

A Minnesota State Management Plan for Invasive Species

This plan was developed by a workgroup of the Minnesota Invasive Species Advisory Council and revised based upon input gathered at a stakeholder workshop, a public review period, a Tribal meeting and review, MISAC member review, and other input.

October 20, 2009

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Statement of Endorsement and Support

The participants in the development of the Minnesota State Management Plan for Invasive Species agree that the elements, desired outcomes, strategies, and actions outlined in the plan provide a structure that, if supported and advanced through individual or cooperative actions, will further the effective management of invasive species across all lands, waters, and jurisdictions in the State of Minnesota.

Supporting organizations as of October 20, 2009:

Leech Lake Band of Ojibwe - Division of Resource Management

Minnesota Association of County Agricultural Inspectors

Minnesota Board of Water and Soil Resources

Minnesota Department of Agriculture

Minnesota Department of Natural Resources

Minnesota Department of Transportation

Minnesota Forestry Association

Minnesota Nursery and Landscape Association

National Park Service

University of Minnesota Extension

University of Minnesota Sea Grant Program

U.S. Department of Agriculture – APHIS – PPQ (Minnesota Office)

U.S Fish and Wildlife Service (Region 3)

Executive Summary

Introduction

Invasive species are defined as a nonnative species that: (1) causes or may cause economic or environmental harm or harm to human health; or (2) threatens or may threaten natural resources or the use of natural resources in the state. Under the leadership of Minnesota Invasive Species Advisory Council (MISAC)—a diverse group with a common interest in battling invasive species in Minnesota—an ad hoc team developed a plan framework to address terrestrial and aquatic invasive species issues in the state.

Minnesota Statutes require the Departments of Agriculture and Natural Resources to establish statewide coordinating programs for invasive species. The statutes also require them to prepare this statewide invasive species management plan to coordinate the aspects of invasive species activities in Minnesota. MISAC took a lead role to develop this plan which can be implemented by MISAC member organizations and other entities in the state. MISAC is co-chaired by the Minnesota Department of Agriculture (MDA) and Minnesota Department of Natural Resources (DNR) and is composed of 35 members and representatives.

Species and Geographic area Covered by the Plan

This plan is intended to cover the full range of species: aquatic animals, aquatic plants, terrestrial animals, terrestrial plants, and pathogens. More details about pathogens, such as in the rankings of threats and actions, will be added to various parts of the plan in the future. This plan is intended to address invasive species issues in the entire state of Minnesota (see Figures 1 and 2).

Purpose and Benefit of a Statewide Plan

The primary purpose of this plan and its addendums is to provide a framework to *coordinate and guide* efforts to prevent the introduction, to reduce the spread, and to promote appropriate management of invasive species populations within the State of Minnesota by state, federal, tribal, and local governments, as well as the private sector.

The benefit of implementing a state plan will be:

"Minimizing the negative impacts caused by invasive species to native plants and animals, natural ecosystems, recreation, tourism, agriculture, businesses, and human health in Minnesota".

Many other invasive species plans exist or are being developed at the national, regional, state, and local levels. This plan is intended to work along with those plans and not replace them.

Plan Development and Review

A workgroup of individuals from MISAC (see Appendix B for members) began the development of this plan in winter 2005. In fall 2005, MISAC hosted a workshop of its members and invited other stakeholders from across the state who have knowledge in invasive species management or whose organizations members are affected by invasive species to review and comment on the first draft of the plan. The draft plan was revised based on input from MISAC members and workshop participants. This second draft was available for a public comment period in September 2009 (See Appendix G). The plan was submitted to the national Aquatic Nuisance Species Task Force (ANSTF) for technical review and the final draft along with the aquatic related implementation tables were resubmitted for ANSTF approval to be eligible for federal grants to implement it.

Background, Issues, and Problem Definition

Minnesota's natural resources, industries, agribusiness, recreation, stored products and structures, and human health are threatened or harmed by hundreds of invasive species. Examples, such as the zebra mussel, Eurasian watermilfoil, purple loosestrife, sea lamprey, gypsy moth, Emerald ash borer, garlic mustard, and leafy spurge, may be relatively well known. These species, along with potential future invasive species such as yellow star thistle, hydrilla, and water chestnut could be easily introduced and spread within the state if agencies, organizations, citizens, businesses, and visitors don't take necessary steps to avoid introducing or spreading them.

There are many pathways of introduction and spread of invasive species. Most species introductions are the result of people's actions. Some introductions, such as common carp, European buckthorn, and purple loosestrife, were intentional and caused unexpected harm. But many other introductions are unintentional. Invasive species are often unknowingly carried in or on animals, vehicles, ships, commercial goods, produce, wood, water, and even clothing. Ballast water discharge from ships continues to be a pathway of introduction for aquatic species, such as zebra mussels and round gobies, into the Duluth harbor and other Minnesota ports on Lake Superior. Transportation of firewood is an example of a pathway that can introduce and spread invasive insects such as emerald ash borer into the state.

The general approaches to address the invasive species problem are often similar across the range of species and pathways of introduction and spread. Because there are many federal, state, local, tribal, and private entities involved in addressing the invasive species problem, using a framework established by this plan for all types of invasive species can aid in addressing the issue cooperatively, and using generally accepted and transparent approaches.

While the approaches are often common among species, there are not sufficient resources, capacity, knowledge, or need to treat all invasive species/situations in a similar manner. For many species there are no tools to manage them once introduced and for others, better management tools are needed. There is a need to prioritize prevention, detection, rapid responses, containment or quarantine, and management actions.

Authorities and Programs

Within the state, there are numerous entities who have programs and regulatory authorities related to invasive species. Some of these may exist under programs or address categories of species with different names: noxious weeds, agricultural pests, plant pests, aquatic invasive species, and aquatic nuisance species. There are agencies with the responsibility for review of potential new introductions of nonnative species to ensure that potentially invasive species are not introduced. DNR has the authority, under Minnesota Statutes 84D, to review and authorize or deny future introductions of *unclassified nonnative species* of aquatic plants and wild animals into the wild for beneficial purposes. USDA-APHIS and Minnesota Department of Agriculture have the authority to approve or deny introductions of nonnative species of insects for biological control. There are also many other entities that manage invasive species although they don't have assigned invasive species responsibilities (e.g., The Nature Conservancy, Lake Minnetonka Conservation District, and Minneapolis Parks and Recreation). Information is provided about the various authorities, responsibilities of agencies, landowners, and others. In addition, the information in Appendix C describes the responsibilities and activities of many agencies and organizations in the state regarding invasive species.

Elements, Desired Outcomes, Strategies, Actions

This plan includes four Elements, their Desired Outcomes, Strategies, and Actions that form the framework of the state plan. During plan development, planning terms such as goals and objectives were purposefully avoided because of many varied opinions of their meanings. The first three Elements address separate phases of invasive species responses and the fourth Element addresses coordination at multiple levels.

Element I. Prevention

Desired Outcome: Participants will actively seek to prevent the introduction of new invasive species in Minnesota

Element II. Early Detection, Rapid Response, and Containment

Desired Outcome: Participants will work to detect new invasive species infestations and support the infrastructure necessary to rapidly eradicate, or suppress, and contain high priority infestations.

Element III. Management of Invasive Species

Desired Outcome: Participants will work to reduce the impacts caused by established invasive species to Minnesota's ecology, society, and economy.

Element IV. Leadership and Coordination

Desired Outcome: Participants will seek to collaborate with intrastate, interstate, and international partners to help coordinate invasive species related efforts.

Each Element has from seven to 17 strategies to help attain the desired outcome for that element. More strategies and actions may be added in the future.

Participating Entities and Plan Implementation

How the plan will be implemented - The participants involved in implementing the plan may be any entity in the state willing to do so. Key participants will include state and federal agencies that have assigned responsibilities related to invasive species and MISAC. Other governmental and non-governmental entities can participate in the implementation of the plan. Ideally, participants will determine which actions in the plan are appropriate for them to implement and will create an implementation table for their entity that can serve as their own invasive species plan. The plan will be implemented according to the implementation tables for each plan partner. Priorities for implementing an entity's actions will be determined by the entity that prepared the table.

Implementation Tables - The plan includes an addendum database of implementable actions, which were completed by diverse partners interested in the common goal to respond to invasive species. It is expected that implementable actions will be dynamic and may change due to changes in authority, priorities, resources and expertise. Information in the implementation database will be a bridge between the strategic planning and operational planning and can be modified without changing this plan framework. The plan will be implemented according to the implementation tables prepared by each plan partner. "Ongoing" actions in the table will be implemented unless replaced by higher priority actions. "Proposed" actions will be implemented when funds or staff resources are made available for those new actions.

Introduction

Invasive species are defined in Minnesota Statutes as a nonnative species that: (1) causes or may cause economic or environmental harm or harm to human health; or (2) threatens or may threaten natural resources or the use of natural resources in the state. Many agencies, organizations, scientists, and private citizens presently strive to minimize the introduction of invasive species, limit their spread, and to control the numbers that are already present in North America. In Minnesota, these include agencies and organizations such as the Departments of Natural Resources, Agriculture, and Transportation, Minnesota Sea Grant Program, the U.S. Department of Agriculture, the U.S. Fish and Wildlife Service, the University of Minnesota, conservation districts, the National Park Service, Natural Resources Conservation Service, The Nature Conservancy, Minnesota Waters and its members, counties, and townships.

The Minnesota Invasive Species Advisory Council (MISAC), a diverse group with a common interest in battling nonnative invasive species in Minnesota, was initiated in May 2001. The Council was formed in response to Presidential Executive Order 13112 on invasive species, the National Invasive Species Management Plan, and Minnesota Legislation that encouraged the state to plan and take action on invasive species. The council is co-chaired by the Minnesota Department of Agriculture (MDA) and Minnesota Department of Natural Resources (DNR) and now has 35 members and representatives from the following organizations:

- Bailey Nurseries,
- Great River Greening,
- Leech Lake Division of Resource Management,
- Minneapolis Park & Recreation Board,
- Minnesota Association of County Agricultural Inspectors,
- Minnesota Board of Water and Soil Resources,
- Minnesota Chapter of the Soil and Water Conservation Society,
- Minnesota Crop Improvement Association,
- Minnesota Forestry Association,
- Minnesota Department of Transportation,
- Minnesota Golf Course Superintendents Association,
- Minnesota Native Plant Society,
- Minnesota Nursery and Landscape,
- Minnesota Shade Tree Advisory Committee,
- National Park Service,
- Natural Resources Conservation Service,
- The Nature Conservancy,
- U.S. Corp of Engineers,
- University of Minnesota,
- University of Minnesota Sea Grant Program,
- U.S. Army Corp of Engineers,
- U.S. Department of Agriculture - APHIS,
- U.S. Department of Agriculture - Forest Service, and
- U.S. Fish and Wildlife Service.

The purpose of MISAC is to facilitate statewide coordination and cooperation on invasive species — including 1) review of information concerning the current status, management and spread of terrestrial and aquatic invasive insect, plant, animal and pathogen species into and within Minnesota; 2) to work cooperatively to prevent new introductions, identify and locate

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invasive species; 3) to contain established or *eradicate* introductions; 4) to manage invasions and take other actions in order to minimize invasive species impacts within Minnesota; and 5) to address these and other existing needs by maximizing available resources.

Minnesota Statutes require the Departments of Agriculture and Natural Resources to establish statewide coordinating programs for invasive species. Statutes also require them to prepare this statewide invasive species management plan to coordinate the many aspects of invasive species activities in Minnesota. MISAC has taken lead role to develop the plan with the assistance of a State Plan Work Group (see Appendix B).

How a Statewide Invasive Species Plan Can Help

The primary purpose of this plan and its addendums is to provide a framework to coordinate and guide efforts to prevent the introduction, to reduce the spread, and to promote appropriate management of populations of invasive species within the State of Minnesota by state, federal, and local governments, as well as the private sector.

The benefit of implementing a state plan will be:

"Minimizing the negative impacts caused by invasive species to native plants and animals, natural ecosystems, recreation, tourism, agriculture, businesses, and human health in Minnesota".

By making this statewide plan available to Minnesotans, it provides a means to identify the numerous participants, desired outcomes, strategies, and future needs to address the invasive species problem in the state.

Required Content of Plan

Specific contents of this plan are required for various reasons. Plan contents and format are guided by the following sources below:

- Minnesota Statutes 84D.02 describes the plan requirements for the Department of Natural Resources (see Appendix E).
- Minnesota Statutes 18G.12 describes the plan requirements for the Minnesota Department of Agriculture (see Appendix E).
- The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 as amended by the National Invasive Species Act of 1996 (see Appendix D); and
- Guidelines established by the national Aquatic Nuisance Species Task Force describe the components that must be included in the plan so state and tribal governments are eligible for grants from the U.S. Fish and Wildlife Service to implement the plan (see Appendix D).

The state statutes listed above call for "long-term" invasive species management plans and the Federal act mentioned above calls for "comprehensive" management plans. This state plan is intended to fulfill the requirements of both of these types of management plans.

Species Covered by the Plan

This plan is intended to cover the full range of species: aquatic animals, aquatic plants, terrestrial animals, terrestrial plants, and pathogens. More details about pathogens, such as in the rankings of threats and actions, will be added to various parts of the plan in the future.

Geographic Area Covered by the Plan

This plan is intended to address invasive species issues in the entire state of Minnesota (see Figures 1 and 2). Minnesota has tremendous aquatic resources. It contains 11,842 lakes over 10 acres; 6,564 rivers totaling 69,200 miles in length, and 9.3 million acres of wetlands. Total surface water area in Minnesota including wetlands is 13,136,357 acres. Minnesota's waters flow outward in three directions: north to Hudson Bay in Canada (via the Red River basin), east to the Atlantic Ocean (via the Lake Superior/Great Lakes basin), and south to the Gulf of Mexico (via the Sioux River and Mississippi River basins).

Minnesota has tremendous agricultural, forest, and other terrestrial resources. They include 16.3 million acres of forest including the Chippewa National Forest, Superior National Forest, and 3.9 million acres of state forests. There are 27 million acres of farmland in the state. There are 11 federally recognized Indian tribes with elected or appointed tribal governments in Minnesota. All of the water resources, forests, farmland, road corridors, and other lands, whether federal, tribal, state, local or privately owned or managed, are subject to impacts from invasive species.

Plan Development and Review

The development of this plan, which addresses both terrestrial and aquatic invasive species, began in 2005. Some portions of it were formulated even earlier. A workgroup of individuals from the Minnesota Invasive Species Advisory Council (MISAC; see appendix B for members) met regularly to develop the plan, section by section. While in draft, MISAC scheduled a workshop of its members and many other federal, state, local, and non-governmental entities from throughout the state who have knowledge in invasive species management or whose organizations members are affected by invasive species. The purpose of the workshop was to debut the draft plan; seek input into the framework of elements, strategies and actions; and begin the formulation of implementation tables for numerous entities that may participate in the plan's implementation.



Following the workshop, the draft plan was revised based on input from the workshop participants and others. The second draft was available for a public comment period in September 2009 and a meeting was held on September 22, 2009 to broaden Tribal review and encourage participation in the plan. Following the public comment period, comments were included in Appendix G and the plan was further revised and finalized. The plan was submitted to the national Aquatic Nuisance Species Task Force (ANSTF) for technical review and the

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final plan along with the aquatic related implementation tables were resubmitted for ANSTF approval. Once approved, the state and tribes will be eligible to apply for grants to implement aquatic portions of the plan from the U.S. Fish and Wildlife Service.

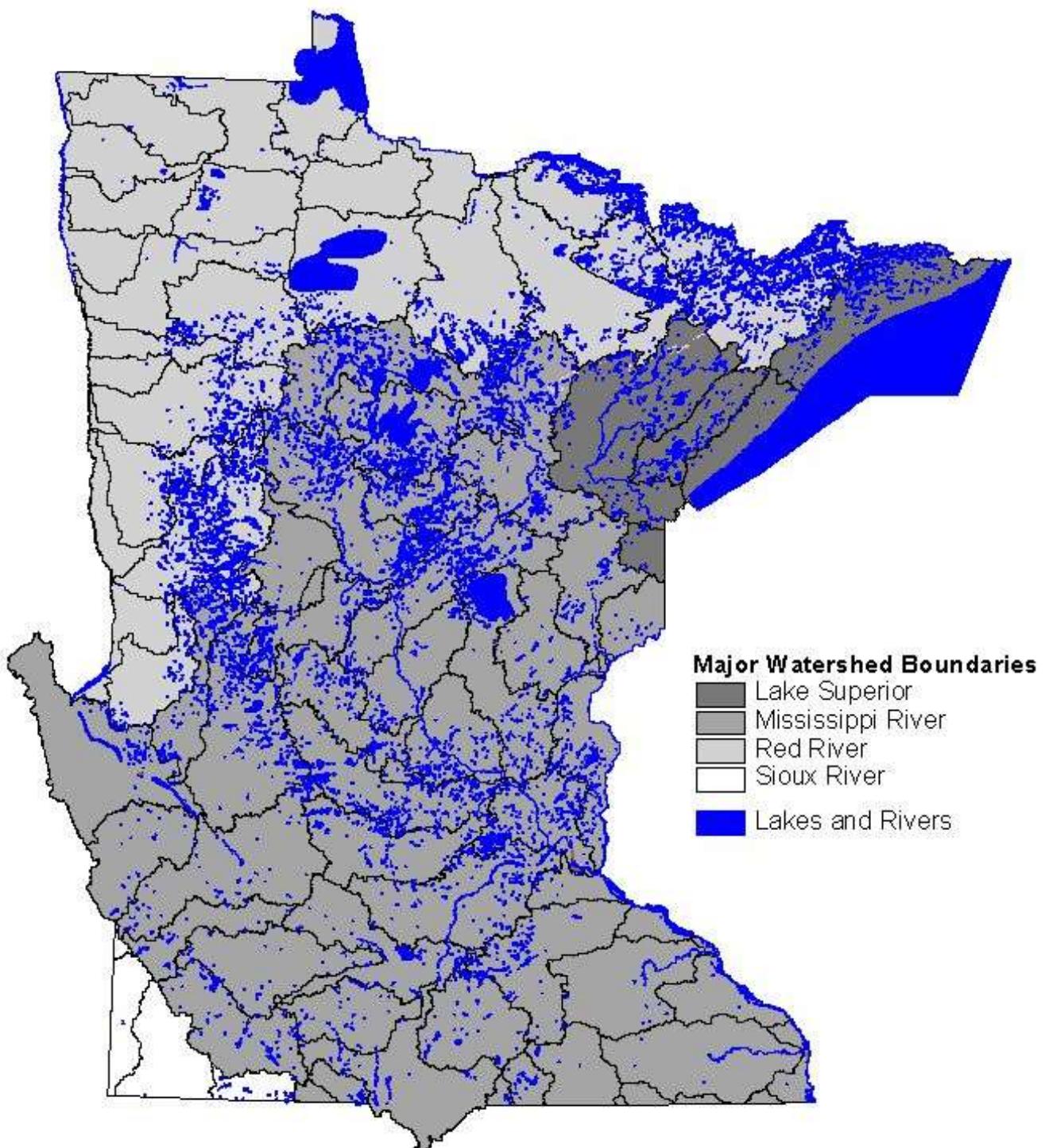


Figure 1. Map of Minnesota Watersheds, Lakes, and Rivers

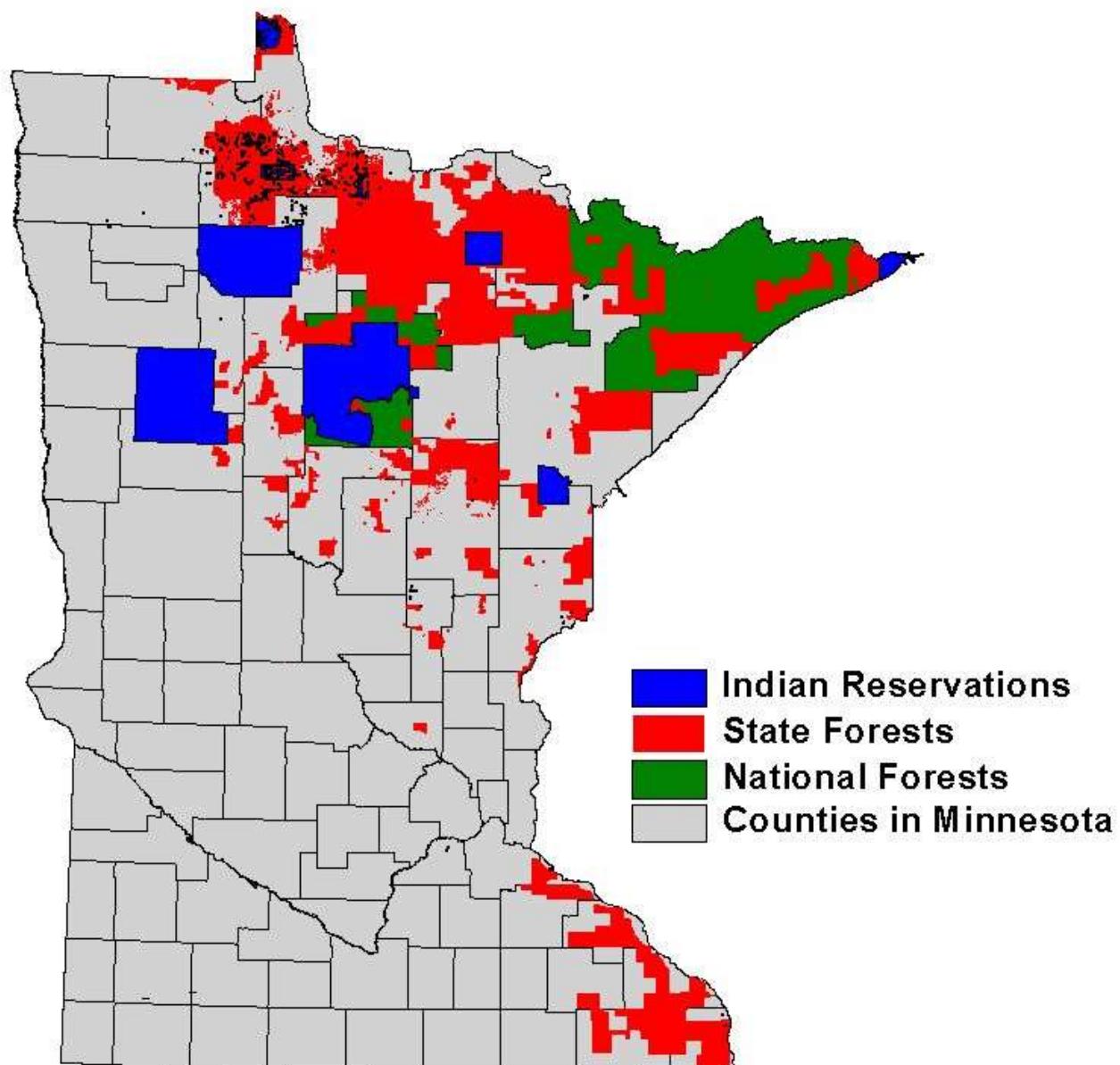


Figure 2. Map of Minnesota with Indian Reservations, State Forests, National Forests, and Counties

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Throughout the plan development numerous aquatic biologists, entomologists, and weed scientists have been involved with the development of the plan. Additionally, professors from the University of Minnesota, which have conducted extensive research on aquatic invasive species, risk assessment, and management of invasive species, participated in the workshop and plan review.

