-rayed silver fish with teeth on both mouth and tongue, and an unusually large mouth for its size. It is native to the Atlantic drainages from Newfoundland to Delaware. While harvesting smelt is a rite of spring for some, smelt can cause the decline of popular game fish including Yellow Perch, Walleye, Northern Pike, Lake Whitefish, and Cisco (Tullibee or Lake Herring). Great Lakes introductions were due to stocking and escape from Crystal Lake, Michigan.

Rainbow Smelt were first detected in Lake Michigan in 1923. Subsequently, Rainbow Smelt spread throughout all the Great Lakes and into many inland waters in Ontario, Minnesota, Wisconsin, and other states and provinces. Rainbow Smelt were first detected in the Duluth-Superior Harbor in 1946. In Minnesota, they are present in Voyageurs National Park, Lake of the Woods, Pokegama Lake (Grand Rapids), Mississippi River, and other waters along Minnesota's northern border.

Regulations: Regulated species that can be harvested for human consumption. It is illegal to use smelt, live or frozen, unless it is used on waters from which it was harvested. Only DNR-approved frozen smelt can be used in inland waters to prevent the spread of viral hemorrhagic septicemia (VHS).

County Supports: Management through policy, enforcement, monitoring and education.

*Tube-nose Goby (*Proterorhinus semilunaris* (formerly *marmoratus*)*

Pathways of concern: Potential illegal introduction or use as live bait. While larvae are pelagic (live in open water), likelihood for transfer in contaminated water is extremely low.

Tube-nose Goby displace native fish like sculpins, darters, and Northern Madtom competing with them for habitat. They eat small midge larvae, invertebrates, clams and young fish. Unlike Round Goby, they do not eat Zebra Mussels. They live in lakes, rivers, ponds and canals, preferring dense vegetation where they lay eggs. Anglers rarely catch them due to their preference for eating small organisms. They are native to freshwaters of Eastern Europe and Black and Caspian Sea region, they spread to the Great Lakes in the ballast water discharge of foreign ships. In Russia, they are endangered due to loss of habitat. They were first found in the Duluth-Superior Harbor in 2001. As of February 2015, they have not been detected in any inland lakes in Minnesota.

Regulations: Prohibited species illegal to possess, use or sell in Minnesota.

County Supports: Management through policy, enforcement, monitoring and education.

Invasive invertebrates

*Asian Clam (*Corbicula fluminea*)*

Means of Spread: Accidental introductions as free floating larvae in contaminated water or as moved via construction equipment, dredge materials or via field equipment. Intentional introduction from live seafood markets has been documented elsewhere.

Asian Clams are small invaders that grow to about the size of a quarter, reproduce rapidly and reach high densities causing millions of dollars in damage by clogging irrigation, municipal drinking water and industrial water intakes worldwide. They filter large amounts of plankton from the water, a food source upon which native species, including native mollusks and clams, rely. They reproduce through self-fertilization and infestations grow rapidly into the tens-of-thousands per square meter. They form dense carpets on the bottoms of lakes and rivers. Incapable of tolerating colder climates, they are now found in 40 states.

Asian Clams were first detected in St. Louis County in 1999 near the Western Lake Superior Sanitary District's warm water sewage discharge in the Duluth-Superior Harbor. While causing biofouling problems elsewhere, Asian Clams have not impeded raw water appropriations in the Duluth-Superior harbor. As of February 2015, they have not been detected in any inland lakes in Minnesota. Eradication of Asian Clams from infested open waters is unlikely – emphasis is generally on preventing further spread.

Regulations: Prohibited species illegal to possess, use or sell in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring and education.

Faucet Snail (Bithynia tentaculata)

Means of Spread: Contaminated bait, mud, debris, construction or recreational equipment including aquatic plants, boats, anchors, decoy anchors, and other gear.

Faucet Snails are small invaders that threaten waterfowl, food webs, and may clog water intakes. They host three intestinal flukes that can kill scaup, coots, and other waterfowl that consume them. Native to Europe, they were first found in the Great Lakes in the 1870s, likely spread with solid ballast (wet soil) used in large timber transport ships or by contaminated vegetation used in packing crates. Faucet Snail can close their shells allowing them to survive out of water for days. They quickly spread to inland waters, often reaching high densities and outcompeting native snails. Found across the Great Lakes, Faucet Snail spread to southern Quebec, Canada, Lake Champlain, and south to Washington, D.C. They are found in Montana, Wisconsin, and Minnesota waters including Big and Little Winnibigoshish, the Mississippi River downstream of Winnibigoshish, and the Mississippi River near LaCrosse, WI. They are also found in the Crow Wing River, Shell River, 1st Crow Wing Lake, and Upper and Lower Twin Lakes in north central Minnesota. Eradicating infestations is nearly impossible.

The “trap door” (operculum) of a faucet snail was found in a mud sample taken from the St. Louis River Estuary in 2006, which suggests Faucet Snails were present. In 2011, whole-specimen samples were found, confirming its presence in the estuary. Thirty-four water bodies in Minnesota are designated as infested with Faucet Snail, but none of the water bodies are in St. Louis County.

Regulations: Prohibited species illegal to possess, use or sell in Minnesota.

County Supports: Management through policy, enforcement, monitoring and education.

Mystery Snails

- Chinese (*Cipangopaludina chinensis*)
- Banded (*Viviparus georgianus*)

Means of Spread: Aquarium release, aquatic vegetation, and transfer of contaminated water.

Chinese and Banded Mystery Snails can form dense populations and outcompete native species for food and habitat in lakes and streams. They are intermediate hosts for parasitic worms and can transmit trematodes that kill waterfowl. Banded Mystery Snails (BMS) prey on fish embryos. Shells often litter shorelines and clog screens of water intakes. They are called “mystery” snails because in spring they give birth to young, fully developed snails that suddenly and mysteriously disappear. After reproducing in their fourth year, they die and wash up on shore causing odor and disposal issues. Native to Asia, Chinese (CMS) were shipped to California in the late 1800s for Asian seafood markets. CMS were likely released from aquaria into the Niagara River in the 1930s. BMS were released into the Hudson River in 1867. Historically, they spread due to release by aquarists and consumers who purchased them from live food markets. Young may spread by bait buckets or as a hitchhiker on aquatic vegetation. They can survive out of water for days by closing their shells. Eradicating mystery snails is nearly impossible.

CMS were first detected in Minnesota in 1944. According to the MNDNR, CMS infest 90 water bodies and BMS infest 60 water bodies. Several infestations are known to be in St. Louis County, but the extent of the distribution is largely unknown.

Regulations: Regulated species allowed for harvest and use. These species are being re-evaluated and may be designated as prohibited invasive species by DNR.

County Supports: Management through policy, enforcement, and education.

New Zealand Mudsnail (Potamopyrgus antipodarum)

Means of Spread: Mud, felt-soled waders, footwear, construction and research gear and other field equipment.

New Zealand Mudsnails are tiny invasive snails that threaten the food webs of trout streams and other waters. They outcompete species that are important forage for native trout and other fishes and provide little nutrition to fish that eat them. Native to New Zealand, they were first accidentally introduced with imported Rainbow Trout in Idaho's Snake River in 1987. They quickly spread to other Western rivers, sometimes reaching densities over 500,000 per square meter. In the Great Lakes, Mudsnails were first found in Lake Ontario in the early 1990s. Anglers pose a risk for spreading New Zealand Mudsnails because they can be moved on waders and gear. They can close their shells allowing them to survive out of water for days. They reproduce asexually, making establishment by one possible, but highly unlikely. Eradicating infestations is nearly impossible.

In 2001, they were found in Lake Superior in Thunder Bay, Ontario. In 2005 they were found in the Duluth-Superior Harbor and were likely spread by ballast water discharged from ships. As of February 2015, they have not been detected in any inland Minnesota waters.