Relation to Other Invasive Species Plans

Many other invasive species plans exist or are being developed at the international, national, tribal, regional, state, and local levels. This plan is intended to work along with those plans and not replace them. It can be used as a framework for developing future plans. State level management plans for high priority species, annual communications and enforcement plans, and other response plans have been or will be prepared to complement the management framework of this plan. Local management plans may also be developed for individual infested water bodies or management areas, as needed. As new plans for species, pathways, or activities are developed, it will be beneficial for those developing them to refer to plans previously developed for larger geographic areas, such as national or regional plans, to simplify the process and maximize cooperation and coordination.

The following are examples of existing aquatic invasive species plans at various levels:

International

- ***Work Group Report on Binational AIS Rapid-Response Policy Framework, 2009.***
International Joint Commission. Draft 2009. Binational AIS Rapid-Response Policy Framework Advisory Work Group to the IJC (IJC), 2009. Great Lakes Water Quality Agreement Priorities 2007-2009 Series. IJC Special Publication 2009-04, Windsor, Ontario, Canada.

National

- ***Management and control plan for bighead, black, grass, and silver carps in the United States.*** Conover, G., R. Simmonds, and M. Whalen, editors. 2007. Asian Carp Working Group, Aquatic Nuisance Species Task Force, Washington, D.C. 190 pp.

Interstate

- ***St. Croix National Scenic Riverway Comprehensive Interstate Management Plan for the Prevention and Control of Nonindigenous Aquatic Nuisance Species.*** Developed cooperatively by: Great Lakes Indian Fish and Wildlife Commission, Lower St. Croix Management Commission, Minnesota Department of Natural Resources, Minnesota-Wisconsin Boundary Area Commission, National Park Service, Wisconsin Department of Natural Resources, U.S. Fish and Wildlife Service, and Upper St. Croix Management Commission. March 30, 1998.

State

- ***Nondigenous Fish in Inland Waters: Response Plan to New Introductions.*** May 1998. By Jodene Hirsch. 21pp. Special Publication 152. Minnesota Department of Natural Resources.
- ***Preventing the Introduction of Asian Carp into Minnesota.*** Minnesota Department of Natural Resources. 2007.

The neighboring states of Wisconsin, Iowa, and North Dakota have management plans for aquatic invasive species. Minnesota DNR, Minnesota Sea Grant and USFWS – Region 3

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aquatic invasive species staff interact with the ANS Coordinators from these states regularly. Often DNR plans cooperative efforts on prevention and containment projects such as implementing the national Stop Aquatic Hitchhikers! campaign in the neighboring states. These states have often consulted with Minnesota as they developed their aquatic invasive species programs and activities (e.g., regulations, signage, watercraft inspections) in part because Minnesota DNR and Minnesota Sea Grant have had active Invasive Species Programs since 1991.

The Asian carp plan for the U.S. referenced above was used to develop the state plan for preventing the introduction of Asian carp into Minnesota. Other national plans, such as the Ruffe Control Program, New Zealand Mudsnail Management & Control Plan, may be useful as references for aquatic invasive species management in Minnesota.

The following are examples of existing terrestrial invasive species plans:

Interstate/Regional

- ***Multi-State Partnership for Security in Agriculture - Emergency Response Plan for Plant Health***

State

- ***Strategic Plan for the Cooperative Management of Gypsy Moth in Minnesota.***
Minnesota Department of Agriculture; Minnesota Department of Natural Resources; USDA. APHIS and Forest Service.
- ***Minnesota Department of Agriculture Plant Protection Emergency Response Plan***
- ***Minnesota Emerald Ash Borer Response Plan***
- ***Minnesota Department of Agriculture Cooperative Soybean Rust Action and Response Plan***
- ***Coordinated Framework for Soybean Rust Surveillance, reporting, Prediction and Management***

A list of Minnesota species-specific plans, regional invasive species plans, and relevant national and international invasive species plans will be listed on the MISAC web site at www.mda.state.mn.us/MISAC/. Links or PDFs of the plans will also be included, when available. Two examples of links with plans are at:

1. the USDA National Invasive Species Information Center site at www.invasivespeciesinfo.gov/animals/controlplans.shtml; and
2. the national ANS Task Force website at www.anstaskforce.gov/control.php

How the Plan Will Be Implemented

Participants - This plan may be implemented by any entity in the state willing to do so. Key participants will include state and federal agencies that have assigned responsibilities related to invasive species and MISAC. Other governmental and non-governmental entities can participate in the implementation of the plan. Ideally, participants will determine which actions in the plan are appropriate for them to implement and will create an implementation table for their entity that can serve as their own invasive species plan. The plan will be implemented according to the implementation tables for each plan partner. Priorities for implementing an entity's actions will be determined by the entity that prepared the table.

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Implementation Table/Database - Detail about implementation for each entity are included in an addendum database of implementable actions, which were completed by diverse partners interested in the common goal to respond to invasive species. It is expected that implementable actions will be dynamic and will change due to changes in authority, priorities, resources and expertise. Information in the database will be organized, sorted, and used in many ways — by element, by strategy, by entity, by types of species (aquatic/terrestrial or plant/animal), by lead entity, by ongoing or proposed actions, or combinations of these. This will be a bridge between the strategic planning and operational planning and can be modified without changing the plan framework. Additional strategies or actions can be added in the implementation table/database as the need for those strategies or actions are determined by participating entities.

Descriptions of the information included in the implementation table/database are included in the Implementation Tables / Database section of this plan. Each line of the table will identify the implementing entity, the action, details about the action, whether the action is ongoing or is proposed, and the time period for implementing the action.

Ongoing and Proposed Actions – The “Ongoing” actions in the table will be implemented unless replaced by higher priority actions. “Proposed” actions will be implemented when funds or staff resources are made available for those new actions. By identifying proposed actions it will help determine future needs and support participants’ requests for funds to implement them.

Background, Issues, and Problem Definition

What are Invasive Species?

Species that have been introduced, or moved, by human activities to a location where they do not naturally occur are termed "nonnative," "exotic," "alien," and "nonindigenous." Nonnative species are not necessarily harmful, in fact many have beneficial purposes. When nonnative species cause ecological or economic problems, they are termed "invasive" (see definitions of invasive species in the Glossary of Terms). Minnesota's natural resources, industries, agribusiness, recreation, stored products and structures, and human health are threatened or harmed by hundreds of invasive species (see Appendix D). Examples, such as the zebra mussel (*Dreissena spp.*), Eurasian watermilfoil (*Myriophyllum spicatum*), purple loosestrife (*Lythrum salicaria*), sea lamprey (*Petromyzon marinus*), gypsy moth (*Lymantria dispar*), Emerald ash borer (*Agrilus planipennis*), garlic mustard (*Alliaria petiolaria*), and leafy spurge (*Euphorbia esula*) may be relatively well known. These species, along with potential future invasives such as yellow star thistle (*Centaurea solstitialis*), hydrilla (*Hydrilla verticillata*), and water chestnut (*Trapa natans*) could be easily introduced and spread within the state if agencies, organizations, citizens, businesses, and visitors don't take necessary steps to avoid introducing or spreading them.

Pathways of Introduction and Spread

There are many pathways of introduction and spread of invasive species. Most species introductions are the result of people's actions. Some introductions, such as common carp (*Cyprinus carpio*), European buckthorn (*Rhamnus cathartica*), and purple loosestrife, were intentional and caused unexpected harm. But many other introductions are unintentional. Invasive species are often unknowingly carried in or on animals, vehicles, ships, commercial goods, produce, wood, water, and even clothing. Experience has shown that it is more productive to manage the pathways than species by species.

Pathways for Aquatic Species - Ballast water discharge from ships continues to be a pathway of introduction for aquatic species into the Duluth harbor and other Minnesota ports on Lake Superior. Ballast water is typically water taken onboard a vessel to assist with vessel draft, buoyancy, and stability. Large vessels (e.g., container ships, bulk carriers, other cargo vessels, tankers, and passenger vessels) normally have dedicated ballast water tanks. The volume of ballast water discharged to Lake Superior is significant. In 2005, more ballast water was discharged to Minnesota Lake Superior harbors than any other Great Lakes port. The Duluth-Superior harbor received approximately 5,387,000,000 gallons of ballast water and the Two Harbors port received approximately 1,876,000,000 gallons (Wiley presentation, January 2008). It was the source of introduction of zebra mussel, New Zealand mudsnail, round (*Apollonia melanostomus*) and tubenose gobies, ruffe (*Gymnocephalus cernuus*), and spiny waterflea (*Bythotrephes longimanus*) and many others into Lake Superior and the Duluth-Superior harbor.

Trailered watercraft and associated recreation equipment are a high-risk pathway in the state for introduction and spread of aquatic species such as Eurasian watermilfoil and zebra mussel that are in the state, and hydrilla and European frog-bit (*Hydrocharis morsus-ranae*) that are not known to be in the state. Movement of boat lifts, docks, and other objects from infested waters are also potential pathways of spread for zebra mussels and invasive snails. Recreational



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activities using waders, hip boots, and other fishing and waterfowl hunting gear are pathways to spread aquatic species such as New Zealand mudsnails, faucet snails, Eurasian watermilfoil, and zebra mussels from infested waters to other waters.



Aquatic plants imported via mail or Internet for watergardens and other uses are a pathway for aquatic invasive species (Maki and Galatowitsch, 2004). Release of live bait by anglers and release of pets, especially from aquaria (such as the pacu shown below) are pathways for introducing nonnative species into the wild. 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. Transport or diversion of water is another pathway for aquatic invasive species movement, especially for zebra mussels, spiny waterfleas, and pathogens.

Natural waterways can be pathways for species to arrive without human assistance, once invasive species have been introduced in other waters or in other parts of a waterway. The ongoing spread of four Asian carp species (bighead carp, *Hypophthalmichthys nobilis*; black carp, *Mylopharyngodon piceus*; grass carp, *Ctenopharyngodon idella*; and silver carp, *Hypophthalmichthys molitrix*) up the Mississippi River are examples of introduction into the state as a result of introductions into interstate waters. Other species could also arrive via interstate waters: round goby and northern snakehead fish in the Mississippi River; many species are in such as bloody red shrimp and viral hemorrhagic septicemia (VHS) are 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 (as is the recent concern about spread to those states from the zebra mussel infested waters in the Detroit Lakes area of Minnesota).



Pathways for Terrestrial Species - There are many pathways to bring invasive species into Minnesota and move them throughout the state. For example, firewood transport and import from other states is a high-risk pathway for forest pest species such as gypsy moth and emerald ash borer, which are invading the state. Straw, gravel, and soil are pathways for seed of many invasive terrestrial plants. Rail, air and other shipments are pathways for insects to be introduced into the state. Tires imported from other states for recycling can spread invasive mosquitoes. Mud and seed on boots, tires, clothing and other objects can be pathways for introducing terrestrial invasive species into trail, forest, wildlife, parks and natural areas as well as farmland.

International Pathways - International pathways can also bring invasive species from other countries directly into Minnesota. Potential entry points include ports of entry, mail facilities, and warehouses that import or handle foreign goods, dunnage holding areas, and container off loading/unpacking locations where shipments are split up and/or repackaged. Other

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introductions can be associated with industry and the surrounding environs to their facilities including nurseries, home garden centers, greenhouses/plant trade groups, cut flower wholesalers, timber resource groups (mills, pallet recycle, firewood dealers, mulch producers etc), zoos and botanical gardens, seed wholesalers, research institutions, aquarium fish and plant wholesalers and retailers, produce warehouses and flea/farmer markets. Minnesotan's activities can also be pathways. Their luggage and mail are also pathways. Internet sales can result in almost anything being shipped directly to the purchaser. People may intentionally smuggle for specialty items, seek species from the "home" country, or introduce species unintentionally through contaminated materials.

Problem Definition

In Minnesota, there are many types of invasive organisms with unique life histories, numerous means of dispersal, varied feasibility of control, and various levels and types of impacts. Too many invasive species occur in the state to describe in detail their threats, pathways, distribution, and management responses in this document (see Appendix D).

Appendix A provides several references on species and management responses in the state. The DNR's annual report (Invasive Species Program 2009) provides a comprehensive review of the aquatic invasive species issues and responses, including distribution maps of priority aquatic invasive species.

Cryptogenic species - There are several cryptogenic species (i.e., those which have not been determined as clearly native) in the state. They are primarily terrestrial insect species, although there is not a complete list available for this plan. The aquatic species, Didymo (*Didymosphenia geminata*), is a cryptogenic species. There is some evidence that it is native to Lake Superior, however there is some evidence that it is spreading with the lake. It is unclear if the population of Didymo in lake superior is the same as populations of the diatom that are invading waters in other states. Therefore, there is concern about its spread from Lake Superior to inland waters in Minnesota.

Approach - Despite these widely varying species, general approaches to address the invasive species problem are often similar across the range of species. Because there are many federal, state, local, tribal, and private entities involved in addressing the invasive species problem, using a framework established by this plan for all types of invasive species can aid in addressing the issue cooperatively, and using generally accepted and transparent approaches.

Prioritization - While the approaches are often common among species, there are not sufficient resources, capacity, knowledge, or need to treat all invasive species/situations in a similar manner. For many invasive species there are no tools to manage them once introduced. For many invasive species, better, more selective management tools are needed. There is a need to prioritize prevention, detection, rapid responses, containment or *quarantine*, and management actions. It must be determined which species should receive high levels of attention in terms of resources allocated, research conducted, and regulations established. It may also be determined that some species should receive lower levels of attention and for some species, none at all. Whether or not to invest in responses to individual nonnative species will depend upon an assortment of factors such as levels of risk or potential harm a species poses, its geographical distribution, authorities over the lands or waters, and the ability to control a species if it establishes in the state. These assessments and prioritization of efforts are key decisions in invasive species management. One of the purposes of this document is to help describe how response allocation choices are made and by whom, what are additional

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response needs, and describe other aspects of invasive species management that would be less obvious without the plan.

Changes over time - Over time, the priority invasive species, management tools, and resources will likely change. This plan will need to be dynamic and those implementing the plan will need to regularly respond to changing circumstances. Priorities in the implementation tables will need to be reviewed and revised and subsequent actions adjusted to address the current priorities with the available resources. Specific actions are included in this plan for that purpose.

Invasive Species Threats to Minnesota

To identify the relative threats of individual nonnative species, the Minnesota Invasive Species Advisory Council ranked the threat of numerous nonnative species to Minnesota, including those with established populations in the state (established), those that have been found in the state but are not established (invading), and those not known to be here (not in state). Species that are invasive or potentially invasive were placed in several categories of threat: Severe, Moderate, Minimal, and Watch/Unknown Threat. Some species were “considered, but not ranked” if they are unlikely to pose any threats in Minnesota. And other species that are “severe threats in other locations, but could not establish in Minnesota” were identified. Each species was evaluated for its threat to several “impacted areas”: native species/natural communities, use of natural resources, agribusiness, landscaped areas, human health, and structures and stored products. The rankings, as of the date this plan was completed, are shown in Appendix D.

Of the nonnative species that have been ranked by panels of experts for the Minnesota Invasive Species Advisory Council, there are 39 species of severe threat that are established or invading the state such as emerald ash borer, Eurasian water milfoil, and zebra mussels. Thirty-five species of moderate threat are established in the state such as the starling and St. John’s wort. Twenty-six species were identified as species to watch such as the Chinese mystery snail and chickory. A total of 25 species that are not in the state are ranked as severe threats and 17 more are moderate threats to Minnesota. These include black carp, European wild boar, and Hydrilla.

The following is a summary by the type of organism.

Aquatic Animals – severe not in state (5), severe invading (3), severe established (8), moderate established (7), moderate not in state (1), and watch (1)

Aquatic plants – severe not in state (4), severe established (3), moderate established (4), and watch (2)

Terrestrial plants – severe not in state (7), severe established (25), moderate not in the state (2), moderate established (21), and watch (20)

Terrestrial animals – severe not in state (1), severe established (2), severe invading (1), moderate established (3), moderate not in state (2), moderate (3), and watch (3)

Insects – severe not in state (5), severe invading (1), moderate invading (1), and moderate not in state (11)

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The following are examples of rankings in each category:

<u>Rank</u>	<u>Example Species</u>
• Severe Threat (established)	zebra mussel, garlic mustard
• Severe Threat (invading)	bighead carp, emerald ash borer
• Severe Threat (not in the state)	hydrilla, wild boar
• Moderate Threat (established)	flowering rush, cut leaf teasel, starling
• Moderate Threat (invading)	gypsy moth
• Moderate Threat (not in the state)	fourspine stickleback, Sechuan pheasant
• Minimal Threat (established)	common burdock, ringnecked pheasant
• Minimal Threat (invading)	no example
• Minimal Threat (not in the state)	no example
• Watch / Unknown Threat	Brazilian elodea, Japanese hops,
• Considered but not ranked	Banded nardo, Osage orange
• Severe pests in other areas, but could not establish in Minnesota	Chinese and Japanese mitten crabs

A database of ranked species and the criteria used for the rankings will be available on the MISAC website at www.mda.state.mn.us/MISAC/ and will be revised and added to periodically. Additional lists and rankings of other invasive species have been developed by various entities and are available for reference from them (e.g., USDA-APHIS and US Forest Service).

Panels of experts were used to determine the appropriate category for each species. Five panels, one for each group of species (aquatic plants, aquatic animals, terrestrial plants, terrestrial animals, and terrestrial insects), included representation invited from the following areas: agriculture, conservation / environmental groups, industry, natural resources, local / tribal government, federal government, and at-large.

The ranking information serves a variety of purposes:

In an education and outreach context the rankings can:

- help explain that not all nonnative species are invasive;
- identify knowledge gaps;
- provide recommendations regarding use of species; and
- encourage sightings;

Rankings can help in prioritizing and justifying management efforts by alerting managers of natural areas, agricultural lands, and landscaped areas to currently, or potentially, problematic species. The rankings also help determine which invasive species are the most important to manage within a specific area.

For purposes of survey and monitoring, rankings can:

- identify species that should be “watched” if they are in the state and species to “watch for” if they are not yet known to be in the state or a specific area within the state;
- assist in seeking funding to conduct *field surveys* for high priority species (e.g., Cooperative Agricultural Pest Surveys).

State rankings can also aide in formulating policy by:

- identifying species for formal risk assessment as part of potential regulation by MDA, DNR, or counties; and

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- assisting in identification of species for state quarantine by MDA.

Additional Ranking of Threats

In addition to the MISAC rankings, other sources of information exist for ranking of species threats to the state including foreign pests of concern. USDA-APHIS-PPQ maintains information about foreign pests of concern and field survey methods. USDA-APHIS-PPQ has a program coordinated with state cooperators to address international threats through our Cooperative Agricultural Pest Survey (CAPS) program. The mission of CAPS program is to rank and provide a survey profile of exotic plant pests in the United States deemed to be of regulatory significance to USDA-APHIS-PPQ, State Departments of Agriculture, tribal governments, and cooperators by:

- Confirming the presence or absence of environmentally and/or economically harmful plant pests that impact agriculture or the environment, and that have potential to be of export significance; and
- Establishing and maintaining a comprehensive network of cooperators and stakeholders to facilitate our mission and to safeguard our American plant resources.

The website with various information about the program including pest lists, ranking and proposed *field survey* methods is <http://ceris.purdue.edu/caps/>.

Aquatic Invasive Species and Priorities

As indicated by the MISAC rankings of aquatic invasive species threats in Appendix D, there are several species in the state that are **severe threats** to natural resources and their use: common carp, curly-leaf pondweed, Eurasian watermilfoil (photo on right), faucet snails, flowering rush, New Zealand mudsnail, purple loosestrife, round goby, rusty crayfish, spiny waterfleas, sea lamprey, and zebra/quagga mussels. In general, these are the priority for containment and management in the state and are designated as prohibited invasive species and the waters where they exist are designated as infested waters.



There are invasive aquatic species in the state that are ranked as **moderate threats**: Chinese and banded mystery snails, flowering rush, pink water lilies, and yellow iris. These are the focus of some management and containment particularly flowering rush (photo on left), which is designated as a prohibited invasive species, and has recently been discovered in a major Twin Cities lake. The moderate threats above are designated as regulated invasive species.

Plants - Four aquatic plant species (Eurasian watermilfoil, flowering rush, curly-leaf pondweed, and

purple loosestrife) are ranked as severe threats and present significant problems in the state for water recreation and ecosystems. Therefore they are high priority species for **containment and management**. Eurasian watermilfoil is present in 232 waters. The total number of known purple loosestrife infestations is 2,379. Curly-leaf pondweed is known to occur in 759 lakes in 70

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Minnesota counties. And flowering rush is present in 25 lakes and rivers.

Animals - Of the several aquatic invasive animals present in the state ranked as severe threats, the most problematic and highest priority for **containment and management** are faucet snail, guagga/zebra mussel, New Zealand mudsnail, spiny waterflea, round goby, sea lamprey, and common carp. Zebra mussels are currently confirmed in 24 waters, including areas of Lake Superior, the Mississippi River from Crow Wing County to the Iowa border, the Alexandria area chain of lakes, Pelican Lake near Detroit Lakes, and the St. Croix River from Stillwater downstream. New Zealand mudsnails are only known to be present in the Duluth harbor area of Lake Superior. Spiny waterflea have continued to spread along Minnesota-Canada border waters and was discovered in Lake Mille Lacs in 2009. Sea lamprey and round goby are present in Lake Superior and its tributaries.

As mentioned in the pathway section, the invasive fish species, bighead (photo below) and silver carp, are invading the state via interstate waterways such as the Mississippi River as a result of escapes in southern states. There is potential for other invasive fish to invade the state from the south via the Mississippi River. They include black carp and the round goby. Information about these species and their impacts is available at:

www.dnr.state.mn.us/invasives/index.html



The highest priority aquatic species for **prevention** are Hydrilla, northern snakehead, bighead carp, silver carp, grass carp, and viral hemorrhagic septicemia (VHS). These are aquatic invasive species that are invading and have not established reproducing populations in the state, or are not present in the state.

Priorities for Pathways of Introduction and Spread

The state has attempted to interrupt the pathways of spread for AIS in several ways. The following are examples of priority approaches to interrupt AIS pathways.

High Priority

- Preventing spread of aquatic invasive species on boats and equipment via public roads has been a priority – using strategies such as laws, enforcement, watercraft inspections and public awareness.
- Preventing spread by transport or diversion of water from infested waters is a high priority – designating infested waters, laws, enforcement, public awareness, and watercraft inspections.
- Preventing downstream spread of AIS is a high priority at locations with new infested waters in previously uninfested watersheds — if there are options.
- Preventing in-water spread of AIS from infested waters to noninfested upstream waters has been a priority where there is local support and involvement – using strategies of regulations and physical barriers.

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- Preventing the introduction of new AIS via ballast water – developing state ballast water requirements and/or supporting better federal regulations; also supporting development and testing of new technology,
- Interrupting the upstream pathway of spread of invasive fish, such as bighead and silver carp, via interstate waters to Minnesota using behavioral barriers.

Medium Priority

- Preventing potential introductions of AIS that could result from aquarium releases.
- Preventing potential introductions of AIS that could result from importation and release of aquatic species used in water gardening.
- Preventing potential introductions that could be the result of distribution of AIS via food markets.

Programs and Regulatory Authorities

Introduction

Within the state, there are numerous entities who have programs and regulatory authorities related to invasive species. Some of these may exist under programs, or address categories of species, with different names: noxious weeds, agricultural pests, plant pests, aquatic invasive species, and aquatic nuisance species. There are also many other governmental and non-governmental entities that manage invasive species although they don't have specific assigned responsibilities: The Nature Conservancy, Lake Minnetonka Conservation District, and Minneapolis Parks and Recreation. The information below provides an overview of the various authorities, responsibilities of agencies, landowners, and others. In addition, the information in Appendix C describes the responsibilities and activities of many agencies and organizations in the state regarding invasive species.

Regulations and Enforcement

A variety of regulations related to invasive species exist at federal, state, and local levels and are administered by many agencies. They are shown in the table below and described in the authorities and programs section of this plan.

<u>Regulatory Category (types of species)</u>	<u>Agencies Involved</u>
State Prohibited and Regulated Invasive Species (wild animals and aquatic plants)	DNR
Unlisted Nonnative Species* (wild animals and aquatic plants)	DNR
State Prohibited and Restricted Noxious Weeds (terrestrial plants)	
• Rules	MDA
• Enforcement	counties, townships & cities
State Restricted (wild boars)	MDA & DNR
State Plant Pest Act (insects and terrestrial plants)	MDA
Tribal Codes (aquatic plants and animals; terrestrial)	Tribes
Federal Noxious Weeds (aquatic and terrestrial plants)	USDA-APHIS
Federal Plant Protection Act (foreign plant pests and diseases)	USDA-APHIS
Interstate Regulations to restrict movement of various pests	USDA-APHIS
Federal Lacey Act / Injurious Wildlife (animals)	USFWS
Federal/State ballast water regulations (aquatic organisms)	U.S. Coast Guard/U.S. EPA/MPCA

* *Unlisted nonnative species are aquatic plants and wild animals that have not been subject to a risk assessment or classified by DNR. Any proposed introductions of these species must follow the process established in M.S. 84D.*

Before classifying nonnative species into regulatory categories, for purposes of restricting or allowing their importation, transportation, possession, sale, and introduction, agencies generally conduct risk assessments and develop rational for the classifications. Federal or State Register notices and Statements of Need and Reasonableness are often prepared prior to classification of species. The involved agencies can be contacted for this information.

DNR has the authority, under Minnesota Statutes 84D, to review and authorize or deny future introductions of *unclassified nonnative species* of aquatic plants and wild animals into the wild for beneficial purposes. USDA-APHIS and Minnesota Department of Agriculture have the authority to approve or deny introductions of nonnative species of insects for biological control.

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Monitoring, Responses, and Management

Many entities can be, and are, involved in the detection, enforcement, and responses to new infestations of invasive species in the state. The type of species and geographic location determine who has responsibilities for detection, rapid responses to keep the species from establishing or spreading if established, and management to reduce nuisance populations. In some situations, there is overlap of responsibilities and often these situations can lead to cooperative efforts.

Examples of the roles of participants in Minnesota are shown below:

Role - Preventing introductions (*inspections*):

Who	Invasive Species Type	Area
DNR	aquatic plants, wild animals	statewide
MDA	terrestrial plants, plant pests	statewide
USDA-APHIS	terrestrial plants, plant pests	statewide
USFWS	injurious wildlife species	statewide
U.S. Coast Guard	aquatic species/ballast water	Lake Superior

Role – Monitoring (early detection, *field surveys*):

Who	Invasive Species Type	Area
DNR	aquatic plants, wild animals	statewide
MDA	plant pests	statewide
UMSGP	aquatic species	statewide
UME	aquatic species	statewide
Tribes	terrestrial and aquatic species	reservations
USDA-APHIS	fed. noxious weeds, plant pests	statewide
Cities, Counties, Townships	noxious weeds, plant pests	county/township
Landowners	noxious weeds, forest pests	their land
Riparian landowners	aquatic plants and animals	waters of the state
Lake Associations	aquatic plants and animals	waters of the state

Role - Responding to the discovery (rapid response, containment):

Who	Invasive Species Type	Area
DNR	aquatic plants, wild animals	statewide
MDA	plant pests	statewide
UMSGP	aquatic species	statewide
UME	aquatic species	statewide
Tribes	terrestrial and aquatic species	reservations
USDA-APHIS	fed. noxious weeds, plant pests	statewide
Government landowner	noxious weeds	their land
Cities, Counties, Townships	noxious weeds, plant pests	county/township
Lake Associations	aquatic plants	waters of the state
Private Landowners	noxious weeds	their land

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Role - Management of established invasive species:

Who	Invasive Species Type	Area
DNR	aquatic plants wild animals forest pests plant pests	portions of public waters statewide statewide statewide
MDA	terrestrial and aquatic plants	statewide
BWSR	terrestrial and aquatic plants	statewide
Tribes	Foreign & PPQ program pests	reservations
USDA-APHIS	noxious weeds	statewide
Cities, Counties, Townships	noxious weeds	county/township
Private landowners	noxious weeds	their land
Government landowner	noxious weeds	their land
Riparian landowners	aquatic plants	nearshore of public waters
Lake Associations	aquatic plant and animals	portions of public waters

Role - Research on species and management tools:

Who	Invasive Species Type	Action
DNR	aquatic plants, wild animals terrestrial plants, plant pests	fund, conduct fund
MDA	terrestrial plants, plant pests	fund, conduct
MnDOT	terrestrial plants	fund
Univ. of Minnesota & other universities	all types of species	fund, conduct
USDA-APHIS	terrestrial plants, plant pests	fund, conduct
U.S. Coast Guard	aquatic species/ballast water	fund
UMSGP	aquatic species	fund

Gaps in Authorities

An assessment of gaps in programs and authorities has not been conducted. It is planned that gaps in the programs and authorities will be identified in the future through the evaluation of actions specified in the implementation database that is an addendum to this plan. The sorting and assessment of actions being implemented will make assessment of those actions that are not being implemented more apparent.

Reporting on Implementation

Two state agencies, the Departments of Agriculture and Natural Resources, are responsible for preparing annual reports on invasive species and progress to address them. Each agency's report is submitted to the State Legislature's Environment Committees by January 15th each year. In addition, the DNR submits reports to the USFWS regarding accomplishments using federal grants to implement state aquatic invasive species related actions. These and other reports are on those agencies' or the MISAC Websites. Minnesota Sea Grant also submits annual reports concerning responses to aquatic invasive species annually to the National Sea Grant College Program and Cooperative Extension Service

Elements, Desired Outcomes, Strategies, Actions

This chapter presents four Elements, and for each Element their Desired Outcomes (representing what the plan will seek to accomplish), Strategies (describing the approach to attain desired outcomes), and Actions (describing the work that is being done or will be done when more resources are available). These four levels of components — Elements, Desired Outcomes, Strategies, and Actions form the framework of the state plan.

During plan development, planning terms such as goals and objectives were purposefully avoided because of many varied opinions of their meanings. The first three Elements address separate phases of invasive species responses and the fourth Element addresses coordination at multiple levels. The plan was built by starting with one Element, developing the statement of desired outcome and brief narrative about the Element, then adding Strategies, and finally adding Actions.

Any entity in the state may be a participant in implementing this plan. Specific information about ongoing and proposed actions, which each entity chooses to implement from the plan, will be compiled into a database of implementation tables. Those implementation tables will be an addendum to the plan. Priorities, costs, and other information about implementation of specific actions will be included in the implementation tables for participating entities. Examples of the content in implementation tables for a few participants are included later in this document.

Note: The terms shown in italics are defined in the Glossary of Terms.

Element I. Prevention

Desired outcome: *Participants will actively seek to prevent the introduction of new invasive species in Minnesota*

It is generally recognized that the most effective strategy against invasive species is to prevent their introduction and establishment. Preventive measures typically offer the most cost-effective means to minimize or eliminate environmental, societal, and economic impacts. Prevention relies on a diverse set of tools and methods, including *inspections*, *outreach*, regulations, and enforcement. Management of existing natural areas and other lands in a way to decrease their susceptibility to invasion by invasive species (e.g., maximizing diversity and reducing disturbance) may also constitute an element of prevention. There is a growing need to examine how we can increase our understanding of managing ecosystems with invasive species as part of the picture. Management should focus on maintaining resilient systems that can act to slow the establishment, spread, and dominance of invasive species. This could lead to a basic shift from focusing solely on control, by adding management of the site to limit invasion as a part of the whole management package.

Prevention Strategies:

1. Understand Risks - Improve understanding of the potential risks associated with *nonnative species* and *pathways* of spread and introduction.

Action a. Identify known and new nonnative species of concern, evaluate their level of risk, and *rank/classify* those **species**. [See MISAC Website; CAPS Website for international pests <http://ceris.purdue.edu/caps/>]

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Action b. Support, fund, and coordinate efforts that allow the responsible agencies to identify, evaluate, rank and *classify* invasive species.

Action c. Identify known and additional **pathways** of introduction, evaluate their level of risk, and rank the relative level of risk of pathways on a continuing basis.

Action d. Support, fund, and coordinate efforts that will identify, evaluate, and rank **pathways**.

2. Coordination - Improve ability of responsible agencies (e.g., BWSR, DNR, USDA-APHIS, UMSGP, MDA, USFWS) to communicate, cooperate, and collaborate on priority prevention strategies for species and pathways.

Action a. Establish an interagency council (MISAC) to discuss *inspection* (in transit or on arrival) and detection (in the wild) and response activities, issues, and responsibilities.

Action b. Distribute lists of prohibited and regulated groups of invasive species and their likely pathways of introduction to agencies in the state responsible for *inspection* and detection.

Action c. Monitor ports of entry and conduct *inspections* for prohibited and regulated groups of invasive species.

Action d. Train staff about invasive species, and evaluate effectiveness of *inspection* efforts.

Action e. State agencies with invasive species responsibilities will monitor federal and regional *inspection* and detection efforts, and coordinate and cooperate on those efforts.

Action f. Determine roles for local agencies and non-governmental entities to assist in prevention and *inspection* efforts.

3. State Regulations - Review state regulations to optimize legal authority for prevention of the import and introduction of invasive species, while recognizing that regulations reflect unique agency approaches and needs.

Action a. Ensure that enforcement authority is clear and appropriate.

Action b. Review existing regulations to identify gaps and needs.

Action c. Explore the need for new approaches or change in legal approach.

Action d. Adopt enforceable and effective rules, permits, or other approaches as appropriate within each responsible agency to augment statutory approach.

Action e. Seek state law changes through the state legislative process if the need is identified by Actions a, b, c above.

4. Federal Regulations - Seek and support more comprehensive and improved federal / international regulations regarding invasive species.

Action a. State and non-governmental entities pursue and support passage of more comprehensive federal regulations through congressional action or by responding to proposed federal rulemaking.

Action b. Modify commodity entry standards as appropriate based on pathway assessment and communicate standards to the Department of Homeland Security.

5. Federal and State Inspections and Enforcement - Continue *inspections*, enforcement of invasive species regulations, and *quarantines* by state and federal agencies.

Action a. Use the MDA inspection and enforcement provisions (Minnesota Statutes, Chapter 18) to provide enforcement authority for plant pests consistent with agricultural statutes and programs.

Action b. Monitor markets for prohibited products and when found, conduct investigation to determine and close source.

Action c. Collaborate with foreign cooperators in offshore mitigation of pests

Action d. Investigate incidents when invasive species are found related to interstate shipments with trace back and trace forward actions to follow distribution chain and take appropriate safeguarding measures.

Action e. Use DNR Conservation Officers, and other state and federal officers/agents to enforce Minnesota Statutes, Chapter 84D and Minnesota Rules 6216 and other

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applicable state and federal regulations according to an annual statewide invasive species enforcement plans.

Action f. Facilitate development of IS-HACCP plans by business, industries, agencies, contractors, researchers, and others.

Action g. Clarify *inspection* authorities of each agency/jurisdiction to allow for cross-agency inspections.

Action h. Train federal, tribal, and state enforcement officers on federal, tribal, state invasive species regulations to facilitate cooperative enforcement efforts.

6. Local Enforcement - Seek and support enforcement efforts by local jurisdictions/agencies (e.g., County Sheriffs and CAI) to enforce state regulations.

Action a. Identify likely local jurisdictions and inquire about cooperative efforts (e.g., DNR to contact lake associations/County Sheriffs and MDA to contact county agricultural inspectors).

Action b. Use peace officers from various jurisdictions/agencies to enforce state regulations (e.g., M.S.84D - civil penalties) and conduct training where appropriate.

Action c. Establish a memorandum of understanding between MDA, USDA-APHIS, DNR and other entities regarding enforcement related to illegal invasive plant sales.

7. Research and Technologies - Improve technological options and strategic approaches, and work to implement appropriate standards that will help prevent introductions of invasive species into the state or connected watersheds (e.g., innovative ballast water management technology and technology for barriers in waterways; alternatives to linking watersheds)

Action a. Conduct, fund, or support research to develop new technologies to prevent/reduce the risks of new introductions of invasive species.

Action b. Support the evaluation of available technology to prevent/reduce the risks of new introductions of invasive species.

Action c. Support use of best available technologies that could prevent the introduction of invasive species into the state. (e.g., development of technological standards)

Action d. Use methods such as AIS-Hazard Analysis and Critical Control Points (AIS-HACCP) to reduce risk of invasive species introduction through business and government operations.

Action e. Encourage the research community in Minnesota to adopt research protocols that will minimize potential introduction and spread of invasive species through research and other scientific activities such as water quality and biological sampling.

(e.g., www.anstaskforce.gov/Documents/Research_Evaluation_Protocol_ANSTF.pdf)

8. Public Awareness - Conduct effective *outreach* programs targeting people who could potentially introduce invasive species into the state.

Action a. Use existing or develop specific messages and actions (e.g., guidelines) for priority audiences (e.g., commercial horticultural trade, recreational boaters, construction companies that use barges, biological supply houses, the pet trade especially in aquatic organisms, firewood sales, and logging industries).

Action b. Participate in state, regional, national evaluation efforts of priority audiences to determine the effectiveness of *outreach* efforts (e.g., boater survey). Use the survey information to improve outreach plans and actions.

Action c. Use enforcement according to the MN DNR statewide Invasive Species Enforcement Plan and watercraft inspectors to inform boaters entering state waters about invasive species, state regulations, and precautions for boaters.

Action d. Observe Invasive Species Month with proclamations and visibility events.

Action e. Develop and distribute invasive species identification informational materials (e.g. TNC's invasive plant card, MNSGP wallet cards)..

Action f. Encourage local growers and horticultural trade to adopt the St. Louis Codes of Conduct which are voluntary codes designed to limit the use and distribution of invasive plant species throughout the nation (see

<http://www.centerforplantconservation.org/invasives>).