Regulations: Prohibited species illegal to possess, use or sell in Minnesota.

County Supports: Management through policy, enforcement, monitoring and education.

Rusty Crayfish (Orconectes rusticus)

Means of Spread: Dumping bait buckets and aquariums, commercial aquaculture activities, and release of live specimens used in schools.

Rusty Crayfish are invasive crustaceans spreading to lakes, rivers, and streams in several areas of North America. They are more aggressive than native crayfish, better able to avoid fish predation, and can harm native fish populations by eating their eggs and young. They can displace native crayfish, hybridize with them, and graze on and eliminate aquatic plants. Native to the Ohio River drainage, Rusty Crayfish have spread to several U.S. states and Ontario. They have likely spread through bait bucket release by anglers, aquarium release by hobbyists, activities of commercial harvesters, and live study specimen release by teachers and students who buy them from biological supply houses. Females can carry fertilized eggs or a male's sperm so even the release of a single female could establish a new population. Eradicating established infestations is very difficult, if not impossible.

Rusty Crayfish were first detected in southwestern Minnesota in the 1960s. As of February 2015, 37 lakes in St. Louis County are infested with Rusty Crayfish with 120 known infestations statewide (Mason, pers. comm.).

Regulations: Regulated species which means release into the environment is illegal. Licensed anglers may collect any crayfish for use as bait on the same waterbody. They may harvest up to 25 pounds of any crayfish for personal consumption. Selling live crayfish for bait or aquarium use is illegal.

County Supports: Management through policy, enforcement, control, monitoring and education.

Spiny Waterflea (Bythotrephes longimanus)

Means of Spread: Cling to fishing lines, downrigger cables, anchor ropes, fishing nets, and possibly in bilge water, bait buckets or livewells.

Spiny Waterfleas are small predacious crustaceans that threaten aquatic ecosystems and fishing by competing with native fish for food and fouling gear. Spiny Waterfleas eat native zooplankton which are an important food for native fishes. In some lakes, they caused the decline or elimination of some species of native zooplankton. They arrived in ships' ballast water from Eurasia. Spiny Waterfleas were discovered in Lake Ontario in 1982, and then spread to all of the Great Lakes and some inland lakes. Anglers often discover new infestations. Waterfleas collect in masses on fishing lines and downrigger cables. These masses can clog the first eyelet of rods, damage a reel's drag system, and prevent fish from being landed. They can spread to inland waters when fishing gear is contaminated with egg-laden females. While females die out of water, under certain conditions they produce eggs that resist drying, remain viable, and can establish a new population. Eradicating established infestations is impossible, but early detection of isolated populations may help slow or prevent the spread.

The first detections of Spiny Waterfleas in Minnesota inland lakes occurred in 1990: Island, Fish and Boulder Lake Reservoirs (St. Louis County). Spiny Waterflea are no longer found in Fish and Boulder lakes. They are, however, still present in Island Lake Reservoir. Since 1990, 13 lakes have become infested in Minnesota likely due to overland transport (average 2/yr). Of these lakes, Rainy, Burntside and Basswood were the first four in St. Louis County to be infested due to overland transport. As of February 2015, 62 waterbodies in Minnesota are designated as infested with Spiny Waterfleas. Of these waterbodies, 21 (34%) are in St. Louis County.

Regulations: Regulated species meaning that introduction into another waterbody is prohibited.

County Supports: Management through policy, enforcement, monitoring and education.

Zebra Mussels (Dreissena polymorpha) and Quagga Mussels (D. bugensis)

Means of Spread: Adults can spread by attaching to boats, motors, boat lifts, docks, swim platforms, and aquatic plants. Larvae (veligers) can spread in contaminated water in tanker trucks, bait buckets, and bilges.

Zebra and Quagga Mussels are invasive aquatic animals that cost over \$1 billion/year to manage in the U.S. They clog drinking water intakes; foul boat hulls, motors, boat lifts, docks and swim platforms. Their sharp shells litter beaches. They harm native fish by consuming food and often kill native mussels, crayfish, and snails through fouling. They spread from Eurasia to the Great Lakes due to the ballast water discharge of commercial ships in the '80s and

'90s. They spread to the Mississippi River via connected waterways and overland by attaching to aquatic plants and recreational watercraft, and possibly in bilge or bait water. Small mussels die out of water, but adults can survive for days.

Zebra Mussels were first detected in the Duluth-Superior Harbor in 1989 and in 1991, in the Mississippi River. From the Mississippi, they spread up the St. Croix River to Stillwater. Since 1990, 29 lakes have become infested in Minnesota likely due to overland transport (average 2.1/yr). Of these lakes, Pike Lake and Gilbert Pit were the first two lakes infested due to overland transport. As of February 2015, 212 waterbodies are designated as infested with Zebra Mussels in Minnesota. Four of these are in St. Louis County (Gilbert Pit, Mud Lake, Pike Lake, and White Pine River).

Quagga Mussels were first detected in the Duluth-Superior Harbor in 2005 and are found in three locations in the Minnesota waters of the Mississippi River. They have not spread to any other inland Minnesota waters.

Regulations: Prohibited species illegal to possess, transport, use or sell in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring and education.

Invasive plants and algae

Common Reed or Non-native Phragmites (Phragmites australis subsp. australis)

Means of Spread: Movement of construction and maintenance equipment, wind, and water.

Non-native Common Reed is perennial grass that can grow over 12 feet high, creating dense stands that displace native plants such as wild rice and wetland orchids. There is a benign native form of Common Reed (*P.a. subsp. americanus*) but non-native Common Reed provides little food or shelter for wildlife. Wetland plant communities are replaced by non-native Common Reed monocultures along lake shores, wetlands, rivers, and roadsides. Presumably from Europe, Common Reed is used in wastewater treatment plants, gardens, and as duck blind material. It produces feathery tops with seeds that are carried by wind. Roads are also an important means for spread, as they increase connectivity between wetlands and provide ditch habitat. Eradicating established populations is difficult. Known infestations span the Twin Cities and northern Minnesota.

In St. Louis County, non-native Common Reed is found in many undocumented sites and in several documented locations within the St. Louis River Estuary.

Regulations: Restricted noxious weed in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring, and education.

Curlyleaf Pondweed (Potamogeton crispus)

Means of Spread: Clings to recreational boats, motors, trailers, and water related equipment; by seeds, rhizomes, turions, and plant pieces that break off and float on water currents.

Curlyleaf Pondweed is a rooted submerged plant that quickly forms dense mats at the water surface of lakes and rivers in late spring and early summer. In late fall and early winter, it sprouts from rhizomes and turions (overwintering buds) shading out later growing native plants. Mats interfere with boating, fishing, waterfowl hunting, and swimming. Summer die-offs can form windrows of decaying plants on shore, sometimes followed by algal blooms. Curlyleaf Pondweed displaces native plant communities and its decay can deplete oxygen levels, leading to fish kills and impacting other aquatic life. When control is necessary, herbicides and harvesting can be effective. Eradicating established Curlyleaf Pondweed infestations is nearly impossible.

Native to Eurasia, Africa and Australia, Curlyleaf Pondweed was first discovered in North America in the mid-1880s. It was first found in Minnesota about 1910 and probably arrived as a hitchhiker with stocked fish. By 1978, it had spread across most of the United States and Canada. As of February 2015, 759 lakes and rivers in 65 Minnesota counties are infested with Curlyleaf Pondweed, 13 of which are in St. Louis County.

Regulations: Prohibited species illegal to possess, transport, use or sell in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring, and education.

Didymo (Didymosphenia geminata)

Means of Spread: Field gear and footwear, especially felt soled waders worn by smelters and fly anglers along the North Shore.