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Action g. Support K-12, non-formal, and informal youth education through development and use of lesson plans and curricula, as well as through special events (e.g., county fairs, water festivals).

9. Regional Approaches - Seek interjurisdictional and watershed-wide cooperation and approaches to prevent introductions of potentially invasive species into watersheds that include Minnesota (e.g., Asian carp in other states; barriers in Illinois waterways).

[Note: Some pathways of introduction transcend the authority of a single state to control. A prime example is ballast water discharge from transoceanic shipping, the largest source of aquatic species invasions world-wide (Carlton 1985). The absence of interjurisdictional authority is problematic in regulating the transoceanic vectors transporting aquatic nuisance species to the Great Lakes. Man-made connections between watersheds outside of the state are another example. A third example of this type of pathway is where species are introduced in other states and can reach Minnesota through their movement in natural waterways such as the Mississippi River.]

Action a. Establish, support, and participate in interstate, international, and watershed-based coalitions (e.g., Great Lakes and Mississippi River Basin Panel) to develop regional prevention approaches regarding invasive species.

10. Manage for Prevention - Manage ecosystems in ways that reduce invasion potential. (e.g., replanting native species in areas that have been cleared to reestablish plant communities)

Action a. Minimize disturbance of native plant communities, reestablish native vegetation, maintain diverse native plant and animal populations to reduce the potential for invasive species to invade.

11. Funding – Seek or provide funding and partners from federal, state, and local resources to increase total funds available for invasive species prevention.

Action a. Seek or provide additional funds to implement unfunded actions in the Statewide Management Plan for Invasive Species.

Action b. Maintain partnerships with agencies, academic institutions, non-government organizations, local communities, and others to seek and leverage funds from appropriate sources.

Element II. Early Detection, Rapid Response, and Containment

Desired Outcome: *Participants will work to detect new invasive species infestations and support the infrastructure necessary to rapidly eradicate, or suppress, and contain high priority infestations.*

Early detection and rapid response (EDRR) is sometimes considered the “second line of defense” after prevention. It is a critical component of any effective invasive species management program. When new invasive species infestations are detected, a prompt and coordinated eradication and containment response can reduce the potential establishment, spread, and harmful impacts of a species. This action results in lower cost and less resource damage than implementing a long-term control program after a species is established. Early detection of new infestations requires vigilance and regular monitoring.

Strategies to detect species presence after introduction

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1. Detection - Detect new invasive species **populations** as early as possible and develop a comprehensive system for people to report sightings/presence of high priority nonnative species within Minnesota.

Action a. Identify people and agencies that might observe invasive species.

Action b. Raise awareness of priority species of concern as well as ‘watch’ species by developing and distributing information about how to recognize, collect, and report various invasive species (e.g., reporting card, hot list of priority species, ID cards) to people identified in Action a.

Action c. Establish processes for reporting sightings/presence of infestations/populations and agency verification of these reports.

Action d. Investigate reports of new nonnative species as soon as possible.

Action e. Develop memorandums of understanding between responsible agencies, such as the MN DNR, MDA, MN Sea Grant, Tribes, USDA-APHIS, NPS, and others regarding monitoring and detection.

Action f. Establish partnership opportunities with existing *field surveys* (such as the DNR County Biological Survey, river surveys, fisheries surveys, and shallow lake surveys, MDA pest surveys, Cooperative Agricultural Pest Surveys), other organizations, and citizens for reporting suspected new sightings/presence of invasive species.

Action g. Conduct *field surveys* for priority invasive species and monitor invasive species populations.

Action h. Provide and seek funding for survey, *outreach*, and monitoring when appropriate.

Action i. When feasible, use remote sensing to detect significant infestations of invasive species with distinct spectral signatures as appropriate.

Action j. Establish new or use existing citizen volunteer monitoring networks for early detection of terrestrial and aquatic invasive species.

2. Database - Maintain inventory of locations of high priority invasive species and watch species within Minnesota.

Action a. Establish and maintain databases of known locations of priority invasive and “watch” species.

Action b. Adopt state data collection standards to facilitate intrastate sharing of invasive species sightings/presence data and that allow Minnesota’s data to be integrated into regional or national data centers of invasive species information (e.g., the North American Weed Management Association (NAWMA), the Midwest Invasive Plant Network or IPANE (Invasive Plant Atlas of New England, e.g., <http://invasives.eeb.uconn.edu/ipane/>), or the USGS–Nonindigenous Aquatic Species web site at <http://nas.er.usgs.gov/>)

3. Prioritize Detection - Prioritize invasive species and their geographic locations for allocation of available resources.

Action a. Identify high-risk areas for invasive species introductions, establishment and spread, (e.g., popular recreational waterbodies, degraded/disturbed systems, urban areas, ports, shipping and receiving terminals, campgrounds, mills) given what we know about the potential risk of certain pathways (see Risk Assessment above) and the biology of the nonnative in question and focus detection efforts in these areas.

Action b. Develop partnerships to increase invasive species identification and *field surveys* (e.g., lake associations performing annual aquatic invasive species searches; fish “round ups”)

4. Research and Technology - Develop new, practical tools for assessing the early presence and identification of invasive species

Action a. Promote technology for identification of invasive species (e.g., genetic fingerprinting).

Rapid Response strategies for newly detected infestations

5. Develop Rapid Response Plan - Develop a general and, where needed, a species-specific rapid response plan outlining the actions required for the first detection of an invasive species that is not known to occur in the state or in boundary areas of the state

Action a. Develop response plans that incorporate the elements of response, recovery, communication and *outreach*, monitoring, research and funding.

Action b. Ensure that training is provided to applicable employees regarding the response plan.

Action c. Identify species for rapid response efforts” and prioritize/select “rapid response” species for plan development”.

Action d. Inform the public about the need to have a rapid response plan(s) that might employ pesticides.

Action e. Review and revise response plans on a periodic basis.

6. Implement rapid response plans - Reduce the potential for establishment of a reproducing population through targeted treatment efforts when acceptable treatment options exist.

Action a. Implement *quarantines* allowed by law or other containment measures to prevent movement of material that may promote the spread of the invasive species.

Action b. Evaluate and implement the use of chemical, biological and/or mechanical methods to *eradicate* recently detected and isolated invasive species populations.

Action c. Monitor eradication efforts through *field survey* or other means to evaluate eradication success.

7. Research and Technology – Develop new tools for use in a rapid response.

Action a. Encourage, support, and conduct research projects to develop new tools to use in rapid response.

Continue to contain infestations where eradication is not possible.

Containment Strategies

8. Public Awareness - Inform people and businesses of actions they can take to prevent the spread of invasive species and comply with state regulations. Also, inform the public and specific stakeholders as invasive species are found in new locations.

Action a. Conduct watercraft inspections at public water accesses with priority given to infested waters, waters with high boater activity, proximity to existing infestations, and where there are local sponsors.

Action b. Provide presentations, training, and assistance to lake associations and other organizations interested in setting up access awareness and other events.

Action c. Encourage /use /support local awareness events and private access awareness activity throughout the state.

Action d. Develop annual communication plans and prepare, distribute, and use various media (e.g., radio and TV ads, brochures) and signs according to the plans.

Action e. Inform buyers and sellers of plants and wild animals of how they can help prevent the release or escape of invasive species, and comply with state and federal laws.

Action f. Inform appropriate business (e.g., home builders associations, developers) and government staff, (e.g., county planners and Soil and Water Conservation Districts) how they can help prevent the spread of invasive species.

Action g. Publicize new infestations to raise awareness aimed at preventing and containing spread.

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Action h. Support community-based coalitions to develop local prevention and containment approaches to help address introduction and spread of invasive species at local levels.

Action i. Provide notice of infested locations and waters for high priority species.

9. Tribal, State, and Local Regulations - Establish new and maintain / revise / improve existing regulations that address pathways of spread in the state per Element I - Strategy 3.

10. Enforcement – Enforce federal, tribal, state, and local laws aimed at *containment*

Action a. Initiate state and federal *quarantines* to contain invasive species of concern and monitor activity.

Action b. Monitor locations and activities operating under permit to ensure proper safeguards are utilized in handling invasive species or high-risk articles.

Action c. Enforce state and federal laws intended to *contain* invasive species.

11. Funding - Seek more funding and partners from federal, state, and local sources to increase total funds available for invasive species containment.

Action a. Seek additional funds to implement unfunded actions in the Statewide Management Plan for Invasive Species (for example request Federal funds as authorized by the National Invasive Species Act).

Action b. Maintain partnerships with agencies, academic institutions, non-governmental organizations, and others to seek funds from appropriate sources.

12. Prioritize Containment - Allocate resources to minimize potential spread based on the prioritization of species and pathway of spread (per Element 1, Strategy 1)

13. Monitor spread - Monitor the spread of invasive species within Minnesota.

[Note: see Action III-1-c]

14. Evaluation - Evaluate the cost effectiveness of actions that have been taken to prevent spread of invasive species within Minnesota.

15. Risk Reduction – Take actions that help minimize pathways from transporting invasive species from infested locations.

Action a. Clear aquatic plant fragments from public water accesses ramps to help reduce the amount of aquatic plants adhering to watercraft and trailer units exiting waterbodies

Action b. Evaluate the use of dry hydrants in the state and inform firefighting entities (fire departments, forest fire fighting agencies) about the risks of transporting water from infested waters via dry hydrants, planes, and other methods.

Action c. Provide notice of infested waters through local communication methods.

16. Research and Technology - Develop new scientific tools for containing invasive species.

Action a. Encourage, support, and conduct research projects to develop new tools to use for containment of invasive species (e.g., fish barriers).

17. Evaluation – Evaluate effectiveness of prevention and containment strategies targeting specific pathways.

Action a. Seek funding to design, conduct and implement evaluation using qualitative and quantitative assessment instruments (e.g., questionnaires, surveys).

Action b. Collaborate with agencies, academic institutions, non-governmental organizations, business and industry and others to provide access to those audience pathways.

Element III. Management of Invasive Species

Desired Outcome: *Participants will work to reduce the impacts caused by established invasive species to Minnesota's ecology, society, and economy.*

Management of invasive species is necessary to reduce the harmful impacts they cause. Because there are numerous invasive species in the state, management must be prioritized for programmatic and species-specific activities to effectively use the limited available resources. Prioritization must be a dynamic and flexible process that enables decisions to be made by using the best available scientific information. Risk assessments can be used to help set priorities. Priority setting will occur at different hierarchical levels (e.g., spatial, agency, taxonomic) as appropriate. Priorities should be set at the lowest level practical to ensure that the appropriate result is achieved at management sites. When setting management priorities the species characteristics, infestation consequences, and the availability, feasibility, and likelihood of success of treatment versus non-treatment must all be considered. Often management tools are limited or have low efficacy. In these situations, more research is needed about the species and tools for better management.

Management strategies

1. Prioritize – Establish processes to prioritize species for which control and research is needed, and prioritize areas where management is most useful, to reduce harmful impacts.

Action a. Develop and use risk assessment models to evaluate which species should be managed and where.

Action b. Use existing or establish criteria for setting priorities such as legal requirements, current technology, costs, and threats determined by risk assessments.

Action c. Maintain and publicize database of locations and related information of high priority invasive species.

2. Integrated Pest Management (IPM) Plans – Develop and revise IPM plans for individual high priority invasive species.

Action a. Develop and revise IPM plans for individual high priority invasive species and when available refer to national invasive species management plans for strategies and actions.

Action b. Technical experts will maintain contact with other researchers and managers working on management of invasive species.

Action c. Continue to monitor findings of national and international research on invasive species control through research conferences, publications and other venues.

3. Implement IPM Plans - Use IPM to manage populations of invasive species, when feasible (when management tools are available and they can be implemented with acceptable results), in order to reduce their impacts.

Action a. Use integrated pest management to control populations of high priority invasive species (as identified in the species management /IPM plans, if they have been written).

Action b. Develop and implement site management plans (e.g., private forest management plans)

4. Coordination/Communication - Coordinate, facilitate, and review control efforts among federal, tribal, state and local units of government, and non-governmental organizations in order to improve the efficiency and effectiveness of the management efforts and to ensure compliance with applicable laws.

Action a. Consult with and listen to the needs of local units of government to foster two-way communication regarding local concerns about invasive species.

Action b. Provide technical advice to federal, state and local units of government, and non-governmental organizations who are controlling invasive species. (e.g., presenting

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lectures for various groups, attending meetings at different agencies, producing articles, newsletters, and other literature about effective management of invasive species.)

Action c. Use landscape and watershed approaches for management of high priority invasive species that include various levels of government and non-governmental entities (e.g., weed management areas).

Action d. Consult national management plans for strategies, actions and information that would be useful in developing effective management plans and activities in the state.

5. Research and Technology - Coordinate, conduct, review, fund, and support research to improve management options necessary to reduce the impacts of invasive species.

Action a. Establish a state research committee to assist carrying out this strategy and research needed under other parts of this plan.

Action b. Provide logistical support and technical assistance to researchers working on invasive species in Minnesota.

Action c. Conduct, fund, and support experiments to test the efficacy of existing and develop new potential control methods, and preferably selective so they minimize harm to native species.

Action d. Provide funding for research on high priority species per species plans (e.g., population genetics work, reproductive ecology of flowering rush).

Action e. Seek and leverage funding for research related to management of priority invasive species (e.g., biocontrol of buckthorn and garlic mustard; studies of impacts).

Action f. Sponsor an annual or bi-annual forum on current research and best practices (e.g., a technology transfer forum with expert research and practitioner presenters and attendance by a variety of resource managers).

[Note: See related research Action I-7-e]

6. Evaluation - Periodically evaluate long-term and short-term success of control methods for the purpose of improving management practices.

Action a. Monitor the effects of control methods on both target and non-target species.

Action b. Determine which invasive species can be managed effectively.

Action c. Conduct cost-benefit analysis to determine if the benefits (environmental, economical, recreational) of the treatment out weigh the costs.

7. Funding – Ensure sufficient funding and other resources are available for invasive species management in Minnesota from federal, state, and local sources.

Action a. Identify appropriate sources and seek funding and cooperation for management work.

Action b. Seek perpetual funding for management projects.

Action c. Work with local, conservation, environmental, and non-governmental organizations that may be willing and able to assist in seeking funding invasive species prevention and eradication efforts.

8. Rehabilitation and Restoration - Integrate rehabilitation and restoration into eradication and management efforts.

Action a. Conduct research to determine problems that may occur in restoration efforts and develop recommendations for overcoming those problems (e.g., some invasive species change soil characteristics that inhibit reestablishment of native plants).

Action b. Use research and other means to increase information and the knowledge base about native species, plant resistance, the role of intact ecosystems, restoration ecology, disturbance ecology, and invasive species.

Action c. Compile, highlight, and share information about existing restoration and rehabilitation successes around the U.S.

Action d. Develop appropriate guidance documents on effective rehabilitation and restoration practices for resource managers.

Action e. Use proven rehabilitation and restoration

Element IV. Leadership and Coordination

Desired Outcome: *Participants will seek to collaborate with intrastate, interstate, and international partners to help coordinate invasive species related efforts.*

Collaboration and Coordination - Invasive species management activities need to be coordinated at all levels to help avoid duplication, leverage resources, and to share knowledge and expertise among federal, state, and local governments; tribal interests; nongovernmental organizations; and private sector interests. Collaboration also extends outside the state and implies cooperating across ownerships, state lines, and political jurisdictions. It is the responsibility of participating entities to determine appropriate entities with whom it may be appropriate to coordinate and cooperate. Participating entities are encouraged to contact MISAC members or the MISAC Web site for information about collaboration and coordination ideas and opportunities.

An important factor that spans all plan Elements is the need to clearly communicate information about invasive species and ensure that it is understood. We need communication for the public to gain understanding and acceptance of the magnitude and urgency of the invasive species problem. *Outreach*, education, communication, and interpretive programs can convey how the public can help prevent, identify, detect, control, and minimize the impacts of invasive species; gather public input into program plans; and promote partnerships in their implementation.

Intrastate coordination strategies

1. State Council – Continue the Minnesota Invasive Species Advisory Council to facilitate statewide coordination and cooperation on invasive species — including the review of information concerning the current status, management and spread of terrestrial and aquatic invasive insects, plants, animals and pathogens into and within Minnesota. The Council should work cooperatively to: prevent new introductions, identify and locate invasive species; contain established introductions; manage invasions and take other actions in order to minimize invasive species impacts within Minnesota; and address these and other existing needs by maximizing available resources.

2. Communication - Communicate and coordinate activity concerning species of concern with appropriate federal, state, tribal, county, university, nongovernmental organizations, industry, and other stakeholders. Facilitate awareness of invasive species issues within federal, tribal, state and local entities in the state.

Action a. Establish, maintain, and promote listserves for those interested in invasive species issues in the state.

Action b. Establish, maintain, and promote a statewide Website to facilitate education and coordination

Action c. Communicate with and use the Minnesota Environmental Education Board and the Minnesota Science Teachers Association to assist in education program development for K-12, non-formal and informal learning about invasive species.

Action d. Make implementation information available for all entities as well as reporting on accomplishments through annual reports of involved entities by posting on MISAC Website.

Action e. Facilitate networking through MISAC, Invasion Biology Research Consortium, and other partnerships in the state.

Action f. Support and host statewide or regional conferences in Minnesota on invasive species (e.g., MNISC 2008).

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Action g. Hold annual or biennial meetings between tribal and state entities, and between state entities and stakeholder groups.

3. Local – Foster the development and participation of local partnerships (e.g., Soil and Water Conservation Districts, Coalitions of Lake Associations, lake associations, Counties, municipalities, citizen groups) to address invasive species using landscape and watershed approaches.

Action a. Seek input from local entities to determine what will work best for them in developing local partnerships.

Action b. Establish Cooperative Weed Management Areas, and other partnerships, such as County Coalitions of Lake Associations, to address invasive species.

Action c. Provide grants that encourage involvement in prevention and management of invasive species at local levels.

Interstate coordination strategies

4. Regional entities – Participate in regional invasive species panels, boards, workshops, meetings, and events to facilitate interstate cooperation and coordination (e.g., Mississippi River Basin Panel on ANS, Great Lakes Panel on ANS, Great Lakes Sea Grant Network, Midwest Invasive Plant Network).

5. Neighboring states and provinces - Maintain ongoing communication and collaboration with entities in neighboring states and provinces that are involved with invasive species prevention and management.

National coordination strategies

6. National entities – Participate in national invasive species panels, boards, workshops, and events to facilitate national cooperation and coordination (e.g., National Invasive Species Council, FICMNEW, Aquatic Nuisance Species Task Force).

International coordination strategies

7. International entities - Work with appropriate entities to coordinate with international entities (e.g., State Department, IJC, USDA-APHIS-PPQ).

Implementation Tables / Database for Participating Entities

Addendum

An addendum of actions accompanies the plan in implementation table / database form. It will be a dynamic table / database that will be added to and modified over time. New actions will be added to the implementation table when new partners are interested in implementing portions of the plan.

Descriptions of Information in Implementation Database (Tables)

For each action shown in the implementation database the following information will be shown in columns with these titles.

Species Category – Specifies if this action is for aquatic or terrestrial organisms.

Species Type – Specifies the types of organisms to which this action will apply (e.g., aquatic plants, terrestrial animals).

Entity – Identifies the entity that will conduct the action (e.g., National Park Service, Hennepin County).

Sub entity – Identifies the unit of the entity of the person who submitted the implementation table for the entity.

Element or Sub-element – Prevention, Early Detection, Rapid Response, Containment, Management, Coordination and Cooperation

Action Number – Identifies each action in the table by the three-character identifier (e.g., I-2-d)

Action – a two to six word description of the action.

Action Description – a detailed description of the action including what is accomplished (e.g., hire 20 seasonal staff; purchase 100 signs)

Status – Identify if the action is ongoing, proposed, or another status

Participation level – Specifies if the entity is the lead, a cooperator, or other participation level within the scale specified in the scale column.

Cooperators – Identifies partners in the implementation of the action.

Estimated Annual Cost – Estimate the cost to implement the action.

Funding Source – Specifies the current or proposed funding source for the action. If it is unknown, insert “undetermined.”

Entity Priority – Identifies the priority level for the action within the implementing entity. Use A, B, C as priority levels.

Scale / Location – Specifies the scale of the action or location (e.g., multi-state, statewide, county, city, watershed, private land) including the name(s) of the location. If multiple sites specify the quantity (e.g., 10 wildlife refuges)

Timelines – Describe when the action will occur (e.g., a specific calendar or fiscal year, annual, biennial, or range of years)

Glossary of Terms

Aquatic plant - a plant, including algae and submerged, floating leafed, floating, or emergent plants, that naturally grows in water, saturated soils, or seasonally saturated soils (Minnesota Statutes, Chapter 84D).

Aquatic Invasive Species (AIS) – for the purposes of this plan, the term AIS will be synonymous with aquatic nuisance species.

Aquatic Nuisance Species (ANS) - a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural or recreational activities dependant on such waters (National Invasive Species Act of 1996 P.L. 104-332).

Classify – the act of determining the appropriate category/classification that a nonnative species fits.

Communication – for the purposes of this plan, the term communication will be used when referring to the distribution and sharing information among many entities, such as interagency communication. (The term outreach will be used to refer to efforts to inform the specific audiences about invasive species to raise public awareness.)

Contain / Containment - attempt to stop spread of invasive species from an infested area to other areas.

Control [noxious weed] - in the context of the state noxious weed law, “Control” means to destroy the above ground growth of noxious weeds by a lawful method that prevents the maturation and spread of noxious weed propagating parts from one area to another (Minnesota Statutes 18.77, subdivision 3).

Cooperative Weed Management Area - partnership of Federal, State and local government agencies; tribes; individuals; and various other interested groups that manage noxious weeds or invasive plants in a defined area).

Designate – the process of officially declaring the regulatory status of a nonnative species that has been classified (new for state plan).

Eradicate – to eliminate a population of an invasive species from a specific area.

Hybrid - offspring resulting from a cross between two different species, or genetically distinct individuals within the same species, that may be naturally occurring or the result of controlled crosses, or being genetically modified.

Injurious [re: state noxious weeds] - the negative economic, physical, aesthetic, environmental, and other effects an uncontrolled plant may have in completing its life cycle.

Inspection – the act of looking for invasive species that may be introduced via a pathway on its way into the state, at the location of its first point of entry (e.g., customs agents at an airport) (new for state plan).

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Integrated Pest Management – the use of a combination of approaches, incorporating the judicious application of ecological principles, management techniques, cultural and biological controls, and chemical methods, to keep pests below levels where they do economic damage (MS 17.114, subdivision 2b).

Intentional introduction - an introduction made deliberately by humans, involving the purposeful movement of a species outside of its natural range and dispersal potential. Such introductions may be authorized or unauthorized. (The International Union for the Conservation of Nature and Natural Resources. - Species Survival Commission - Invasive Species Specialist Group).

Introduction - the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity (Executive Order 13112).

Invasive species (Federal) - an alien [nonnative / exotic / introduced] species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112).

Invasive species (State) - a nonnative species that:

- (1) causes or may cause economic or environmental harm or harm to human health; or
- (2) threatens or may threaten natural resources or the use of natural resources in the state (M.S. 84D.01).

Native species - species naturally present and reproducing within this state or that naturally expands from its historic range into this state (M.S. 84D).

Nonnative species / exotic species / introduced species - a species occurring outside its natural range. One that is not native (NWPEC/MISAC).

Noxious weed (state) - in the context of the state noxious weed law, “noxious weed” means an annual, biennial, or perennial plant that the commissioner designates to be injurious to public health, the environment, public roads, crops, livestock, or other property Minnesota Statutes 18.77, subdivision 8 and M.R. 1505.0750, subpart 8).

Outreach – for the purposes of this plan, the term outreach will be used to refer to efforts to inform the specific audiences about invasive species to raise public awareness.

Pathway – means by which species are transported from one location to another. Natural pathways include wind, currents, and other forms of dispersal in which a specific species has developed morphological and behavioral characteristics to employ. Man-made pathways are those that are enhanced or created by human activity. These are characteristically of two types. The first type is intentional, which is the result of a deliberate action to translocate an organism. The second type of man-made pathway are those that unintentionally move organisms (e.g., ballast water discharge, soil associated with the trade of nursery stock). In these and countless other unintentional pathways, the movement of species is an indirect byproduct of our activities. (NISC website)

Plant pest - includes, but is not limited to, an invasive species or any pest of plants, agricultural commodities, horticultural products, nursery stock, or noncultivated plants by organisms such as insects, snails, nematodes, fungi, viruses, bacterium, microorganisms, mycoplasma-like organisms, weeds, plants, and parasitic plants (Minnesota Statutes, Chapter 18G).

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Prohibited invasive species - An invasive species that has been designated as a prohibited invasive species in a rule adopted by the commissioner [of Natural Resources] under section 84D.12 (Minnesota Statutes, Chapter 84D).

Prohibited noxious weed - Plants designated by the commissioner as a prohibited noxious weed are injurious to public health, the environment, public roads, crops, livestock, and other property. Plants in this category must be controlled in all locations statewide unless other laws apply (NWPEC).

Quarantine - an enforced isolation or restriction of free movement of plants, plant material, animals, animal products, or any article or material in order to treat, control, or *eradicate* a plant pest (Minnesota Statutes, Chapter 18G).

Rank – the process of evaluating the relative threats/invasiveness of various nonnative species (new for plan)

Rapid response – actions intended to eliminate the establishment or perpetuation of reproducing populations.

Regulated article - any item, the movement of which is governed by *quarantine* or this chapter (Minnesota Statutes, Chapter 18G).

Regulated invasive species - an invasive species that has been designated as a regulated exotic species in a rule adopted by the commissioner [of Natural Resources] under section 84D.12 (M.S. 84D).

Field Survey – the act of looking for invasive species in the environment beyond the original point of entry (e.g., looking for Eurasian milfoil in a lake, placing insect traps near a warehouse).

Unlisted nonnative species - a nonnative species that has not been designated as a prohibited invasive species, a regulated invasive species, or an unregulated nonnative species in a rule adopted by the commissioner under section 84D.12 (Minnesota Statutes, 84D).

Unregulated nonnative species - a nonnative species that has been designated as an unregulated nonnative species in a rule adopted by the commissioner under section 84D.12 (Minnesota Statutes, Chapter 84D).

Vector – a biological carrier for a disease or parasite (i.e., an organism that transmits pathogens to various hosts) and is not completely synonymous with the much broader definition of a pathway. (National Invasive Species Council Website)

Glossary of Acronyms

ANSTF	Aquatic Nuisance Species Task Force
BWSR	Board of Water and Soil Resources
DNR	Minnesota Department of Natural Resources
IPM	Integrated Pest Management
MDA	Minnesota Department of Agriculture
Mn/DOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
NPS	U.S. National Park Service
NISC	National Invasive Species Council
SWCD	Soil and Water Conservation District
UMSGP	University of Minnesota Sea Grant Program
UME	University of Minnesota Extension
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDA-APHIS	USDA-Animal Plant Health Inspection Service
USFWS	U.S. Fish and Wildlife Service
WD	Watershed District
WMO	Water Management Organization

Appendix A - References

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Appendix B - MISAC State Plan Work Group

The following individuals were involved in numerous meetings to develop the draft plan prior to holding a workshop to involve numerous other individuals and entities in the plan development.

Val Cervenka, MDA Invasive Species Coordinator (currently DNR Forestry Entomologist)

Kevin Connors, USDA-APHIS PPQ

Meredith Cornett, The Nature Conservancy

Tony Cortilet, MDA

Collie Graddick, MDA

Mike Hoff, U.S. Fish and Wildlife Service - Region 3 ANS Coordinator

Bob Jacobson, Mn/DOT and BWSR

Doug Jensen, University of Minnesota Sea Grant Program

Alan Jones, DNR Forest Health Supervisor

Terry McDill, MDA Invasive Species Unit Supervisor and MISAC Co-chair

Nick Palaia/Kelly Hogan, U.S. Fish and Wildlife Service – Region 3 Assist. Refuge

Supervisor

Jay Rendall, DNR Invasive Species Program and MISAC Co-chair

Luke Skinner, DNR Invasive Species Program

Rob Vennette, U.S. Forest Service

Appendix C. Federal, Tribal, State, Local, Non-Governmental Authorities and Programs

Federal Agencies

National Park Service

National Park Service (NPS) units within the State of Minnesota include the St. Croix NSR, Pipestone NM, Voyageurs NP, Mississippi NRRA, and Grand Portage NM. Most of these have monitoring programs in place to identify and assess species of concern. On the St. Croix National Scenic Riverway, the Park has had a zebra mussel/AIS prevention plan since 1992. Elements of the Plan include information (brochures, billboards, etc.) and education (programs, lectures, etc.); inspections (boats at launches or moored boats at marinas) and access management (see regulations below); monitoring using stationary samplers and active searches employing SCUBA. Research and the development of a remediation plan are also central to the response. To date, zebra mussels have been confined to the lower 22 miles of the river.

The National Park Service restricts upstream travel at the Soo Line Railway High Bridge (mile 28.5) to protect Riverway aquatic resources from the accidental introduction of the zebra mussel and certain other aquatic invasive species. Using existing regulatory authority found in the Code of Federal Regulations Title 36 Sections 3.3 and 7.9, the National Park Service may provide a special use permit for upstream travel past the Zebra Mussel Checkpoint under case-by-case conditions.

Vessels traveling upstream beyond the High Bridge must meet certain conditions. Vessel owner/operators not conforming to these conditions are in violation of 36 CFR Sections 2.32 Interfering with Agency Functions, 3.3 Permits, and 7.9(c) Vessels. Violators may be required to appear before a federal magistrate and may be subject to a fine of up to \$5000.00 and/or imprisonment for up to 6 months.

Vessel owner/operators in violation of the above regulations (e. g.: with a vessel containing zebra mussels), are also in violation of 36 CFR section 2.1(a)(2) Preservation of Natural, Cultural, and Archeological Resources, and may be in both civil and criminal violation of 16 U. S. Code Chapter 53 Control of Illegally Taken Fish and Wildlife, Section 3372(a) Prohibited Acts - Offenses other than Marking Offenses. Violators will be subject to a mandatory court appearance before a federal magistrate and may be subject to a fine of up to \$5000.00 and/or imprisonment for up to 6 months.

Other species of concern on the Riverway are addressed with varying degrees of effort. As an example, the Park has a purple loosestrife management plan, tries to reduce to zero Grecian foxglove and Japanese barberry, engages in buckthorn and garlic mustard removal were practicable, and monitors Eurasian watermilfoil, curly-leaf pondweed, and spotted knapweed. Finally certain AIS will require action plans (Asian Carp), or have been addressed through regulation and regular monitoring programs (Rusty Crayfish – illegal use of live bait).

Voyageurs NP has similar crayfish regulation to the St. Croix and monitors for spiny waterflea. Grand Portage monitors for gypsy moths. Mississippi removes buckthorn and will have an Asian carp response plan. Pipestone has a prairie restoration program which includes removal of non-native invasives.

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All national parks in the Great Lakes Network (include all Minnesota units) enjoy the efforts of the exotic plant management team. This small group of specialist travels from park to park performing intensive removal/restoration work on park lands of high value. The Park Service is committed to addressing invasive species concerns, even within the constraints of staff and funding.

USDA – Animal Plant Health Inspection Service (APHIS), Plant Protection & Quarantine (PPQ)

Responsibilities – USDA-APHIS PPQ protects America's plant resources by safeguarding them from exotic invasive pests and diseases, monitoring and managing pests and diseases existing in the U.S. and resolving trade issues related to plant health. USDA-APHIS-PPQ is responsible for plant protection and agricultural quarantine and inspection programs. It cooperates with other federal agencies, states, farmers, foreign and tribal governments, and private organizations to carry out program activities. These activities include pest exclusion, pest survey and detection, pest eradication, pest management, including the use of biological control, and development of plant methods for use in field programs. Some of the duties USDA-APHIS-PPQ performs are:

- Pursuant to federal statute, being the lead agency in response to introductions of PPQ program pests and pests never before identified in the United States. Generally, will work with responding states in a cooperative effort through a unified command approach;
- Conducts active surveillance for a variety of specific plant pests and diseases, including gypsy moth, sudden oak death, Asian long-horned beetle and emerald ash borer, along with many other pests and noxious weeds;
- Evaluates emerging plant issues in the global arena, monitors current plant pest and disease outbreaks worldwide, prioritizes pests for recommended *field survey* and develops eradication plans in the event that any of these pests or diseases enter the United States;
- Assist with pest eradication and plant safety threat activities including: diagnostics, quarantine, evaluation and inspections, plant treatment or destruction, disposal and interstate trace-back;
- Assist states in the coordination of a multi-state or regional response and outbreak investigation;
- Define the affected area and quarantine zones and restrictions on interstate commerce;
- Prepare information for dissemination to the public, producers, processors and other concerned groups;
- In cooperation with the Department of Homeland Security, examine high-risk cargo shipments for exotic plant pests at ports of entry.
- Provide funding for plant pest survey and detection, monitoring, eradication and outreach functions as needed;
- Improve management of selected exotic plant pests through development of new technology.

USDA Forest Service

Responsibilities - The Forest Service has the authority to directly manage 192 million acres of national forests and grasslands. It also has the responsibility and authority to provide technical and financial assistance (primarily for insect, disease, and invasive plant suppression) for all the Nation's 731 million acres of forest lands, including urban, State, private, and tribal lands, and forested lands managed by other Federal agencies.

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The Forest Service is recognized internationally for its land management and research expertise. It conducts research, scientific collaboration, and reviews to fill priority information gaps on a scientific foundation. In addition to more than 500 research scientists, its thousands of specialists include forest entomologists, forest pathologists, botanists, wildlife and fisheries biologists, and ecologists. Forest Service Technology and Development Centers specialize in developing and applying the latest in technology. Other Forest Service staff that support invasives programs include experts in public communication, legislative affairs, technology transfer, and education.

The Forest Service has working relationships with other agencies involved in invasive species, including the USDA-Animal and Plant Health Inspection Service (USDA-APHIS) and the other government departments in the National Invasive Species Council. In addition, it maintains working relationships with leading national and international organizations that focus on invasive species and has ongoing partnerships with each State and territorial agency with invasive species responsibility. It has a long history of providing technical and financial assistance to States and territories to handle natural resource problems. The Forest Service has formal working relationships with most major colleges and universities and with international partners.

The Forest Service has a national strategy for the management of invasive species that may affect trees and forests. The four main elements of that plan are Prevention, Early Detection and Rapid Response, Control and Management and Rehabilitation and Restoration. The three primary divisions of the Forest Service (National Forest System, State and Private Forestry, and Research and Development) coordinate activities within the organization and with other partner institutions to achieve the goals of that plan. The Forest Service is represented in Minnesota by the Superior National Forest, the Chippewa National Forest, the Northeastern Area office of State and Private Forestry, and the Northern Research Station with research work units in Grand Rapids and St. Paul.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is the principal federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats for the continuing benefit of the American people. The agency administers the Lacey Act of 1900 (as amended in 1998), and has authorities and responsibilities under the Endangered Species Act of 1973 (as amended), Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (as amended by the National Invasive Species Act of 1996), and National Environmental Policy Act of 1970. The Lacey Act enables the USFWS to help prevent the introduction and spread of animals listed as injurious under the act, by prohibiting their importation and interstate transportation, and by enforcing those prohibitions. Under the Endangered Species Act, the USFWS can protect and restore species listed as either Threatened or Endangered by implementing programs to control and eradicate invasive species. The Nonindigenous Aquatic Nuisance Prevention and Control Act established the Aquatic Nuisance Species Task Force (ANSTF), which is co-chaired by the USFWS, to coordinate governmental efforts related to nonindigenous aquatic species in the United States with those of the private sector and other North American interests. The National Environmental Policy Act requires that actions taken by the USFWS, and with funding provided by that agency, must comply with the act.

The USFWS supports several programs that include invasive species prevention, management, and control activities. Within the region including Minnesota, the Aquatic Nuisance Species Program is administered by Regional Office in Fort Snelling, Minnesota. Staff coordinate activities of the USFWS Fisheries Program and its partners, and also provide technical assistance designed to prevent introductions of aquatic invasive species and control and

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manage populations after establishment. Two Fishery Resources Offices support invasive species programs in Minnesota that are led by the Department of Natural Resources. The Ashland (Wisconsin) Fishery Resources Office is responsible for program activities in the Great Lakes watershed of Minnesota, while the La Crosse (Wisconsin) Fishery Resources Office is responsible for programs in the remainder of the state.

The National Wildlife Refuge System (NWRs) developed a National Strategy for the Management of Invasive Species that will guide invasive species management on refuges nationwide. The strategy emphasizes assessment information, monitoring recommendations and best management practices. Guided by this national strategy, NWRs invasive species operations include preventive activities, control and eradication, research and monitoring, cooperative partnerships and cost-share projects, and public education about invasive species. The Partners for Fish and Wildlife Program is a voluntary habitat restoration program that provides restoration expertise and financial assistance to private landowners, tribes, and other conservation partners who voluntarily restore fish and wildlife habitat on their properties. Habitat restoration activities supported by the Partners Program include managing and controlling invasive species.

The Great Lakes Coastal Program funds projects that seek to protect and restore Great Lakes coastal ecosystems for the benefit of fish, wildlife, and people. Habitat restoration activities funded by the Coastal Program may include invasive species management and control.

Two national public awareness campaigns (Stop Aquatic Hitchhikers!, and Habitattitude) are cosponsored by the USFWS. Risk assessments are conducted by the USFWS, and by their contractors, to evaluate the injurious nature of species that either are or may be imported into the U.S. USFWS provides support for ecological surveys conducted to acquire baseline information on abundance and distribution of aquatic invasive species in ports where ballast water is discharged, and in waters connected to those ports.

USFWS provides support for implementation of Management and Control Plans approved by the ANSTF. Management and control plans relevant to Minnesota include the Ruffe Control Plan, and the Asian Carp Management and Control Plan. USFWS provides the federal cost-share to implement State and Interstate Management Plans approved by the ANSTF. In addition to providing the federal share to support this plan, USFWS is providing the federal share of the St. Croix Interstate Plan that is implemented by Minnesota, Wisconsin, and the Great Lakes Indian Fish and Wildlife Commission.

Tribal Entities

There are several ongoing Tribal efforts in the state to address the prevention, management, and impacts of invasive species. The Leech Lake Band and Mille Lacs Band of Ojibwe have invasive species specialists who work on terrestrial and aquatic invasive species issues, as well as invasive forest pests.

Leech Lake is working cooperatively with the DNR to address the faucet snail population in Lake Winnibigoshish that is responsible for causing die-offs of the Lesser scaup and American coots. The Leech Lake Band is also managing garlic mustard cooperatively with the US Forest Service. The Band is leading grassroots efforts to increase awareness of invasive species impacts and initiate community-based management. Grassroots projects have been conducted

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in collaboration with Onigum community to control wild parsnip. The Leech Lake Association has committed to future grassroots project support with help from Leech Lake property owners.

The Great Lakes Indian Fish and Wildlife Commission

The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an organization exercising delegated authority from 11 federally recognized Ojibwe tribes in Minnesota, Wisconsin, and Michigan. These tribes retain hunting, fishing, and gathering rights in the territories ceded to the United States through various treaties. The degradation of native ecosystems by invasive species poses a serious threat to the continued exercise of these rights and the traditional lifeways they sustain. Because this direct and critical link exists between native people and natural resources, impacts to the function of native ecosystems are greater in areas that support traditional lifeways.

GLIFWC's invasive species program consists of four comprehensive elements – education outreach, inventory and monitoring, control, and evaluation. Each of these elements is coordinated with local cooperators to maximize the efficient use of limited resources. GLIFWC's educational outreach efforts center around its web site (www.glifwc.org/invasives) which provides basic information on invasive species and provides access to a regional GIS database (www.glifwc-maps.org) of invasive species survey efforts, distribution records and control efforts. In addition, GLIFWC distributes and develops print material to raise awareness of invasive species issues.

State Entities

Minnesota Board of Water & Soil Resources

The Minnesota Board of Water & Soil Resources (BWSR) administers many of the state's wetland programs including the Wetland Conservation Act (WCA). This involves regulatory activities, providing oversight and long-term monitoring of wetland replacement sites, and implementing the wetland replacement program for local road authorities and the Minnesota Department of Transportation (Mn/DOT). BWSR is also involved in administering State conservation programs such as Reinvest In Minnesota (RIM), The Native Buffer Cost-share Program, and The Cooperative Weed Management Area Cost-share Program that is focused on bringing together partners for the control of invasive species across geographic boundaries.

Invasive species are a major concern for BWSR statewide because they are a threat to nearly all wetland restoration and creation sites as well as other conservation projects. BWSR works with local units of government and private landowners to establish and manage high quality native plant communities and minimize populations of invasive species and noxious weeds.