Didymo or “rock snot” is a brownish alga that can form thick mats on river bottoms and shorelines. Mats can reduce bottom dwelling organisms thereby affecting fish diets and reproduction. In its invasive form, Didymo looks like slimy goo, but feels like wet wool or fiberglass insulation. Likely native to Lake Superior and parts of Canada, around 1990 an invasive form spread to some Western rivers and eastward from the Mid-Atlantic to Quebec. It is especially invasive in New Zealand. Recreational anglers can spread Didymo that gets imbedded in felt soles of boots, waders, and field gear. It can survive for days out of water under moist conditions. Eradicating infestations is impossible. Didymo is found in Lake Superior, along the north shore. It is not known if it is native or non-native or if it would become invasive in other parts of Minnesota if it were transported inland.

Regulations: Unregulated in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring, and education.

Eurasian Watermilfoil (Myriophyllum spicatum)

Means of Spread: Clings to recreational boats, motors, trailers, and water related equipment; spreads when plant pieces break off and float on water currents.

Eurasian Watermilfoil is a feathery submerged aquatic plant that can quickly form thick mats in shallow areas of lakes and rivers in North America. These mats can interfere with swimming and entangle propellers, which hinders boating, fishing, and waterfowl hunting. Heavy infestations may reduce property values. Matted milfoil can displace native aquatic plants, impacting fish and wildlife. Since it was discovered in North America in the 1940s, Eurasian

Watermilfoil has invaded nearly every U.S. state and at least three Canadian provinces. Eradicating established infestations is nearly impossible. Statewide, prevention efforts have slowed the spread of Eurasian Watermilfoil.

As of February 2015, there are 300 waterbodies in Minnesota designated as infested with Eurasian Watermilfoil; three (Gilbert Pit, Horseshoe Lake, and McCormack Lake) are in St. Louis County. Of these, the Gilbert Pit and Horseshoe Lake infestations are likely due to overland transport.

Regulations: Prohibited species that is illegal to possess, transport, use or sell in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring and education.

Narrowleaf and hybrid cattail (Typha angustifolia L., Typha x glauca)

Means of Spread: Spread is by wind dispersed seeds, rapidly spreading rhizomes, and mud contaminated with seeds clinging to footwear and equipment.

Narrowleaf Cattail is native to Europe and Asia. It can hybridize with native Broadleaf Cattail. Narrowleaf and hybrid cattail outcompete native plants and form dense stands, reducing native plant diversity. They grow in roadside ditches, disturbed sites, and in areas with moist soil. In open water, dense, floating mats can break away from a stand and establish elsewhere. Narrowleaf Cattail and its hybrid are difficult to manage.

Regulations: Unlisted species in Minnesota. All cattails in public waters are regulated under state aquatic plant management regulations and permits are required for their removal.

County Supports: Management through policy, enforcement, control, monitoring, and education.

Purple Loosestrife (Lythrum salicaria)

Means of Spread: Spread is by wind dispersed seeds, rhizomes, mud with contaminated seeds clinging to footwear and equipment, some wild seed mixtures, and a few ornamental gardens.

Purple Loosestrife is an invasive perennial plant that spreads rapidly in North American wetlands, shorelines, and roadside ditches. Thick stands of Purple Loosestrife crowd out native plants and reduce food, shelter, and nesting sites for wildlife, birds, turtles, and frogs. After multiple introductions in the 1800s for bee keeping, as an ornamental plant, and in discarded soil used as ballast on ships, this European species has invaded nearly every U.S. state and at least six Canadian provinces. Gardeners, waterfowl hunters, and other outdoor enthusiasts should know how to identify Purple Loosestrife - detecting new infestations can prevent the spread of this plant. Depending upon the size and density of infestation, Purple Loosestrife can be effectively controlled using cutting, herbicide treatment or release of biological control agents.

As of February, 2015, there are 2,408 infestations of Purple Loosestrife in 68 counties, including St. Louis County, in Minnesota.

Regulations: Prohibited species including cultivars, which means it cannot be possessed, grown, cultivated, transported, or sold in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring, and education.

Reed Canary Grass (Phalaris arundinacea)

Means of Spread: Spreads by wind dispersed seeds, rapidly spreading rhizomes, and mud contaminated with seeds clinging to footwear and equipment, and escape from intentional plantings.

Reed Canary Grass is a perennial native to Europe and Asia that has been planted throughout the U.S. since the 1800s for forage and erosion control. It is a major threat to natural wetlands colonizing wet prairies, stream banks, marshes, fens, and sedge meadows. It can even invade upland areas. It forms large, single-species stands and outcompetes native species. If it is cut during the growing season, a second growth spurt occurs in the fall. Invasion is associated with disturbances, such as ditch building, stream channeling sedimentation, and intentional planting. It is difficult to manage.

Reed Canary Grass has spread widely across Minnesota and is found in several largely undocumented locations throughout St. Louis County.

Regulations: Unregulated in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring, and education.

Invasive pathogens

Heterosporis (Heterosporis sp.)

Means for Spread: Fish to fish contact and possibly contaminated water.

Heterosporis is a microscopic parasite that infects the muscle tissue of fish. These parasites produce millions of spores, which gradually destroy muscle tissue until it is almost all replaced with the spores. Predominantly seen in Yellow Perch, this disease has also been detected in Walleye, Northern Pike, Trout-perch, Burbot, and other fish. Heterosporis infections in Minnesota have been documented in Big Sand, Winnibigoshish, Leech, Clitherall, Vermilion, Mille Lacs, Bear, Moose, Cass, Andrusia, and Gull lakes. While there is no evidence that it can infect people, it is thought but not proven that thoroughly cooking fillets will kill the spores.

Regulations: Unlisted in Minnesota.

County Supports: Management through policy, enforcement, control, monitoring, and education.

Viral Hemorrhagic Septicemia (VHS)

Means for Spread: Natural fish to fish contact (eggs, sperm, urine, slime), moving or stocking of infected fish, and possibly transport of virus-infected water in ballast, bilges, livewells, and bait containers.

Viral hemorrhagic septicemia (VHS) is a rhabdovirus that kills fish causing long-term reductions in some fish populations and severe losses for aquaculture. It causes widespread hemorrhages (bleeding) on the eyes, skin, and fins and internal organs such as liver, intestine, and swim bladders. Sick fish will often be listless, swim in circles, or are observed just below the water surface. Confirming VHS infection requires laboratory tests. Spread to the Great

Lakes may have been from migrating fish from the Atlantic Coast or possibly via ballast water from ships. Over 50 species of fish are known to be susceptible to VHS. In the Great Lakes, some large die-offs of Muskellunge, Northern Pike, and other fish have occurred. Rapid temperature change triggers viral outbreaks. If fish are not killed by VHS, they are life-long carriers of the virus, and can spread it to other fish through urine and sex products. VHS can be infective up to 14 days in water.

First confirmed in Lake Ontario and St. Clair in 2005, it caused large scale mortalities in lakes St. Clair, Erie, Huron, Ontario and Michigan in 2006, and was found in Wisconsin in 2007. VHS was first detected in Lake Superior in 2010, but has not resulted in any fish kills. As of February 2015, it has not been detected in any inland Minnesota waters.

Regulations: A federal order under the Animal Health Protection Act restricts the transport of infected fish. DNR regulations require use of VHS-free bait including DNR approved treated Rainbow Smelt and Ciscoes.

County Supports: Management through policy, enforcement, control, monitoring, and education.