Minnesota Department of Agriculture

History - In 1919, concerns were raised over barberry as an alternate host for black stem rust on wheat, and regulated pest control (now known as invasive species management) was born in the state at the Minnesota Department of Agriculture (MDA). Since then, plant health has been the focus of the plant protection regulations, including the Plant Pest Act, the Seed Law, the Noxious Weed Law, and two laws recently modernized in 2003, the Plant Protection Act and Nursery and Export Certification Act.

Responsibilities - MDA is charged with the responsibility of keeping out terrestrial invasive plants, insects and pathogens that would be new to the state, and managing or minimizing the

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impacts of established terrestrial invasive insects, weeds and plant pathogens in the state. The Invasive Species Unit surveys for pests that pose a high risk of introduction to the state, including emerald ash borer, a pest that has killed millions of ash trees in Michigan. In addition, isolated pest populations that are encroaching into the state are eradicated through treatment programs. MDA is in the process of performing pest risk assessments, to determine which invasive species will require the future focus of resources.

In addition, MDA, in conjunction with US Department of Agriculture Animal and Plant Health Inspection Service (USDA-APHIS), and US Homeland Security Department Customs and Border Protection (HSD CBP), regulates the movement of plant material into and out of Minnesota, to reduce the risk that invasive species may arrive through global trade. MDA issues phytosanitary certificates for products going out of the country, inspects nursery stock coming in and going out of the state, and regulates seed distribution within, into and out of the state. This is done to ensure that the trade pathway, normally a high risk for introduction for invasive species, is closely controlled. Along with our USDA-APHIS and HSD CBP partners, MDA is educating the public about the impacts of invasive species, and what can be done to prevent invasive species infestations.

The MDA is charged with overseeing the Minnesota Noxious Weed Statutes (Sections 18.75 – 18.91) and regulating noxious weed seeds (MN Statute, Section 21.86) to protect the state's agricultural and natural resources from the negative economic and environmental impacts resulting from these species. The Noxious Weed Unit works closely with federal, state, and county personnel designated to implement the state's noxious weed statutes by providing expertise with identification, management, and outreach for the eleven prohibited, two restricted, and fifty-two secondary noxious weeds. Additionally, all federally listed terrestrial noxious weeds are regulated in Minnesota as state prohibited noxious weeds. The Noxious Weed Unit is also involved with the implementation of weed biological control projects for leafy spurge, spotted knapweed, and Canada thistle. New and emerging weed species, that are not listed as noxious but are deemed to have potentially serious implications if established in Minnesota, are dealt with by educating landowners/managers on how to identify these invasive plants, how to report a sighting, and assisting with the development of voluntary management plans once a species has been located to quickly deal with small infestations before they become too large to eradicate.

MDA is also involved with the management and field survey of established invasive species. MDA is the lead state agency for integrated pest management and functions under the authority of MS 17.114 subdivision 4. The IPM program conducts inventory surveys for invasive pests, provides IPM outreach for agricultural producers, county and local governments, and private landowners, implements and coordinates biological control practices statewide, facilitates host-screening and specificity studies for new biological control candidates through the MDA - U of M Quarantine Facility, and collaborates on research projects with U of M and USDA-ARS scientists to provide empirical evidence of IPM strategies.

Minnesota Department of Natural Resources

History – The Minnesota Department of Natural Resources (DNR) Invasive Species Program was established in 1991 and was the first program of its kind in the nation. DNR has responsibility to develop and coordinate a statewide program to prevent the spread of invasive species of wild animals and aquatic plants (Minnesota Statutes 84D). This comprehensive program was preceded by programs addressing single species. In 1987, the DNR was designated the lead agency for control of purple loosestrife, an invasive plant of particular concern for the state's wetlands. In 1989, DNR was officially assigned a coordinating role for

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Eurasian watermilfoil control (Minnesota Statutes 84D.02, Subd. 2). Program staff are involved in the testing and use of biological control for species such as purple loosestrife and buckthorn.

Responsibilities for Aquatic Species - The Invasive Species Program works to prevent the introduction of invasive species that have the potential to move into and establish in Minnesota. The DNR Invasive Species Program also addresses management and containment of many invasive species that are present in Minnesota such as Eurasian watermilfoil, curly-leaf pondweed, flowering rush, purple loosestrife, faucet snail, spiny waterflea, zebra mussel, and common carp. They include hydrilla, water chestnut, and Asian carp.

Prevention - A large part of the prevention is outreach to boaters, anglers, and others via radio, newspapers, billboards, and publications. Prevention efforts are often undertaken with other states, agencies, and partners with similar concerns. DNR provides grants to local entities for prevention efforts such as implementing the Stop Aquatic Hitchhikers campaign in their area.

DNR has regulatory and enforcement roles for aquatic invasive species as specified in Minnesota Statutes 84D (www.revisor.leg.state.mn.us/statutes/?id=84D). The agency has adopted Minnesota Rules 6216 (www.revisor.leg.state.mn.us/rules/?id=6216) that designate prohibited and regulated invasive species of wild animals and aquatic plants and establish regulations related to infested waters. The agency designates infested waters through commissioner's orders that are published in the *State Register*.

Management – DNR conducts management of aquatic invasive plants such as Eurasian watermilfoil, curly-leaf pondweed, and purple loosestrife. The agency also provides management grants to local entities for managing aquatic invasive plants such as Eurasian watermilfoil and curly-leaf pondweed. Invasive Species Program staff provide technical assistance to entities interested in conducting management of aquatic invasive plants.

Most of the invasive species prevention and management activities are conducted or directed by staff from DNR's Division of Ecological Resources-Invasive Species Program. In addition, the Invasive Species Program hires about 75 students during the summer to inspect boats at public water accesses and help implement management activities. Staff from the DNR divisions of Fish and Wildlife and Enforcement, as well as the Bureau of Information and Education, also contribute significantly to the implementation and coordination of invasive species activities. In total, the equivalent of over 20 full-time positions are focused on invasive species work. Further information is available in the agencies annual reports — *Invasive Species of Aquatic Plants and Wild Animals in Minnesota* — available at the DNR Website (www.dnr.state.mn.us/eco/invasives/index.html).

Responsibilities for Terrestrial Species - The DNR's Division of Forestry is also involved with invasive species management. Working in cooperation with the MDA, it is charged with surveying and controlling forest pests, including non-native organisms such as bark beetles.

DNR also works to reduce the impacts of terrestrial invasive plants on its managed lands such as state parks, state forests, wildlife management areas, scientific and natural areas, and state trails.

Minnesota Department of Transportation (Mn/DOT)

Mn/DOT manages roadsides on over 12,000 miles of federal and state highways located throughout the state. This transportation system encompasses 250,234 acres of which approximately 175,000 acres is greenspace. Although smooth and clear roads remain the

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highest priority, controlling state-listed prohibited noxious weeds and emerging invasive weed species ranks near the top of roadside vegetation management activities. Mn/DOT uses an integrated pest management approach that considers mechanical, cultural, chemical and biological alternatives for pest control. Mn/DOT and private licensed applicators engage in selective herbicide applications to control the eleven state-listed prohibited noxious weeds in addition to several secondary noxious weeds and other emerging invasive weeds. Other efforts to control invasives includes requiring certified weed free mulch on construction projects and inventorying noxious weed locations during transportation project design and incorporating control measures into the contract.

Mn/DOT helps address aquatic invasive species introduction and spread through their requirements in construction and maintenance projects. Maintenance crews and contractors are required to use Best Management Practices, developed in consultation with DNR, to clean all barges and other equipment placed in and removed from state waters.

Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency (MPCA) has responsibilities and authorities related to vessel discharges such as ballast water of ships. MPCA issued a ballast water general permit under the State Disposal System (SDS) permit program defined in Minnesota Statute 115.07 and Minnesota Rule 7001.0020, subp. D. Minnesota's Lake Superior harbors receive ballast water discharges from both ocean-going vessels (Salties) and Great Lakes-only vessels (Lakers).

The Duluth Seaway Port Authority estimates that approximately 5% of the ballast water discharged to Lake Superior is from Salties and 95% is from Lakers. The MPCA has determined that a general permit is an appropriate permitting mechanism for these vessels to minimize the threat of aquatic invasive species (AIS) into the Minnesota State waters of Lake Superior.

In May 2008, the Minnesota Legislature passed S.F. 3056 that contains language related to ballast water management. The legislation became effective on July 1, 2008. The legislation specifies requirements related to ballast water management and ballast water record books for vessel owners and operators. Specifically, S.F. 3056 details what a ballast water management plan and ballast water record book should contain, and provides for the MPCA's approval of the management plan. The MPCA's ballast water general permit reflects the requirements in the legislation.

University of Minnesota Extension

The University of Minnesota Extension has roles related to invasive species. The many regional and county officers and websites offer information about aquatic and terrestrial invasive species. Extension's staff offer workshops on invasive species related subjects. Extension's staff at the St. Paul Campus of the U of M have expertise and are involved in research on management of many invasive species.

University of Minnesota Sea Grant Program

The University of Minnesota Sea Grant Program is a part of a nationwide network of 30 university-based programs administered through the National Oceanic and Atmospheric Administration (NOAA) with a legislative mandate (PL 107-299) to "increase the understanding, assessment, development, utilization, and conservation of the nation's ocean and coastal resources." As one of the pressing issues related to the health and sustained well-being of our

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coasts and inland waters, aquatic invasive species (AIS) is one of ten priority areas that Sea Grant addresses.

The University of Minnesota Sea Grant Program is known as a leader in supporting scientific research, and conducting outreach, education, communication and training on AIS. By integrating these disciplines, Sea Grant is positioned to: 1) support development of novel, environmentally-safe solutions for control and management of AIS; 2) examine economic, ecological, recreational and human health impacts of AIS; and 3) identify and target pathways with innovative outreach strategies and technologies – all aimed at preventing, containing, and minimizing the impacts AIS. Sea Grant programming is often offered in collaboration with multiple agencies and organizations to avoid duplication of effort, leverage resources, and combine expertise to effectively address AIS issues in Minnesota and beyond.

Minnesota Sea Grant co-leads *Habitattitude™*, a national public education campaign aimed at preventing the release of unwanted fish and aquatic plants by aquarists and water gardeners. Launched in fall 2004, *Habitattitude™*, was created by a government-industry-academia coalition of the Pet Industry Joint Advisory Council, the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration's Great Lakes Sea Grant Network. It is building upon efforts to extend and evaluate the *Stop Aquatic Hitchhikers!* campaign along key invasion corridors in Minnesota, Wisconsin, and Iowa, in collaboration with multiple partners – aimed at preventing the spread of AIS by resident and non-resident boaters and anglers. On behalf of the Great Lakes Sea Grant Network, Minnesota Sea Grant continues to promote the successful Aquatic Invasive Species-Hazard Analysis and Critical Control Point (AIS-HACCP, has-sip) training, which is aimed at preventing the spread of AIS or providing AIS-free certification for aquaculturists, wild baitfish harvesters, hatchery operators, fisheries managers, and conservation officers.

University of Minnesota – Invasion Biology Research Consortium

Many faculty at the University of Minnesota are involved with invasive species research, education, and collaborative efforts. The Invasion Biology Research Consortium was established by the University to promote discussions and research on invasion biology in plants, invertebrates, and animals in Minnesota and elsewhere.

Local Entities

Cities and Counties

Several local government organizations are involved in the management of invasive species. For example, parks and environmental departments at the city or county level often invest resources to manage invasive species on their lands and waterways. County Agricultural Inspectors and Townships are key players in the implementation of the state Noxious Weed Law.

Conservation Districts

Soil and Water Conservation Districts and Watershed Districts play an important role in working with landowners to plan and implement conservation projects including invasive species removal. Soil and Water Conservation Districts in 18 counties have led the establishment of Cooperative Weed Management Areas (CWMA), and additional CWMA will be forming in coming years. Involvement of local government organizations is essential to effectively coordinate invasive species prevention and control.

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The Lake Minnetonka Conservation District and White Bear Lake Conservation District have roles in managing aquatic invasive species such as Eurasian watermilfoil and preventing introductions of new aquatic invasive species into those waters.

Non-governmental

The Nature Conservancy*

Responsibilities - The mission of The Nature Conservancy (TNC) is to preserve the plants, animals, and natural communities that represent the diversity of life on earth by protecting the lands and waters they need to survive. TNC has identified invasive species as a top threat to achieving our mission in priority conservation areas around the world. Conservation success therefore depends on preventing new invasions and effective management of invaded areas. Building on years of experience in invasive species management, TNC has created the Invasive Species Initiative to address this urgent and pervasive threat.

Our Strategy - TNC's Invasive Species Initiative works with a network of private and public partners worldwide to pursue the following tactics as part of a comprehensive strategy:

- Prevention: This strategy offers the greatest benefit for the least cost. TNC is supporting enhanced port inspections and voluntary efforts to eliminate intentional introductions of non-native, invasive species.
- Early Detection/Rapid Response: Mimicking initiatives like the one under way in Chicago, where hundreds of local residents have been trained and have volunteered their time to check trees for signs of invasive Asian long-horned beetles.
- Restoration: Working with local organizations at thousands of sites to remove and prevent the spread of invasive species.
- Research: Working with leading academic institutions, like the University of California and the University of Florida, to develop new research to improve the management and control of invasives.
- Outreach: Working with government agencies and international organizations to develop policies for invasive species awareness, management, and prevention.

Putting our Strategy into Action - This comprehensive strategy is woven through the Initiative's work, both within TNC and with external partners, as we strive towards the ultimate goal of preventing and abating invasive species threats to biological diversity. We put this strategy into action by:

- Assessing Problems and Setting Priorities. We work with other TNC programs and partners to encourage comprehensive regional assessments of invasive species threats to biodiversity, of efforts underway to prevent and abate those threats, and of important gaps in those efforts.
- Engaging in Public Policy. To improve government programs and regulations that prevent, contain, and manage invasions, we work with TNC staff and external partners across the globe to identify and coordinate activities promoting the highest priority policies.
- Creating Strategies and Tools. We develop information, tools, and templates on invasive species biology, impacts, assessment, prevention, and management to aid staff and partners in management, public education, and policy decisions for conservation projects.

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- Working with Industry & Professionals. We are working with partners in the nursery industry, landscape architects, botanical gardens, and garden clubs to reduce the use and spread of invasive horticultural plants. We are also working with other TNC programs and partners to identify other industries, such as oceanic shipping, where adoption of voluntary practices could prevent new invasions and stop the spread of existing ones.
- Training and Networking. We lead Conservation Learning Networks to solve problems on invasive species assessment, prevention, management, and monitoring. We develop materials on best practices, available through our practitioner's website, including a photo gallery, weed control handbook, information about new plant, animal, insect, and disease invaders, success stories and other resources (<http://tncweeds.ucdavis.edu/>)

* For more information, please see The Nature Conservancy's Invasive Species Initiative website (<http://www.nature.org/initiatives/invasivespecies/>)

Lake Associations and Coalitions of Lake Associations

Hundreds of lake associations exist in the state and many are active in aquatic invasive species prevention and management efforts. County coalitions of lake associations (COLAs) are also concerned about aquatic invasive species. Both of these levels of organizations contribute hundreds of thousands of dollars of funds, volunteer hours on awareness, prevention, monitoring and management of aquatic invasive species. Lake associations, COLAs, Lake Improvement Districts (LID), and watershed groups have worked for years throughout the state to address local aquatic invasive species needs that are not addressed by state resources. These organizations are also recipients of DNR grants for prevention and management of aquatic invasive species.

Minnesota Waters

The Minnesota Waters (formerly the Minnesota Lakes Association and Minnesota Rivers Council) has been active in promoting strong state policies and programs for preventing and managing aquatic invasive species problems. Their strong focus on aquatic invasive species prevention and management is primarily citizen-led initiatives.

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Appendix D - MISAC Rankings of Species Threats to Minnesota

- Each species threat to several impacted areas (see criteria below) was determined by a panel of experts. This rank represents the most severe rank of those assigned by the experts.

<u>Ranking*</u>	<u>Common Name</u>	<u>Genus</u>	<u>Species</u>
Aquatic Animals			
Watch	Chinese mystery snail, Japanese trap door snail	<i>Cipangopaludina</i>	<i>spp.</i>
Severe/Invading	Bighead carp	<i>Hypophthalmichthys</i>	<i>nobilis</i>
Severe/Invading	Grass carp	<i>Ctenopharyngodon</i>	<i>Idella</i>
Severe/Invading	Silver carp	<i>Hypophthalmichthys</i>	<i>molitrix</i>
Severe/Not in state	Black carp	<i>Mylopharyngodon</i>	<i>piceu</i>
Severe/Not in state	Fishhook waterflea	<i>Ceropagis</i>	<i>Pengoi</i>
Severe/Not in state	New Zealand mudsnail	<i>Potamopyrgus</i>	<i>antipodarum</i>
Severe/Not in state	Rudd	<i>Scardinius</i>	<i>erythrophthalmus</i>
Severe/Not in state	Zander	<i>Stizostedion</i>	<i>lucioperca</i>
Severe/Established	Common carp, Koi	<i>Cyprinus</i>	<i>Carpio</i>
Severe/Established	Rainbow smelt	<i>Osmerus</i>	<i>mordax</i>
Severe/Established	Round goby	<i>Neogobius</i>	<i>melanostomus</i>
Severe/Established	Ruffe	<i>Gymnocephalus</i>	<i>cernuus</i>
Severe/Established	Rusty crayfish	<i>Orconectes</i>	<i>rusticus</i>
Severe/Established	Sea lamprey	<i>Petromyzon</i>	<i>marinus</i>
Severe/Established	Spiny water flea	<i>Bythotrephes</i>	<i>longimanus</i>
Severe/Established	Zebra / Quagga mussels	<i>Dreissena</i>	<i>spp.</i>
Moderate/Not in state	Fourspine stickleback	<i>Apeltes</i>	<i>quadraucus</i>
Moderate/Established	Alewife	<i>Alosa</i>	<i>pseudoharengus</i>
Moderate/Established	Corbicula	<i>Corbicula</i>	<i>fluminea</i>
Moderate/Established	Goldfish	<i>Carassius</i>	<i>auratus</i>
Moderate/Established	Lumholtzi waterflea	<i>Daphnia</i>	<i>lumholtzi</i>
Moderate/Established	Threespine stickleback	<i>Gasterosteus</i>	<i>aculeatus</i>
Moderate/Established	Tubenose goby	<i>Proterorhinus</i>	<i>marmoratus</i>
Moderate/Established	White perch	<i>Morone</i>	<i>Americana</i>
Severe pest, not expected to survive in MN	Chinese / Japanese Mitten Crabs	<i>Eriocheir</i>	<i>sinensis and japonica</i>
Aquatic Plants			
Watch/Unknown	Brazilian elodea	<i>Egeria</i>	<i>densa</i>
Watch	Waterlilies, nonnative or exotic	<i>Nymphaea</i>	nonnative spp.
Severe/Not in state	European frog-bit	<i>Hydrocharis</i>	<i>morsus-ranae</i>
Severe/Not in state	Hydrilla	<i>Hydrilla</i>	<i>verticillata</i>
Severe/Not in state	Indian swampweed	<i>Hygrophila</i>	<i>polysperma</i>
Severe/Not in state	Water chestnut	<i>Trapa</i>	<i>natans</i>
Severe/Established	Curly-leaf pondweed	<i>Potamogeton</i>	<i>crispus</i>
Severe/Established	Eurasian watermilfoil	<i>Myriophyllum</i>	<i>spicatum</i>
Severe/Established	Purple loosestrife	<i>Lythrum</i>	<i>salicaria, virgatum, and any hybrids</i>
Moderate/Not in state	Yellow floating heart	<i>Nymphoides</i>	<i>peltata</i>
Moderate/Established	Eurasian flowering rush	<i>Butomus</i>	<i>umbellatus</i>
Moderate/Established	Water cress	<i>Nasturtium</i>	<i>officinale</i>
Moderate/Established	Yellow iris	<i>Iris</i>	<i>pseudacoroides</i>