For lists of AIS and other non-native species, please visit: www.seagrant.umn.edu/ais, or www.dnr.state.mn.us/invasives/aquatic

For a complete list of designated AIS infested waters in Minnesota, visit: <http://www.dnr.state.mn.us/invasives/aquatic>

Appendix C. Guidelines for preventing spread

ANSTF – Guidelines for recreational water users

VOLUNTARY GUIDELINES TO PREVENT THE INTRODUCTION AND SPREAD OF AQUATIC INVASIVE SPECIES: RECREATIONAL ACTIVITIES

Aquatic Nuisance Species Task Force
November 2013

In July 2011, the Aquatic Nuisance Species Task Force (ANSTF) re-established the Recreational Guidelines Committee (Committee) composed of 55 Federal and State agency, non-profit and industry representatives. The Committee's mission was to update the 2000 ANSTF *Recommended Voluntary Guidelines for Preventing the Spread of Aquatic Nuisance Species Associated with Recreational Activities* (Federal Register/ Vol. 65, No. 76/ Thursday, April 13, 2000/ Notices, Pg. 19953). Those guidelines were revised taking into account new aquatic invasive species (AIS), and new recreational activities and equipment. Guidelines were revised for six recreational activities: anglers, motor boaters, non-motorized boaters, scuba divers and snorkelers, seaplane pilots, and waterfowl hunters.

The purpose of these guidelines is to:

- Provide a consistent, practical, and effective document to inform outreach efforts geared toward public recreationalists to prevent the spread of AIS,
- Take into account the specific pathways, vectors, and life histories of *all* AIS, including fish, aquatic plants, invertebrates, and pathogens, and
- Promote voluntary actions to support the national *Stop Aquatic Hitchhikers!*TM campaign, as well as statewide efforts such as *Clean Boats, Clean Waters*.

*Stop Aquatic Hitchhikers!*TM is a national education campaign that helps recreational users to become part of the solution to stop the spread of AIS. Launched in 2002, the campaign was created under the auspices of the ANSTF. Joining the campaign is free and easy. Visit www.protectyourwaters.net and then click on “Become a Partner”. As of 2013, over 1,100 entities including agencies (federal, state, tribal, county), universities, colleges, schools, businesses, industries, non-profit organizations, and clubs have joined helping to reach millions of recreational users.

Recreational user exposure to the campaign’s messages is key. Research shows that exposure to the campaign combined with audience-specific recreational guidelines can not only raise awareness, but also motivate positive actions that can prevent AIS spread. Therefore, any entity wishing to enhance AIS prevention in their region are strongly encouraged to capitalize on the campaign’s visibility by using the campaign’s logo, wordmark and tagline at every opportunity in communication and education media.

Guidelines for each recreational activity are formatted so that they can be “cut and pasted” from this document for inclusion in communication or education media. Common to all activities is basic communication message, “Clean, Drain, Dry”. Uses of this message include billboards, stickers, newsletter sidebars, and small sized media, which serve as communication prompts. Guidelines on the right side of each recreational activity are intended for use in education media such as brochures and fact sheets in their entirety when possible. When not possible, the guidelines can be scaled down to fit needs of the media and intended audience.

These guidelines are also meant to compliment local, state or tribal laws concerning possession or transport of AIS. They do not override and should not be confused with AIS decontamination and quarantine laws that are in effect in various locations across the nation.

Approach to Recreational Equipment Inspection and Decontamination:

A key concept for recreational equipment inspection and decontamination is that the effectiveness of the treatment depends on the activity and the type of AIS.

Synopsis of Recommended Actions:

- For day users, inspect, clean off, drain, rinse (with low pressure, hot water when possible) and dry for **five days** or more or wipe with a towel.
- For recreational equipment left in Zebra Mussel infested waters for more than a day, do all of the above, except use high pressure, hot water treatment for exterior surfaces, and low pressure hot water treatment for interior components when possible.

Bottom line approach: Inspection, rinsing, flushing or high pressure washing **removes** them, while hot water **kills** AIS. In the absence of hot water or high pressure, rinsing with tap water and completely drying will help prevent spread of AIS.

Inspection and Removal:

If recreational equipment has been left in the water for less than a day, key actions to prevent the spread of all AIS are:

- ***Inspect*** and ***clean off*** any visible aquatic plants, animals, and mud from all equipment *before leaving water access*.
- ***Drain*** motor, bilge, livewell, and other water containing devices *before leaving water access*.
- ***Dispose*** of unwanted bait, worms, and fish parts in the trash. When keeping live bait, drain bait container and replace with spring or dechlorinated tap water.
- ***Never*** dump live fish or other organisms from one water body into another.
- ***Dry*** everything for ***five days*** or more or ***wipe*** with a towel *before reuse*.

Those key actions will clean off any visible large-bodied organisms attached to or in watercraft or recreational equipment. Draining can also remove small and nearly invisible organisms such as Zebra Mussel larvae (veligers) potentially entrained in water containing devices.

However, additional precautions are needed to remove small bodied organisms from other parts of the equipment:

- ***Spray/rinse*** recreational equipment with high pressure hot water to clean off mud and kill aquatic invasive species when possible,
- ***Flush*** motor according to owner's manual, **AND/OR**
- ***Dry*** everything for ***five days*** or more **OR** ***wipe*** with a towel *before reuse*.

Notes: It is recommended that even a simple hull rinsing with a garden hose and running water through the live well system is an effective way to clean off species not visible to the naked eye. Drying can also be effective but keep in mind that young mussels can survive in standing water for 24 days at 50°F, 8.5 days at 59°F, or 4.5 days at 86°F and a thorough decontamination is recommended.

Decontamination:

If recreational equipment has been left in the water for more than a day, the following decontamination methods are recommended in accordance with manufacturers' recommendations whenever possible:

- ***Spray/rinse*** hull and other external areas or recreational equipment with high pressure (2,500 psi) hot water (140°F for 10 sec).
- ***Rinse/flush*** motors with hot water (120°F) for 2 minutes.
- ***Rinse/flush*** interior compartments with hot water (120°F).
- ***Dry*** everything for ***five days*** or more **OR** ***wipe*** with a towel *before reuse*.

Notes: Young invasive Zebra Mussel settlers are difficult to see with the unaided eye, but on smooth surfaces they feel like sandpaper. Research indicates that 140°F water will kill these settlers as well as Eurasian Watermilfoil, New Zealand Mudsnaails, and Spiny Waterflea. However, residential hot water heaters are generally set at 120°F and temperatures at the nozzle will be lower because of the water's heat loss to pipes, hoses, ambient temperature, etc. Likewise, commercial car washes typically use water pressure of no more than 1,500 psi and rarely have water hotter than 100° F. Therefore, 140°F water is likely unobtainable, at least through easily-accessible means. Individuals can maximize their decontamination efficacy by using water that's as hot as possible. Skin contact should be avoided when using water above 120°F to avoid irritation or burns.

Chemical Treatments:

The Committee does not recommend wide use of chemical prophylactics or disinfectants for treating watercraft and recreational equipment. Reasons are that chemicals: 1) may damage equipment or components; 2) pose risks for environmental damage and human health, if not properly used; and 3) have varying levels of effectiveness. Therefore, promotion of chemical treatment should be limited to situations in which guidelines can only be partially conducted or are not practical (such as when drying times are limited and known AIS are present). If a chemical treatment is promoted, it should be the most effective *and* the most environmentally benign (e.g., a salt-water solution for certain AIS).

If recreational equipment is fouled, certified or professional decontamination services are highly recommended and may be required based on local, state, or tribal regulations.

Environmental Stewardship and Compliance:

To promote environmental stewardship and compliance with regulations, guidelines for each pathway can include the following statement:

Know the rules! Specimens are needed to confirm sightings, but some jurisdictions prohibit possession and transport of invasive aquatic plants and animals. Before collecting specimens, contact your local natural resource management agency for instructions. Unauthorized introduction of plants, fish, or invertebrates into the wild is illegal in most states. Protect your property and our waters.

Report new sightings. Note exact location; take a photo; if possible, place specimens in a sealed plastic bag; and call federal state, tribal or Sea Grant office or the National ANS Hotline at 1-877-**STOP-ANS**. * Reports can also be submitted at <http://stop-ans.org/>

* As an alternative, state-specific contact information is encouraged.

Recreational Activity:

**Anglers
Stop Aquatic Hitchhikers!™**

Clean *Inspect* and *clean off* plants, animals, and mud from gear and equipment including waders, footwear, ropes, anchors, bait traps, dip nets, downrigger cables, fishing lines, and field gear *before leaving water access*.