Minnesota State Management Plan for Invasive Species

<u>Ranking*</u>	<u>Common Name</u>	<u>Genus</u>	<u>Species</u>
Severe pest, not expected to survive in MN	<i>Salvinia complex</i>	<i>Salvinia</i>	<i>spp.</i>
Severe pest, not expected to survive in MN	Water hyacinth	<i>Eichhornia</i>	<i>crassipes</i>
Considered/not ranked	Banded nardo	<i>Marsilea</i>	
Terrestrial Animals			
Watch/Unknown	European rabbit	<i>Oryctolagus</i>	<i>Cuniculus</i>
Watch/Unknown	House finch	<i>Carpodacus</i>	<i>Maxicanus</i>
Watch/Unknown	Red-eared slider		
Severe/Not in state	Eurasian swine, European wild boar	<i>Sus</i>	<i>scrofa scrofa</i>
Severe/Invading	Mute swan	<i>Cygnus</i>	<i>Olor</i>
Severe/Established	Earthworms, nonnative	see separate list	
Severe/Established	Norway rat	<i>Rattus</i>	<i>norvegicus and ratus</i>
Moderate/Not in state	Asian raccoon dog	<i>Nyctereutes</i>	<i>Procyonoides</i>
Moderate/Not in state	Sechuan pheasant	<i>Phasianus</i>	<i>colchicus struchi</i>
Moderate/Established	House mouse		
Moderate/Established	House sparrow	<i>Passer</i>	<i>Domesticus</i>
Moderate/Established	Starling	<i>Sturnus</i>	<i>vulgaris vulgaris</i>
Minimal/Established	Ringnecked pheasant	<i>Phasianus</i>	<i>Colchicus</i>
Terrestrial Insects			
Severe/Invading	Emerald ash borer	<i>Agrilus</i>	<i>Planipennis</i>
Severe/Not in state	Asian Longhorn Beetle	<i>Anoplophora</i>	<i>Glabripennis</i>
Severe/Not in state	European Gypsy Moth	<i>Lymantria</i>	<i>Dispar</i>
Severe/Not in state	Mountain Pine Beetle	<i>Dendroctonus</i>	<i>Ponderosae</i>
Severe/Not in state	Spruce Engraver Beetle	<i>Ips</i>	<i>Typographus</i>
Severe/Not in state	Wood wasp	<i>Sirex</i>	<i>Noctilio</i>
Moderate/Invading	Asian Gypsy Moth	<i>Lymantria</i>	<i>Dispar</i>
Moderate/Not in state	Balsam Wooly Adelgid	<i>Adelges</i>	<i>Picea</i>
Moderate/Not in state	Brown Spruce Longhorn Beetle	<i>Tetropium</i>	<i>Fuscum</i>
Moderate/Not in state	Douglas Fir Tussock Moth	<i>Orgyia</i>	<i>Pseudotsugata</i>
Moderate/Not in state	Europoean Oak Bark Beetle	<i>Scolytus</i>	<i>Intricatus</i>
Moderate/Not in state	Fir Engraver	<i>Scolytus</i>	<i>Ventralis</i>
Moderate/Not in state	Great spruce bark beetle	<i>Dendroctonus</i>	<i>Micans</i>
Moderate/Not in state	Japanese Cedar Longhorn Beetle	<i>Callidiellum</i>	<i>Rufipenne</i>
Moderate/Not in state	Nun Moth	<i>Lymantria</i>	<i>Monacha</i>
Moderate/Not in state	Red-Haired Pine Bark Beetle	<i>Hylurgus</i>	<i>Ligniperda</i>
Moderate/Not in state	Siberian moth	<i>Dendrolimus</i>	<i>Sibiricus</i>
Moderate/Not in state		<i>Scolytus</i>	<i>Schevyrewi</i>
Terrestrial Plants			
Watch/Unknown	Baby's-breath	<i>Gypsophila</i>	<i>Paniculata</i>
Watch/Unknown	Burdock, Woodland	<i>Arctium</i>	<i>Nemorosum</i>
Watch/Unknown	Burning Bush, Winged Euonymus	<i>Euonymus</i>	<i>Alatus</i>
Watch/Unknown	Celandine	<i>Chelidonium</i>	<i>Majus</i>

Minnesota State Management Plan for Invasive Species

<u>Ranking*</u>	<u>Common Name</u>	<u>Genus</u>	<u>Species</u>
Watch/Unknown	Chicory	<i>Chicorium</i>	<i>Intybus</i>
Watch/Unknown	Daisy, Portuguese	<i>Leucanthemum</i>	<i>Lacustre</i>
Watch/Unknown	English Ivy	<i>Hedera</i>	<i>Helix</i>
Watch/Unknown	Everlasting Pea	<i>Lathyrus</i>	<i>Latifolius</i>
Watch/Unknown	Foxglove, Garden	<i>Digitalis</i>	<i>Purpurea</i>
Watch/Unknown	Japanese Cork Tree	<i>Phellodendron</i>	<i>Amurensse</i>
Watch/Unknown	Japanese Honeysuckle	<i>Lonicera</i>	<i>Japonica</i>
Watch/Unknown	Japanese Hops	<i>Humulus</i>	<i>Japonicus</i>
Watch/Unknown	Locust Bristly	<i>Robinia</i>	<i>Hispida</i>
Watch/Unknown	Locust, clammy	<i>Robinia</i>	<i>Viscosa</i>
Watch/Unknown	Porcelain Berry	<i>Ampelopsis</i>	<i>Brevipedunculata</i>
Watch/Unknown	Princess Tree	<i>Paulownia</i>	<i>Tomentosa</i>
Watch/Unknown	Queen of the meadow	<i>Filipendula</i>	<i>Ulmaria</i>
Watch/Unknown	Rugosa Rose	<i>Rosa</i>	<i>Rugosa</i>
Watch/Unknown	Sawtooth Oak	<i>Quercus</i>	<i>Accutissima</i>
Watch/Unknown	Timothy	<i>Phleum</i>	<i>Pratense</i>
Severe/Not in state	Black Swallow-wort	<i>Vincetoxicum</i>	<i>Nigrum</i>
Severe/Not in state	Giant Hogweed	<i>Heracleum</i>	<i>Mantegazzianum</i>
Severe/Not in state	Honeysuckle, Amur	<i>Lonicera</i>	<i>Maackii</i>
Severe/Not in state	Lespedeza, Chinese	<i>Lespedeza</i>	<i>Cuneata</i>
Severe/Not in state	Oriental Bittersweet	<i>Celastrus</i>	<i>Orbiculatus</i>
Severe/Not in state	Thistle, marsh	<i>Cirsium</i>	<i>Palustre</i>
Severe/Not in state	thistle, milk	<i>Silybum</i>	<i>Marianum</i>
Severe/Established	Alyssum, hoary	<i>Berteroa</i>	<i>Incana</i>
Severe/Established	Autumn Olive	<i>Eleagnus</i>	<i>Umbellate</i>
Severe/Established	Bird's-foot trefoil	<i>Lotus</i>	<i>Corniculatus</i>
Severe/Established	Buckthorn, common or European	<i>Rhamnus</i>	<i>Cathartica</i>
Severe/Established	Buckthorn, glossy (all cultivar)	<i>Frangula</i>	<i>Alnus</i>
Severe/Established	Crown Vetch	<i>Coronilla</i>	<i>Varia</i>
Severe/Established	European or Common Barberry	<i>Berberis</i>	<i>Vulgaris</i>
Severe/Established	Foxglove, Grecian	<i>Digitalis</i>	<i>Lanata</i>
Severe/Established	Garlic Mustard	<i>Allaria</i>	<i>Petiolaria</i>
Severe/Established	Giant Knotweed	<i>Polygonum</i>	<i>Sachalinense</i>
Severe/Established	Honeysuckle, Bela	<i>Lonicera</i>	<i>x bella</i>
Severe/Established	Honeysuckle, Morrow's	<i>Lonicera</i>	<i>Morrowii</i>
Severe/Established	Japanese Knotweed	<i>Polygonum</i>	<i>Cuspidatum</i>
Severe/Established	Knapweed, spotted	<i>Centaurea</i>	<i>Maculosa</i>
Severe/Established	Locust, black	<i>Robinia</i>	<i>Pseudocacia</i>
Severe/Established	Maple, Norway	<i>Acer</i>	<i>Platanoides</i>
Severe/Established	Multiflora Rose	<i>Rosa</i>	<i>Multiflora</i>
Severe/Established	Purple Loosestrife	<i>Lythrum</i>	<i>Salicaria</i>
Severe/Established	Reed canary grass	<i>Phalaris</i>	<i>arundinacea</i>
Severe/Established	Spurge, Leafy	<i>Euphorbia</i>	<i>escula</i>
Severe/Established	Tansy	<i>Tanacetum</i>	<i>vulgare</i>
Severe/Established	Tartarian Honeysuckle	<i>Lonicera</i>	<i>tatarica</i>
Severe/Established	Thistle, Canada	<i>Cirsium</i>	<i>arvense</i>
Severe/Established	Thistle, musk	<i>Carduus</i>	<i>nutans</i>
Severe/Established	Thistle, plumeless	<i>Carduus</i>	<i>acanthoides</i>
Not likely to establish	Chinese Yam	<i>Dioscorea</i>	<i>oppositifolia</i>

Minnesota State Management Plan for Invasive Species

<u>Ranking*</u>	<u>Common Name</u>	<u>Genus</u>	<u>Species</u>
Not likely to establish	Japanese Stilt Grass	<i>Microstegium</i>	<i>vimineum</i>
Not likely to establish	Kudzu	<i>Pueraria</i>	<i>montana</i>
Not likely to establish	Mimosa	<i>Albizia</i>	<i>julibrissin</i>
Not likely to establish	Tree of Heaven	<i>Ailanthus</i>	<i>altissima</i>
Moderate/Not in state	Globe Thistle	<i>Echinops</i>	<i>sphaerocephalus</i>
Moderate/Not in state	Teasel, common	<i>Dipsacus</i>	<i>sylvestris</i>
Moderate/Established	Buttercup, tall	<i>Ranunculus</i>	<i>acris</i>
Moderate/Established	Carrot, wild	<i>Daucus</i>	<i>carota</i>
Moderate/Established	Clover, White	<i>Trifolium</i>	<i>repens</i>
Moderate/Established	Creeping Charlie	<i>Glechoma</i>	<i>hederacea</i>
Moderate/Established	Daisy, oxeye	<i>Leucanthemum</i>	<i>vulgare</i>
Moderate/Established	Dalmatian Toadflax	<i>Linaria</i>	<i>dalmatica</i>
Moderate/Established	Dame's Rocket	<i>Hesperis</i>	<i>matronalis</i>
Moderate/Established	Elecampane	<i>Inula</i>	<i>britannica</i>
Moderate/Established	Europ. Highbush Cranberry	<i>Viburnum</i>	<i>opulus</i>
Moderate/Established	Field bindweed	<i>Polygonum</i>	<i>convolvulus</i>
Moderate/Established	Japanese Barberry	<i>Berberis</i>	<i>thunbergii</i>
Moderate/Established	Lily-of-the-Valley	<i>Convallaria</i>	<i>majalis</i>
Moderate/Established	Maple, Amur	<i>Acer</i>	<i>ginnala</i>
Moderate/Established	Mulberry, White	<i>Morus</i>	<i>alba</i>
Moderate/Established	Orange Day Lily	<i>Hemerocallis</i>	<i>fulva</i>
Moderate/Established	Quackgrass	<i>Elytrigia</i>	<i>repens</i>
Moderate/Established	Sowthistle, perennial	<i>Sonchus</i>	<i>arvensis</i>
Moderate/Established	Spurge, Cypress	<i>Euphorbia</i>	<i>cyparissias</i>
Moderate/Established	St. Johns'wort	<i>Hypericum</i>	<i>perforatum</i>
Moderate/Established	Teasel, cut leaf	<i>Dipsacus</i>	<i>laciniatus</i>
Moderate/Established	Willow, Hybrid	<i>Salix</i>	<i>x rubens</i>
Minimal/Established	Barnyard grass	<i>Echinochloa</i>	<i>crusgalli</i>
Minimal/Established	Big-leaf Lupine	<i>Lupinus</i>	<i>polyphyllus</i>
Minimal/Established	Bittersweet Nightshade	<i>Solanum</i>	<i>dulcamara</i>
Minimal/Established	Black medic	<i>Medicago</i>	<i>lupulina</i>
Minimal/Established	Bouncing Bet	<i>Saponaria</i>	<i>offinalis</i>
Minimal/Established	Burdock, Common	<i>Arctium</i>	<i>minus</i>
Minimal/Established	Butter-and-eggs	<i>Linaria</i>	<i>vulgaris</i>
Minimal/Established	Campion, Bladder	<i>Silene</i>	<i>vulgaris</i>
Minimal/Established	Campion, White	<i>Silene</i>	<i>latifolia</i>
Minimal/Established	Clover, Red	<i>Trifolium</i>	<i>pratense</i>
Minimal/Established	Common Bugloss	<i>Anchusa</i>	<i>arvensis</i>
Minimal/Established	Creeping Bellflower	<i>Campanula</i>	<i>rapunculoides</i>
Minimal/Established	European Mountain-ash	<i>Sorbus</i>	<i>acuparia</i>
Minimal/Established	Goutweed	<i>Aegopodium</i>	<i>podagraria</i>
Minimal/Established	Helleborine	<i>Epiactis</i>	<i>helleborine</i>
Minimal/Established	Hemp	<i>Cannabis</i>	<i>sativa</i>
Minimal/Established	Motherwort	<i>Leonurus</i>	<i>cardiaca</i>
Minimal/Established	Mullein	<i>Verbascum</i>	<i>thapsus</i>
Minimal/Established	Poplar, White	<i>Populus</i>	<i>alba</i>
Minimal/Established	Russian Olive	<i>Eleagnus</i>	<i>angustifolium</i>
Minimal/Established	Thistle, bull	<i>Cirsium</i>	<i>vulgare</i>
Minimal/Established	Willow, Crack	<i>Salix</i>	<i>fragilis</i>
Minimal/Established	Willow, White	<i>Salix</i>	<i>alba</i>

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Considered/not ranked	Black Alder	<i>Alnus</i>	<i>glutinosa</i>
Considered/not ranked	Cinquefoil, Silver	<i>Potentilla</i>	<i>argentia</i>
Considered/not ranked	Cinquefoil, Sulphur	<i>Potentilla</i>	<i>recta</i>
Considered/not ranked	Clover, Alsike	<i>Trifolium</i>	<i>hybridum</i>
Considered/not ranked	Lombardy Poplar	<i>Populus</i>	<i>nigra</i>
Considered/not ranked	Osage Orange	<i>Maclura</i>	<i>pomifera</i>
Considered/not ranked	Sweet Woodruff	<i>Galium</i>	<i>odoratum</i>

The MISAC rankings are based on the following standards developed by the MISAC Criteria Subcommittee, panels of experts, and the Council.

MISAC's Categories, Criteria, and Standards for Evaluating Invasiveness of Nonnative Species in Minnesota

The MISAC rankings are based on the following standards developed by the MISAC Criteria Subcommittee, panels of experts, and the Council. Only the standards for the impacted areas of native species/natural communities and use of natural resources (recreation/ industry) are shown in this version.

A. “Severe threat” - known to be in the state:

Characteristics - possesses many characteristics of an invasive species
(see list of characteristics)

Ease of Spread -

Spread into and within sites - spreads easily into sites; aggressive invaders.

Spread between sites - spreads easily between sites (e.g., submersed aquatic plants can spread by fragments attached to equipment, wind blown seed can travel long distances).

Impacted areas -

Native species / natural communities

- known to displace native species [e.g., those plants or organisms that have the capacity to invade and develop large mono-cultures/populations to the exclusion of native species in mostly undisturbed native communities]; or
- causes significant undesirable alteration [e.g., changes structure of natural community, eliminates a structural component of community, changes fire regime, changes water regime, changes water chemistry/dissolved oxygen level, resulting in near collapse or total loss of that communities or portions of that communities function] of natural communities in Minnesota, in adjacent states/provinces, or in similar climates throughout the world.

Use of natural resources (recreation and industry, including wild bait harvest)

- causes significant reduction in use of site for recreation or industry prompting active control or management (when available);
- creates mats on water surface; treatment could limit use of site; or species can plug water intakes of utilities.

B. “Severe threat” - not known to be in the state:

Criteria and standards are the same as A, but species is not yet identified in the state.

Attributes of these species, when observed in similar states, Canadian provinces, or other countries meet criteria and standards in A. If any quantity is found, notify DNR/MDA.

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C. “Moderate threat” - known to be in the state:

Characteristics - possess some characteristics of invasive species.

Ease of Spread

1. **Spread into and within sites** - not considered to spread as easily into sites as those species listed as A and B (Severe Threat) **and Spread between sites** - spread less rapidly between sites than species listed as A and B (Severe Threat).
or
2. The spread between sites, or the spread within sites, is low and the other is high.

Impacted areas

Native plants / natural communities

- less significant displacement of native species [species that have the capacity to invade natural communities along disturbance corridors, or to spread from stands in disturbed sites into undisturbed areas, but which seem to principally spread and remain in disturbed sites; organisms that have the capacity to invade, but do not develop large mono-cultures/populations and allow native species to successfully reproduce and persist in mostly undisturbed native communities]
- less significantly alters* [causes some damage or mortality to a mostly undisturbed natural community, but that community continues to function but at a reduced capacity] natural communities in Minnesota, in adjacent states/provinces, or in similar climates.

Use of natural resources (recreation and industry including wild bait harvest)

- causes less significant reduction in use of site for recreation or industry;
- causes less significant nuisance conditions [e.g., do not form extensive matting at water surface, or because of narrow habit requirements only affect limited areas.]

D. “Moderate threat” - not known to be in the state:

Criteria and standards are the same as C, but species is not yet identified in the state.

Attributes of these species, when observed in similar states, Canadian provinces, or other countries meet criteria and standards in C.

E. “Minimal” - known to be in the state:

Characteristics - species can naturalize in the state; and has a few characteristics of invasive species.

Impacted areas

Native plants/communities

- insignificant displacement of, or competition with native species [may naturalize, but does not become abundant]; or
- insignificantly alters [organisms that cause little or no damage or mortality to a mostly undisturbed natural community, and that community continues to function at full capacity] natural communities in Minnesota, in adjacent states/provinces, or in similar climates.

Use of natural resources (recreation and industry including wild bait harvest)

- causes slight reduction in use of site for recreation or industry;
- cause some nuisance conditions.

Ease of Spread

Spread into and within sites - insignificant, or no spread into sites.

Spread between sites - insignificant; only rarely have the ability to spread to and establish in new sites; or no spread between sites.

F. “Minimal” - not known to be in the state:

Criteria and standards are the same as E, but species not yet identified in the state.

Attributes of these species, when observed in similar states, provinces, or countries meet criteria and standards in E.

G. “Watch / Unknown threat”:

These are nonnative species that may become a problem in the future. At this time more information is needed, and there is no consensus about their status. If found, spreading locally within or between sites, notify DNR or MDA.

Characteristics - might naturalize; or not known if species can naturalize in Minnesota.

Impacted areas – none established for individual impacted areas.

Ease of Spread - species with unknown potential or low observed spread in other locations.

H. Considered But Not Ranked:

These are species that after review, do not appear to pose any threats to native species, agribusiness, natural resource use, human health, or landscaped areas. Does not need to be controlled and does not alter the use of the land. Significant benefits can be derived from it. Does not reduce production or value of the product.

Characteristics – and has a few to no characteristics of invasive species.

Ease of Spread - can't naturalize in Minnesota; or can over winter and spread vegetatively, but have not been observed in the wild, or are uncommon in the wild.

I. Severe pests in other areas, but could not establish in Minnesota.

These species could be seasonal pests or pests in areas of warm water discharges.

Notes about process:

- The distribution of a species, other than presence or absence in the state, is not one of the criteria used to assign species to the above categories. At some point the distribution may/could be considered to create sub categories of the major categories as has been done in other states.
- The Criteria subcommittee will continue to work on the criteria, standards, and characteristics. Panels of experts may have comments on these and modifications can be made based on those comments.
- MISAC decided to consider invasiveness as more than the spread into and impacts to natural communities — species will be assigned to a category based on its most severe impact, but will be given a ranking for each area of impact (native plants/communities, agriculture, human health, use of natural resources – recreation & industry) based on the standards for each area of concern. (e.g., purple loosestrife: NR - severe, AG - min, HH - none, UNR - none; Eurasian watermilfoil: NR - severe, AG - none, HH - none, UNR – severe; leafy spurge: NR - severe, AG - severe, HH - min, UNR - none)

Appendix E - Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 – Section 1204 (as amended)

SEC. 1204. STATE AQUATIC NUISANCE SPECIES MANAGEMENT PLANS.