Scrub off any visible material on footwear with a stiff brush.

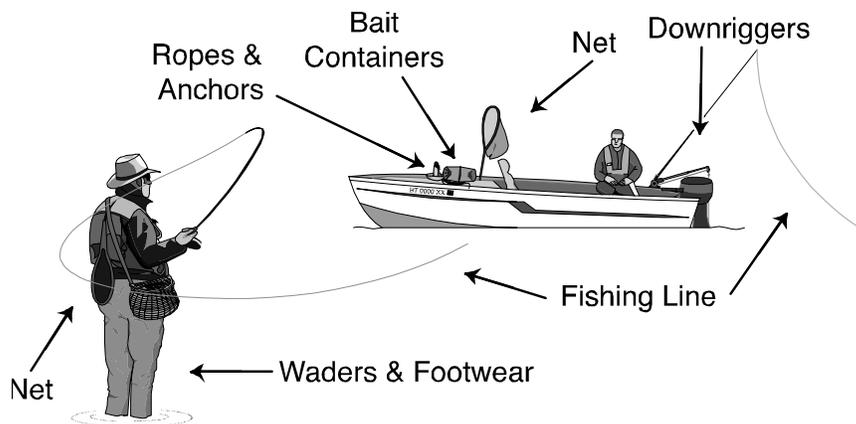
Drain water from watercraft, motor, bilge, bladder tanks, livewell and portable bait containers *before leaving water access*. *Replace* with spring or dechlorinated tap water when keeping live bait *before leaving water access*. Don't add other live fish to bait container.

Dispose of unwanted bait, fish parts, and packing materials, in the trash; do not dump them in the water or on land.

Dry everything *five days* or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen **OR wipe** with a towel *before reuse*.

Other key actions:

- Use non-felt soled boots to further reduce the risk of spreading AIS.
- Fish caught for eating or taxidermy should be cleaned at designated fish cleaning stations or placed on ice.
- Never dump live fish or other organisms from one water body into another.



Motor Boaters
Stop Aquatic Hitchhikers!™

Clean **Inspect** and **clean off** visible aquatic plants, animals, and mud from watercraft, motor, trailer, and equipment *before leaving water access*.

Scrub hull using a stiff brush.

Rinse watercraft, trailer, and equipment with high pressure hot water when possible.

Flush motor according to owner's manual.

Jet Boats and Personal Watercraft (PWCs) users should also:

Inspect and **clean off** visible aquatic plants, animals, and mud from hull, trailer, intake grate and steering nozzle, etc.

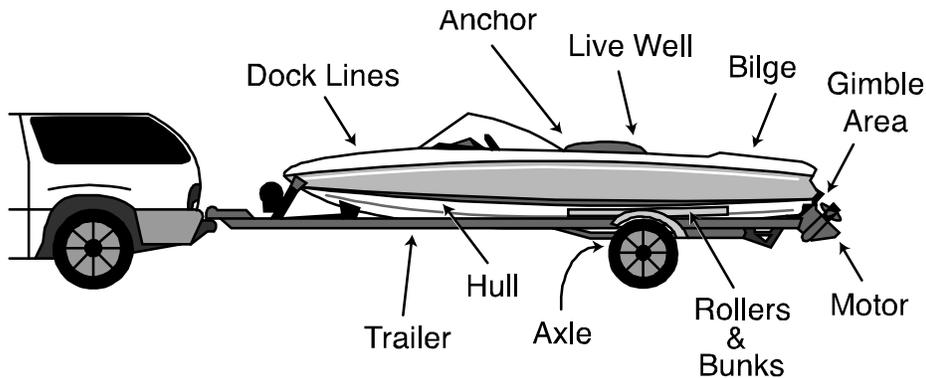
Run engine 5-10 seconds to blow out excess water and vegetation from internal drive *before leaving water access*.

Sailors should also:

Inspect and **clean off** visible aquatic plants, animals, and mud from the centerboard, bilge board wells, rudderpost, trailer and other equipment *before leaving water access*.

Drain water from watercraft, motor, bilge, bladder tanks, livewell, and portable bait containers *before leaving water access*.

Dry everything for **five days** or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen OR wipe with a towel *before reuse*.



Non-Motorized Boaters Stop Aquatic Hitchhikers!™

For canoes, boards, rafts, kayaks, rowboats, paddleboats, inflatables, sculls, and other non-motorized recreational watercraft:

Clean *Inspect* and *clean off* any visible aquatic plants, animals, and mud from watercraft, gear, paddles, floats, ropes, anchors, dip nets, and trailer *before leaving water access*.

Scrub hull using a stiff brush.

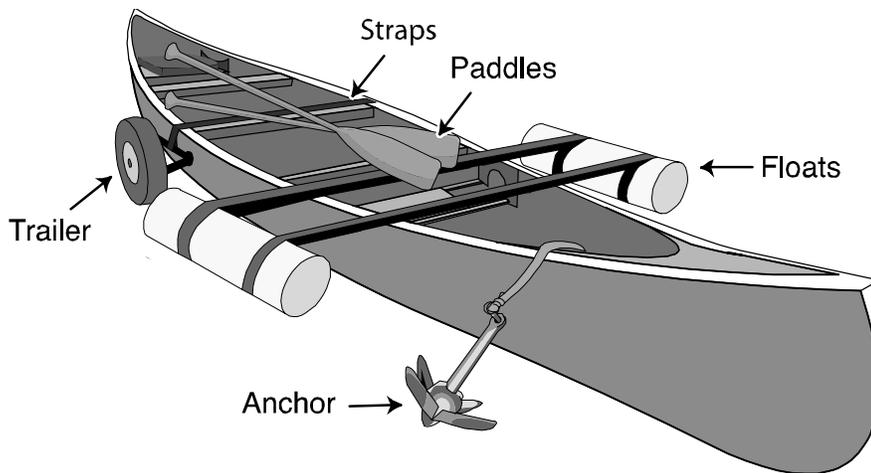
Rinse watercraft, trailer and equipment with high pressure hot water, when possible.

Drain water from watercraft, sponges, bailers, and water containing devices *before leaving water access*.

Dry everything *five days* or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen OR wipe with a towel *before reuse*.

Completely dry inflatables and other recreational watercraft *before storing*.

Wear quick-dry footwear or bring a second pair of footwear with you when portaging between waterbodies.



Scuba Divers and Snorkelers Stop Aquatic Hitchhikers!™

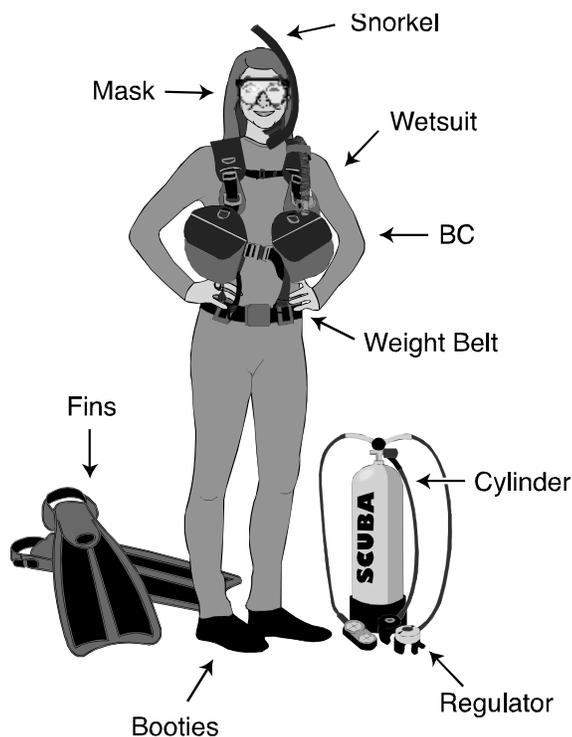
Clean *Inspect* and *clean off* visible plants, animals and mud from wetsuit, dry suit, mask, snorkel, fins, buoyancy compensator (BC), regulator, cylinder, weight belt, watercraft, motor, and trailer *before leaving water access*.

Soak gear used in saltwater dives in 5% dishwashing liquid solution (1 cup/gallon)¹, or gear used in freshwater dives in 3.5% salt solution, (½ cup/gallon)² for 30 minutes.

Rinse inside and outside of gear with hot water, when possible.

Drain water from BC, regulator, cylinder boot, watercraft, motor, and any water containing devices *before leaving water access*.

Dry everything *five days* or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen **OR wipe** with a towel *before reuse*.



**Seaplane Operators
Stop Aquatic Hitchhikers!™**

Clean **Inspect** and **clean off** any visible aquatic plants, animals, and mud from pontoons, cross members, steps, transom, rudders, chine, wheel wells, mooring ropes, wires, and cables.

Scrub off any floats with a stiff brush.

Rinse landing gear with high pressure hot water, when possible.

Land plane in marine waters if moving between known infested freshwater as this can be an effective method of killing freshwater AIS.

At water take-off:

- Avoid taxiing through aquatic plants.
- Raise and lower water rudders several times to clear off plants.

After water take-off:

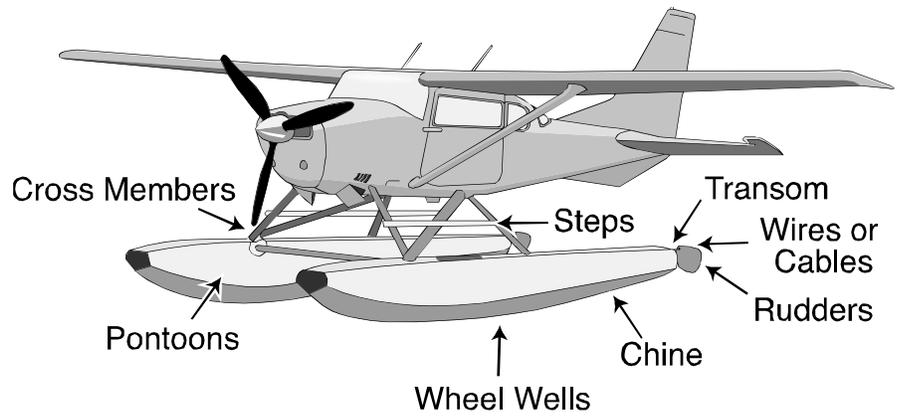
- Raise and lower water rudders several times to dislodge aquatic plant fragments while flying over the waters you left or over land.
- If aquatic plants remain visible on aircraft, return to same water body and clean them off.

Drain **Pump** water from floats *before take-off*.

Dry everything **five days** or more, unless otherwise required by local or state laws, when moving between waters to kill small species not easily seen **OR wipe** with a towel *before reuse*.

Runway land (if so equipped) or haul out and clean aircraft previously used in known invasive species infested waters as soon as possible after arrival at the destination.

Store aircraft on land when possible. Hot summer temperatures and flights during dry weather will help kill aquatic invasive plants and animals that may be on floats.

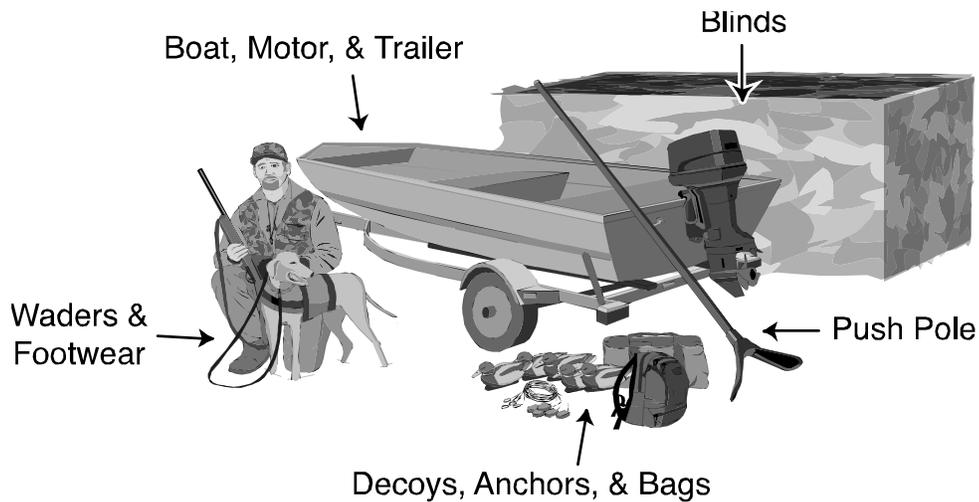


**Waterfowl Hunters
Stop Aquatic Hitchhikers!™**

- Clean** *Inspect and clean off* visible plants, animals and mud from waders, hip boots, watercraft, motor, trailer, ATV's, push poles, decoys, decoy lines and anchors *before leaving area.*
- Brush* hunting dogs and rinse kennels with tap water.
- Drain** water from watercraft, motor, bilge and other water containing devices *before leaving water access.*
- Dry** everything **five days** or more, unless otherwise required by local or state laws, **OR wipe** with a towel *before reuse.*

Other key actions:

- Use non-felt soled boots to further reduce the risk of spreading AIS.
- Cut emergent vegetation above waterline for blinds or camouflage in accordance with regulations.
- Use elliptical and bulb-shaped anchors to help avoid snagging aquatic plants.



¹<http://www.lakegeorgeassociation.org/what-we-do/Invasive-Species/documents/cleanwetsuitscleanwaterlowrescard.pdf>

²<http://www.usbr.gov/mussels/prevention/docs/EquipmentInspectionandCleaningManual2012.pdf>

Committee Members

NAME	AGENCY
Lad Aikens	REEF
James Ballard	Gulf States Marine Fisheries Commission
Glenn Plumb	National Park Service
Amy Benson	U.S. Geological Survey, Southeast Regional Science Center
Rick Boatner	Oregon Department of Fish and Wildlife
Kim Bogenschutz	Association of Fish and Wildlife Agencies& IA DNR
Stas Burgiel	National Invasive Species Council
Pat Campfield	Atlantic States Marine Fisheries Commission
Stephanie Carman	Bureau of Land Management
Sam Chan	Oregon Sea Grant Program
Pat Charlebois	Illinois-Indiana Sea Grant Program
Noreen Clough	BASS
Pat Conzemius	Wildlife Forever
Tammy Davis	Alaska Department of Fish and Game
John DePersenaire	Recreational Fishing Alliance
David Dickerson	Personal Watercraft Industry Association
Joe DiVittorio	Bureau of Reclamation
Teal Edelen	National Fish and Wildlife Foundation
Alyssa Hausman	American Sportfishing Association
Kim Holzer	U.S. Fish and Wildlife Service, Branch Aquatic Invasive Species
Fred Iantorno	Blackhawk Bassmasters
Doug Jensen	University of Minnesota Sea Grant Program and RAC Co-Chair
Doug Keller	Indiana Department of Natural Resources
Verne Lehmborg	Federation of Fly Fishers
Paul Lepisto	Izaak Walton League of America
Jed Livingstone	National Association of Underwater Instructors
Madelyn Martinez	U.S. Army Corps of Engineers
Steve McCaughey	Seaplane Pilots Association
Karen McDowell	San Francisco Estuary Partnership
Jim McManus	Seaplane Pilots Association
Marshall Meyers	Pet Industry Joint Advisory Council
Meg Modley	Lake Champlain Basin Program
Pat Neu	National Professional Anglers Association
Laura Norcutt	U.S. Fish and Wildlife Service, Branch Aquatic Invasive Species, RAC Co-Chair
Walter Opuszynski	North Forest Canoe Trail
Susan Pasko	National Oceanic and Atmospheric Administration
George Peterson	Monterey Bay Aquarium

Jay Rendall	Minnesota Department of Natural Resources
Mark Riechers	Mercury Marine
Gordon Robertson	American Sportfishing Association
Eileen Ryce	Montana Fish, Wildlife and Parks
Patty Seery	Divers Alert Network
Susan Shingledecker	Boat U.S. Foundation
Brad Smith	Professional Association of Diving Instructors
Cindy Squires	National Marine Manufacturers Association
Arisa Teasley	Recreational Boating & Fishing Foundation
Keith Weaver	Georgia Wildlife Resources Division, Fisheries Section
Sarah Whitney	Pennsylvania Sea Grant
Bob Wiltshire	Invasive Species Action Network
John Wullschleger	National Park Service
Libby Yranski	American Sportfishing Association
Sarah Zack	Illinois-Indiana Sea Grant
Joe Zarzynski	Bateaux Below, Inc.

**Voluntary Guidelines to Prevent the
Introduction and Spread of Aquatic Invasive Species:
Water Gardening**

Aquatic Nuisance Species Task Force

September 2013

Background: Water gardens, or aquatic gardens, generally are designed to house and display aquatic plants and fish. They range in size from small patio container gardens to large ponds, both natural and human-made. Despite their beauty, water gardens can lead to introductions of invasive plants and animals into natural waterways.

Many of the plants and animals traditionally used in water gardens are non-native, and can become invasive if introduced into natural waterways. Such introductions can be accidental or purposeful. For example, major rainstorms can wash plants, seeds, fish and other animals from a water garden into an adjacent waterway where they can flourish. Likewise, draining water or dumping water garden plants and animals into a nearby waterbody can lead to an invasive species becoming established.

Introductions into natural waterways can have harmful environmental and economic consequences. This is one reason why many states prohibit release of organisms into natural waterways.

Many states regulate what organisms can be sold for use in water gardens. However, many aquatic plants and animals are available through the online marketplace, which is only loosely regulated. Therefore, it is important for individuals to be aware of their state's regulations to ensure that organisms being considered for purchase are not prohibited. (To find out which species are regulated in each state visit www.takeAIM.org.) Because even non-regulated species could become invasive if introduced into natural waterways, it is also important for water gardeners to know the specific steps that they can take to ensure that their water gardening activities don't lead to introductions of invasive organisms.

The following guidelines are intended to provide water gardeners with consistent invasive-species-prevention recommendations. Accordingly, water gardeners, water gardening societies, retailers, and outreach professionals who work with water gardeners are encouraged to use this information to guide their own activities and when developing outreach tools. More information and examples of outreach tools incorporating these recommendations are available on the Web including www.takeAIM.org and www.Habitattitude.ca/www.Habitattitude.net.

*Please note that these guidelines are not intended for those involved with creating or conducting outreach on rain gardens or stormwater retention basins, although some of the individual recommendations may apply.

Guidelines:

When constructing a new water garden

Locate a new water garden away from all waterways and flood-prone areas. *This will help ensure that the plants and animals in the water garden will not be carried into local ditches, canals, streams, ponds, lakes, etc. as a result of heavy rainfall.*

When adding plants and animals

Choose regionally-native or non-invasive plants and animals. *This will reduce the amount of plant-removal (i.e., weeding) needed to maintain the garden while also reducing the risk to nearby waterways should any organisms be moved by wind, animals, flooding, etc. Moreover, many states regulate the possession of*

invasive species. Using non-invaders will help water gardeners conform to those regulations. Visit www.takeAIM.org to find out which species are regulated in each state.

Purchase from local, licensed nurseries. *Local nurseries are more likely to be aware of state and local regulations because of their licensing requirements. Many jurisdictions require that the license be posted. If the license isn't clearly visible, ask an employee about their licensing.*

Rinse plants in a bucket to remove all dirt and any attached debris including other vegetation, animals, or eggs before planting; strain debris from the bucket water; place this debris and any unwanted packaging material in a sealed plastic bag, freeze thoroughly, and dispose in the trash; dump water on dry land. *This will help keep unwanted plants and animals from being accidentally introduced into the water garden, and keep these same organisms out of adjacent waterways and storm drains that may lead to natural waterways.*

Remove any similarly attached debris from animals before adding them to the water garden; dispose of the debris as above. *This will also help keep unwanted plants and animals from being accidentally introduced into the water garden or into natural waterways.*

When doing maintenance

Check that the water garden remains isolated from natural waterways and areas that flood. *If this is not the case, the above recommendations regarding rinsing and plant and animal choice are even more critical; installation of standard landscape water diverting structures (e.g., water bars, swales) or relocation of the water garden should be considered.*

Remove uninvited plants that colonize the water garden. *A plant that moves into the water garden and becomes established is likely an invasive species. It should be removed and disposed of properly (see below).*

Freeze unwanted plants in a sealed plastic bag and dispose in the trash. *Unwanted plants should not be composted because their seeds and other reproductive plant parts may remain viable.*

Find a new home for unwanted fish and other animals such as a pet retailer, animal shelter, or other water gardener. *If an unwanted animal finds a new home with another water gardener, be sure to share these guidelines with the new owner. If euthanasia is an option, contact a veterinarian or pet retailer for guidance.*

Classroom Guidelines for Preventing the Introduction and Spread of Aquatic Invasive Species (AIS)

Many teachers and students are unaware of the impacts¹ of disposing unwanted live specimens (animals, plants, and microorganisms) into local waters, letting them go down drains or flushing them down the toilet. Recent releases of concern include goldfish, red swamp crayfish, Brazilian elodea, and red-eared slider turtles! It may seem simple and kind hearted, but releases can reduce biodiversity, water quality, harm fishing and native species.

Besides not being good for the environment, releases are illegal in most states. Aquarium fish can compete with native fish. Invasive plants can clog waterways and impair boating, swimming and other recreation. Some organisms can spread diseases and parasites by improper disposal of contaminated water and packing material. Releases can also have economic impacts such as a loss of income that would have come from tourism and fishing, damage to infrastructure from fouling organisms, costs to clean up shorelines, and the devaluation of waterfronts. Preventing releases is important to protect our lakes, rivers, wetlands, estuaries, and oceans from the harmful impacts of AIS.

What can teachers and students do with unwanted live study specimens such as aquatic plants, animals, fish, and microorganisms?

These guidelines support the bi-national *Habitattitude** education campaign, which promotes ethical and humane treatment of organisms and alternatives for preventing the release of organisms into the environment through reuse and resale of live organisms, and proper disposal. The guidelines are also meant to comply with federal, state/provincial, tribal, and local regulations concerning possession or transport of AIS.

When obtaining a live study specimen for your classroom:

- ✓ **Research and select** species that comply with federal, state/provincial, tribal and local laws and regulations² which restrict certain species. When possible, choose a species that is native to your region, is not invasive or is a recommended alternative^{1,2,3}.
- ✓ **Confirm** the scientific name of plants or animals that come in a science learning kit with the vendor to ensure you have the correct species information and details about their care.
- ✓ **Inspect the contents and packaging that arrives with your organism.** Remove any unwanted seeds, plants, and animals and dispose according to the guidelines below.
- ✓ **Report** to your state/provincial wildlife or agriculture agency if you observed or suspect that an organism may have escaped from the package in which it was shipped or was accidentally released.
- ✓ **Dispose** of packaging materials in a sealed plastic bag in the trash.
- ✓ **Sterilize** discarded water (¼ teaspoon bleach for each gallon of water) and **dispose** sterilized water down the toilet or sink—never down a storm drain where it could enter and damage local waterways.

What to do with unwanted plants and animals:

- ✓ **Give** unwanted plants and animals to another school or classroom, environmental learning center, aquarium, zoo and where possible return them to the pet store or supplier. If your plant or animal finds a new home with another classroom or is taken home by a student, be sure to emphasize “Don’t Let It Loose” into the environment.

- ✓ **Sign** an Adoption Pledge Form with the new owner (see attached⁴) when organisms are removed from the classroom or when a student is allowed to take an organism home to ensure that they are not released into the environment.
- ✓ **Dispose** of unwanted plants in a sealed plastic bag in the trash. These materials should not be composted because their seeds and other plant parts may spread.
- ✓ **Contact** a veterinarian or pet retailer for guidance on humane disposal of animals. Disposal of live organisms should be considered as the last resort.

Appendix D. State legislation and definitions (2014)

477A.19 AQUATIC INVASIVE SPECIES PREVENTION AID.

Subdivision 1. Definitions. (a) When used in this section, the following terms have the meanings given them in this subdivision.

(b) "Aquatic invasive species" means non-native aquatic organisms that invade water beyond their natural and historic range.

(c) "Watercraft trailer launch" means any public water access site designed for launching watercraft.

(d) "Watercraft trailer parking space" means a parking space designated for a boat trailer at any public water access site designed for launching watercraft.

Subd. 2. Distribution. The money appropriated to aquatic invasive species prevention aid under this section shall be allocated to all counties in the state as follows: 50 percent based on each county's share of watercraft trailer launches and 50 percent based on each county's share of watercraft trailer parking spaces.

Subd. 3. Use of proceeds. A county that receives a distribution under this section must use the proceeds solely to prevent the introduction or limit the spread of aquatic invasive species at all access sites within the county. The county must establish, by resolution or through adoption of a plan, guidelines for the use of the proceeds. The guidelines set by the county board may include, but are not limited to, providing for site-level management, countywide awareness, and other procedures that the county finds necessary to achieve compliance. The county may appropriate the proceeds directly, or may use any portion of the proceeds to provide funding for a joint powers board or cooperative agreement with another political subdivision, a soil and water conservation district in the county, a watershed district in the county, or a lake association located in the county. Any money appropriated by the county to a different entity or political subdivision must be used as required under this section. Each county must submit a copy of its guidelines for use of the proceeds to the Department of Natural Resources by December 31 of the year the payments are received.

Subd. 4. Payments. The commissioner of revenue must compute the amount of aquatic invasive species prevention aid payable to each county under this section. On or before August 1 of each year, the commissioner shall certify the amount to be paid to each county in the following year. The commissioner shall pay aquatic invasive species prevention aid to counties annually at the times provided in section 477A.015. For aid payable in 2014 only, the commissioner shall certify the amount to be paid to each county by July 1, 2014, and payment to the counties must be made at the time provided in section 477A.015 for the first installment of local government aid.

Subd. 5. Appropriation. \$4,500,000 in 2014, and \$10,000,000 each year thereafter, is appropriated from the general fund to the commissioner of revenue to make the payments required under this section.

Appendix E. Meeting rosters for Duluth and Mt. Iron

Two public meetings were held, one in Duluth, MN and one in Mountain Iron, MN on February 3-4, 2015 to gather recommendations for actions in the St. Louis AIS Prevention Plan. A total of 63 individuals (43 in Duluth and 20 in Mountain Iron) were present. Federal, state, tribal, local, business and non-profit organizations were represented. A debriefing meeting between St. Louis County staff and Minnesota Sea Grant was held on February 11, 2015 to discuss outcomes from the meetings and next steps in the planning process.

Last Name	First Name	Organization	Meeting location
Armstrong	Sherri	Fredenberg Township	Duluth
Bickford	Alexandra	US Forest Service	Duluth
Borkholder	Brian	Fond du Lac Band of Lake Superior Chippewa	Duluth
Brady	Val	Natural Resources Research Institute	Duluth
Brooks	Kurt	Member of the Public	Duluth
Butcher	Jason	US Forest Service	Duluth
Campbell	Scott	Canosia Township	Duluth
DiDomenico	Jill	St. Louis River Alliance	Duluth
Donovan	Dan	Pelican Lakeshore Owners Association	Duluth
Dumke	Josh	Natural Resources Research Institute	Duluth
Falk	Miles	Great Lakes Indian Fish and Wildlife Commission	Duluth
Fink	Dennis	Eagle's Nest Resort	Duluth
Forester	Jeff	Minnesota Lakes and Rivers Advocates	Duluth
Hagley	Cindy	University of Minnesota Sea Grant	Duluth
Hanzal	Randy	Minnesota Department of Natural Resources	Duluth
Hayden	Barb	St. Louis County	Duluth
Hoffman	Joel	US Environmental Protection Agency	Duluth
Hull	Keri	Minnesota Department of Natural Resources	Duluth
Hunsicker	Phil	Minnesota Department of Natural Resources	Duluth
Jensen	Doug	University of Minnesota Sea Grant	Duluth
Johnson	Dewey	Grand Lake Township	Duluth
Kaspar	Tyler	1854 Treaty Authority	Duluth
Kitson	Marte	University of Minnesota Sea Grant	Duluth
Kittelson	Tonia	Friends of the Boundary Waters Wilderness	Duluth
Lee	Brandon	Express Employment Professionals	Duluth
Mack	Reynold	Burntside Lake Association	Duluth
Majewski	Bill	St. Louis River Alliance	Duluth
Manns	Mary	Caribou Lake Association	Duluth
Marchand	Tom	Caribou Lake Association	Duluth

Last Name	First Name	Organization	Meeting location
Mead	Phyllis	Pequaywan Lakes Association	Duluth
Mead	Scott	Pequaywan Lakes Association/Pequaywan Township	Duluth
Modean	Rocci	Pike Lake Area Association	Duluth
Modean	Larry	Pike Lake Area Association	Duluth
Sawatzky	Sheri	Sportsmen's Club of Lake Vermilion	Duluth
Sironen	Mary Ann	Town of Duluth	Duluth
Skafta	Cheryl	City of Duluth	Duluth
Slade	Andrew	Minnesota Environmental Partnership	Duluth
Tefft	Bill	Ely Field Naturalists	Duluth
Thomforde	Larry	White Iron Chain of Lakes Association	Duluth
Voxland	Phil	Burntside Lake Association	Duluth
Werner	John	Rice Lake Township	Duluth
Yapel	Dave	St. Louis County	Duluth
Yonke	Alice	South St. Louis SWCD	Duluth
Ankrum	Howard	Sportsmen's Club of Lake Vermilion	Mountain Iron
Curtis	Monika	Eagle's Nest Lake Association	Mountain Iron
Grantges	Bill	Itasca Water Legacy Partnership	Mountain Iron
Hayden	Barb	St. Louis County	Mountain Iron
Jensen	Doug	University of Minnesota Sea Grant	Mountain Iron
Kitson	Marte	University of Minnesota Sea Grant	Mountain Iron
Lampella	Tyler	St. Louis County	Mountain Iron
Lovgren	Jeff	Sportsmen's Club of Lake Vermilion	Mountain Iron
Maass	Lisa	Voyageurs National Park	Mountain Iron
Mogush	Jeff	Eagles Nest Township Association	Mountain Iron
Oliver	William	Sand Lake Association	Mountain Iron
Passe	Derrick	Lake County SWCD	Mountain Iron
Peterson	Mark	North St. Louis SWCD	Mountain Iron
Provinzino	Anita	North St. Louis SWCD	Mountain Iron
Rauker	Steve	St. Louis County Commissioner, 7th district	Mountain Iron
Rukavina	Tom	St. Louis County Commissioner, 4th district	Mountain Iron
Sawatzky	Sheri	Sportsmen's Club of Lake Vermilion	Mountain Iron
Wilson	Bob	Sportsmen's Club of Lake Vermilion	Mountain Iron
Yapel	Dave	St. Louis County	Mountain Iron
Zinter	Dennis	McDavitt Township	Mountain Iron