(a) STATE OR INTERSTATE INVASIVE SPECIES MANAGEMENT PLANS. —

(1) **IN GENERAL** — After providing notice and opportunity for public comment, the Governor of each State may prepare and submit, or the Governors of the States and the governments of the Indian tribes involved in an interstate organization, may jointly prepare and submit—

(A) a comprehensive management plan to the Task Force for approval which identifies those areas or activities within the State or within the interstate region involved, other than those related to public facilities, for which technical, enforcement, or financial assistance (or any combination thereof) is needed to eliminate or reduce the environmental, public health, and safety risks associated with aquatic nuisance species, particularly the zebra mussel; and

(B) a public facility management plan to the Assistant Secretary for approval which is limited solely to identifying those public facilities within the State or within the interstate region involved for which technical and financial assistance is needed to reduce infestations of zebra mussels.

(2) **CONTENT** — Each plan shall, to the extent possible, identify the management practices and measures that will be undertaken to reduce infestations of aquatic nuisance species.

Each plan shall—

(A) identify and describe State and local programs for environmentally sound prevention and control of the target aquatic nuisance species;

(B) identify Federal activities that may be needed for environmentally sound prevention and control of aquatic nuisance species and a description of the manner in which those activities should be coordinated with State and local government activities;

(C) identify any authority that the State (or any State or Indian tribe involved in the interstate organization) does not have at the time of the development of the plan that may be necessary for the State (or any State or Indian tribe involved in the interstate organization) to protect public health, property, and the environment from harm by aquatic nuisance species; and

(D) a schedule of implementing the plan, including a schedule of annual objectives, and enabling legislation.

(3) **CONSULTATION** —

(A) In developing and implementing a management plan, the State or interstate organization should, to the maximum extent practicable, involve local governments and regional entities, Indian tribes, and public and private organizations that have expertise in the control of aquatic nuisance species.

(B) Upon the request of a State or the appropriate official of an interstate organization, the Task Force or the Assistant Secretary, as appropriate under paragraph (1), may provide technical assistance in developing and implementing a management plan.

(4) **PLAN APPROVAL** — Within 90 days after the submission of a management plan, the Task Force or the Assistant Secretary in consultation with the Task Force, as appropriate under paragraph (1), shall review the proposed plan and approve it if it meets the requirements of this subsection or return the plan to the Governor or the interstate organization with recommended modifications.

(b) **GRANT PROGRAM** —

(1) **STATE GRANTS** — The Director may, at the recommendation of the Task Force, make grants to States with management plans approved under subsection (a) for the implementation of those plans.

(2) **APPLICATION** — An application for a grant under this subsection shall include an identification and description of the best management practices and measures which the State proposes to utilize in implementing an approved management plan with any Federal assistance to be provided under the grant.

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(3) FEDERAL SHARE —

(A) The Federal share of the cost of each comprehensive management plan implemented with Federal assistance under this section in any fiscal year shall not exceed 75 percent of the cost incurred by the State in implementing such management program and the non-Federal share of such costs shall be provided from non-Federal sources.

(B) The Federal share of the cost of each public facility management plan implemented with Federal assistance under this section in any fiscal year shall not exceed 50 percent of the cost incurred by the State in implementing such management program and the non-Federal share of such costs shall be provided from non-Federal sources.

(4) ADMINISTRATIVE COSTS — For the purposes of this section, administrative costs for activities and programs carried out with a grant in any fiscal year shall not exceed 5 percent of the amount of the grant in that year.

(5) IN-KIND CONTRIBUTIONS — In addition to cash outlays and payments, in-kind contributions of property or personnel services by non-Federal interests for activities under this section may be used for the non-Federal share of the cost of those activities.

(c) **ENFORCEMENT ASSISTANCE —** Upon request of a State or Indian tribe, the Director or the Under Secretary, to the extent allowable by law and in a manner consistent with section 141 of title 14, United States Code, may provide assistance to a State or Indian tribe in enforcing an approved State or interstate invasive species management plan.

(16 U.S.C. 4724)

Appendix F – Minnesota Statutes Related to Invasive Species Management Plans

M.S. 18G.12 Invasive species management and investigation.

Subd. 3. Invasive species management plan. The commissioner [of Agriculture] shall prepare and maintain a long-term terrestrial invasive species management plan which may include specific plans for individual species. The plan must address:

- (1) coordination strategies for detection and prevention of accidental introductions;
- (2) methods to disseminate information about harmful invasive species to the general public and appropriate agricultural and resource management agencies or organizations;
- (3) coordination of control efforts for selected harmful terrestrial invasive species; and
- (4) participation by local units of government and other state and federal agencies in the development and implementation of local management efforts.

M.S. 84D.02 Invasive Species Management Program.

Subd. 3. Management plan. The commissioner [of Natural Resources] shall prepare and maintain a long-term plan, which may include specific plans for individual species and actions, for the statewide management of invasive species of aquatic plants and wild animals. The plan must address:

- (1) coordinated detection and prevention of accidental introductions;
- (2) coordinated dissemination of information about invasive species of aquatic plants and wild animals among resource management agencies and organizations;
- (3) a coordinated public education and awareness campaign;
- (4) coordinated control of selected invasive species on lands and public waters;
- (5) participation by lake associations, local citizen groups, and local units of government in the development and implementation of local management efforts;
- (6) a reasonable and workable inspection requirement for watercraft and equipment including those participating in organized events on the waters of the state;
- (7) the closing of points of access to infested waters, if the commissioner determines it is necessary, for a total of not more than seven days during the open water season for control or eradication purposes;
- (8) maintaining public accesses on infested waters to be reasonably free of aquatic macrophytes; and
- (9) notice to travelers of the penalties for violation of laws relating to invasive species of aquatic plants and wild animals.

Appendix G. Comments Received on the Plan and Responses

This appendix includes written comments received on the plan during the public comment period in September 2009. Comments are listed under the relevant portion of the plan and the individual or entity that submitted the comments is identified in parentheses following the comment. Responses to the comments are often provided and are shown in italics after the comments. In addition, numerous edits to text provided by MISAC members were made to the document without notation below.

General Comments

- I am on an area lake association board, the head of the AIS committee. ... Quick action needs to be taken, or we will have unrecoverable damage to the majority of lakes in MN. Given the bureaucracies involved, I doubt that will be possible. Some sort of "super-active task force" needs to be proposed to the legislature. Good luck with this effort, and know that you have lots of support to take extraordinary means to accomplish this mission. (David Anderson)
- Please extend our thanks to all of those who have worked on the MISAC State Invasive Species Plan. The leadership of the Minnesota Nursery & Landscape Association stands ready to play a positive role in addressing invasive species which are causing environmental damage. (MNLA)
- I viewed your exotic species management plan and it looked good. (Reid Baumann)
- Thank you for requesting comments on the above-referenced draft plan (the Plan) developed by the Minnesota Invasive Species Advisory Council (MISAC). Minnesota Waters' comments are in reference only to aquatic invasive species (AIS), as opposed to terrestrial invasive species, and are framed in accordance with our recent report and recommendations regarding Minnesota's AIS system.

Minnesota Waters has found the AIS management system in Minnesota to be ineffective and not fully protective of Minnesota's lakes and rivers. The Plan coordinates Minnesota's invasive species functions among state agencies and others within the existing framework of plans, policies, statutes and funding and therefore does little to address the underlying systemic deficiencies we have identified. As a result, Minnesota's lakes and rivers face a real, imminent and severe threat from AIS. This Plan does little to allay that threat or the likely irreversible impacts AIS are and will cause.

Minnesota Waters main comment is:

The Plan, four years in the making, probably satisfies its legislative mandate, but does little to fix Minnesota's broken AIS management system. Minnesota Waters finds the formalization of this plan could lead to a false sense of security within Minnesota and lead to complacency and inaction among our state's leaders, policy-makers and resource managers.

Minnesota Waters believe the state's resource managers are doing a good job with the resources and within the constraints of the current AIS management system. Unfortunately, there are too few resources and real constraints. Minnesota Waters appreciates the scope and breadth of AIS challenges on many levels and encourages the MISAC or another appropriate state-level commission to develop post haste a vision and plan to adequately protect Minnesota's aquatic resources from AIS. (Minnesota Waters)

• I continue to be amazed at how far behind the "eight ball" the Minnesota DNR is regarding Invasive Aquatic Plant Species. The State habitually maintains and protects their "Ownership" of the lakes, but then pushes the care and maintenance of these lakes off on the surrounding property owners. As such, the spread of milfoil from host lakes has been carelessly ignored by the DNR for years, but when another lake becomes infested with Milfoil the property

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owners are left with no funds and resources to clean up or control the mess. (Allan Bradshaw, Cass County Minnesota)

- I very much appreciate the effort and time spent by the task force on developing a comprehensive policy regarding invasive species. (Jeffrey L. Johnson, commenting as a private citizen. I am however, a University of Minnesota employee, working at the Minnesota Landscape Arboretum)
- This plan is misleading and inappropriate because 1) it is based on outdated information, a lot has changed since 2006; 2) terrestrial and aquatic invasive species should be addressed separately - they are very different in source and methods of containment and prevention; and 3) the real partners (lake associations and COLAs) in managing AIS weren't involved in the development of this plan or actively involved in the Council. I concur with all the comments submitted by Jerry Lerom, president, Association of Cass County Lakes.

The report is extremely negligent in painting a true picture of what is needed to implement measures that will actually curb the spread of AIS and manage it in the state of Minnesota. The DNR needs to develop a forward thinking plan that has dollars attached to what is necessary, not what is possible in 2009 dollars. How can we develop appropriate legislative efforts if we don't know the real cost of containment and prevention?

Before going too far down the implementation schedule of the proposed Statewide Plan, I suggest you separate out terrestrial and aquatic invasive species and convene your "real stakeholder" for both tracks and then update the plan with a forward thinking vision. I met with Marian Bender, Minnesota Waters, and I encouraged her to assist the DNR in convening meetings with your lake association partners who are actively managing AIS to get their assessment of what needs to happen in Minnesota and how the DNR could effectively spend one million, if received. However, we all know that one million is minor compared to the real need in Minnesota to adequately address AIS. (Paula West, Mission Lakes Association)

- The issues related to Aquatic Invasive Species and Terrestrial Invasive Species are certainly at a statewide critical stage, but it would seem that they should have been addressed separately considering they have different routes of spreading and main issues to address. (Jerry Lerom, Association of Cass County Lakes)
- The information contained in the Minnesota AIS Management Plan is good solid information that serves as an excellent foundation for an ANSTF approved State ANS Management Plan. However, the plan is lacking many of the required components listed in the Guidance.

Typically, when the ANSTF encounters a plan that focuses on all invasive species instead of just aquatic invasive species, the Task Force asks for the plan to be divided into two sections: an aquatic section and a terrestrial section. This way, the ANSTF reviewers can focus their attention on the aquatic components of the plan and easily distinguish what activities are being proposed for ANS. If the above is not possible, then at the very least, the aquatic components should be detailed in a separate set of implementation tables from the terrestrial section. (ANSTF)

Response: *The plan was not separated into aquatic and terrestrial because, other than the implementation tables, there are more similar aspects of the plan for aquatic and terrestrial than dissimilar. Also, many entities working on the plan work on both types of species (e.g., DNR, AHPIS, Tribes). We are trying to have participants in the plan think broadly about all types of invasive organisms rather than having narrower focus. The narrative has been divided where possible to make reading for a particular set of species easier for the reader. As mentioned in the comments above, the aquatic related implementation tables will be submitted and will be separated in our database by the type of species – aquatic/terrestrial.*

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Comments on Invasive Species Threats to Minnesota

- The Problem Definition section does not define the problem. We recommend referring to our position statement. (Minnesota Waters)
- The section, Invasive Species Threats to Minnesota provides a priority ranking of invasive species. This section is helpful for focusing the state's efforts and resources. (Minnesota Waters)

Response: *Additional text was added about the problems of aquatic invasive species, species priorities, and management priorities.*

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- Rather than commenting directly on the draft Plan, I thought I would forward the Lake Minnetonka perspective on new AIS and the strategies that the LMCD community has taken to reduce new AIS introductions. For some time, the LMCD has been extremely concerned about the introduction of zebra mussels into Lake Minnetonka. There are a number of pathways that zebra mussels and other AIS could get introduced into Lake Minnetonka. Some of these include: 1) commercial transporters bringing boats from the infested bodies of waters, 2) recreational boats that come from infested bodies of water, and 3) special events. The primary strategies we have implemented to address these pathways include inspection of incoming watercraft at public accesses, contracted with the MN DNR, and public education efforts.

Currently, the Lake Minnetonka community is working through an EWM/Exotics Task Force facilitated by the LMCD on a AIS Prevention Plan for Lake Minnetonka. It is good to know that this Minnesota State Plan is currently being worked on because a number of the elements included in this Plan will be considered for Lake Minnetonka. Once this Plan has been finalized, please forward me a copy of it. (Greg Nybeck, Executive Director, Lake Minnetonka Conservation District)

- The following excerpt from the plan is an understatement at best. "Trailered boats and water recreation equipment are a high-risk pathway in the state for introduction and spread of aquatic species such as Eurasian watermilfoil and zebra mussel that are in the state, and hydrilla and European frog-bit (*Hydrocharis morsus-ranae*) that are not known to be in the state."

Saying that recreational boating equipment is a "high-risk pathway" is delusional wordsmithing and is not accurate. The state's recreational boaters are in fact solely responsible for the vast majority of the current invasive aquademic occurring within Minnesota. That is a fact, just say it. And many more species should be included in the statement, especially the snails. (Daniel J. Dexter, Duluth)

- Dispersion of aquatic invasives via bait and aquarium fishes may warrant explicit mention because it is so significant and has unique issues associated with it. Links between quality of life (and water) and invasive species need to be made somehow (Peter Sorensen, U of Minnesota)

Comments on the Elements

General

- Throughout the Plan, strategies, actions, and desired outcomes are stated in vague, non-quantitative terms such as, "actively seek," minimize" and "will work to." There are no measurable outcomes in the Plan, thus there is no reliable way to evaluate effectiveness. (Minnesota Waters)
- The Elements, Strategies, Actions section is categorically complete and rational. However, it makes reference to implementation tables, which are to be provided (when?) as an addendum to the Plan. (Minnesota Waters)

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Response: *The strategies and actions were intentionally written without specific information about who or when the actions would be taken so that the plan would be useful for any entity to use and use over the long-term. Details about how the actions would be implemented are/will be included in the implementation tables/database as they are developed by the entities responsible for their implementation.*

- As a member of a Lake Association in northern Minnesota, we are starting to focus on AIS education. It would be helpful as part of the framework to have a specific "step-by-step approach" for a lake association to take now before AIS and then if there ever is a suspected AIS discovery. What is the progression of steps? Is it best to get a lake AIS vegetation and fish/animal baseline right now, for example, before any problem has been discovered. The step-by-steps could be what the "best practice" is in a perfect world. This could be helpful for each of the 10,000 lakes in MN. (Sharon Natzel, New Hope, MN)

Response: *These ideas are being discussed and information to address each of the points will be developed by DNR, Minnesota Sea Grant and Minnesota Waters for distribution to lake associations as part of annual communications plans.*

- I was unable in my cursory reading to find reference to measurable, documentable or observable outcomes. There seems to be some reference to an evaluation of the plan, but little or no language addressing how this will be done. (Jerry Lerom, Association of Cass County Lakes)

Prevention / Containment

- The DNR and related partners have done a great job educating the public and stakeholders about the threat of aquatic invasive plants and basic steps people can take to contain that negative impact. The leadership of MDA and related partners on educating the public in the wake of emerald ash borer's arrival has been outstanding. Similar informational efforts and campaigns will be needed for terrestrial invasive plants and other threats. (MNLA)

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- I believe future signage in your plan should be larger, brighter, and more graphic than the current signs which are small and blend in with the others. A sign should be posted at the entrance to the access and at the water, large and bright. Graphic pictures of what exotics do to a lake may finally hit home for boaters and make them sit up and notice. Additional, homemade signs from local homeowners' associations could help too. It needs to be like cigarette packs in Europe vs. cigarette packs here...a few words on a small sign are nice, but a large graphic sign of the damage exotics can cause can bring about more awareness and less damage to our precious lakes. (Reid Baumann)

Response: *Larger, brighter signage and local produced signs have been suggested by lake groups and individuals in recent years. In response to these suggestions, the DNR developed new large signage in 2009 for use at public and private water accesses. The signs will be available through the DNR Prevention grants, for purchase, and DNR posting on infested waters in future years.*

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- Many lakes, like our Long Lake in Hubbard County, have many platted public accesses. Only a few are actually used, but still far too many to diligently monitor, if that is one of our options. The enforcement effort will require a reduction in the use of the many accesses available, even if only on a temporary basis.

To gain the complete cooperation of the boating public, commercial entities, like Cabela's, Gander Mountain, etc, need to be quickly and forcefully engaged to promote the educational effort.

A large cash incentive should be considered, to be given several times a year to people/organizations that come up with workable preventions, biological or otherwise. (David Anderson)

Response: *Each year DNR provides grant to help local prevention and management efforts. If new federal*

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funding is available to the state, grants to local groups will be increased.

- I think we could really slow down the spread of aquatic species if people who recreate on lakes that are infested are only allowed to recreate on lakes that are infested. If they want to recreate on lakes that are not infested they must use equipment that has not been in infested waters. Also I have seen purple loosestrife growing in places it would not normally grow, but growing in areas MnDOT has mowed. I think MnDOT is mowing in areas where it is growing and the seeds get stuck under the mower and vibrate off while they continue to mow. Cleaning the mower decks may prevent this. (Nicki Weber, U of MN CNR Graduate)
- If your group is serious about natural resource stewardship and interested in maintaining any pristine water resources within the state of Minnesota, a moratorium on new public water access would be recommended as part of this plan. The state statutes in use today to provide additional public water access have gone out of date and are no longer good conservation law. (Daniel J. Dexter, Duluth)

Response: *Many ideas have been presented in the past and recently such as closing, restricting and not developing public water accesses in the state. An assessment of these ideas and similar access related prevention efforts in other states will be done in the fall and winter of 2009-2010. Stakeholder workshops will also be held during that time period to reassess the current efforts in the state and potential new ideas. This will be facilitated by DNR, Minnesota Waters, and Minnesota Sea Grant.*

Early Detection

- Research is needed to develop new detection mechanisms (genetic, pheromones, etc). (Peter Sorensen, U of Minnesota)

Management

- Research is needed on developing new means to control invasive species (not just to tests the efficacy of techniques). Also, research is definitely needed to develop statistical models to manage species. (Peter Sorensen, U of Minnesota)

Coordination

- No comments were received on this Element of the plan.

Comments on Implementation Table and Funding

• With so many agencies involved in developing and implementing the various recommendations, it seems there may be a need for an invasive species "czar" who is independent of any agency and ultimately responsible for moving the overall plan forward as well as prodding various stakeholders to execute individual implementation plans. (MNLA)

• MDA and DNR are identified as the two primary interacting agencies. Success will hinge on whether or not there is an active level of support for the invasive species programs from the highest levels of both agencies, and preferably from the governor's office as well. Consequently, some person or organization should be identified as the lead in marshalling political support for the funding of the recommendations in this plan and related plans. Without strong support from the department commissioners, the governor's office, and/or a really strong legislative champion, any new initiatives that cost money aren't going very far. (MNLA)

• Evaluation of the state's programs is indicated, but no one, no schedule, no budgets are identified to implement these actions. The lack of an implementation plan is a serious deficiency in the Plan. (Minnesota Waters)

• The plans must include more local help in prevention and state funding for clean-up. (Allan Bradshaw, Cass County Minnesota)

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- Unfortunately, control and monitoring will be determined by the level of funding available for direct control, education and outreach efforts. (Jeffrey L. Johnson, commenting as a private citizen. I am however, a University of Minnesota employee, working at the Minnesota Landscape Arboretum)

Response: *Developing implementation tables and finding funding for implementation of this plan is a separate and subsequent step. Completing the plan and state and tribal implementations tables, and obtaining approval of the plan will make the state and tribes eligible for federal grants to implement the aquatic aspects. Other federal, tribal, state funds may be available to implement the plan as well.*

There is a new funding available through the Farm Bill over the course of the next 5 years. It's ear marked toward early pest detection and surveillance, threat identification and mitigation and outreach and education to increase public understanding and support of pest control programs. This fund is available to nontraditional stakeholders. The deadline to submit proposals for 2010 is past however, more opportunities for 2010 may come out and something to be ready for in the future. More details can be found at http://www.aphis.usda.gov/plant_health/plant_pest_info/pest_detection/farm_bill.shtml

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- I found no language regarding implementation of the plan. I noted in the Implementation Section under Management it contains "research" and the whole implementation section shows the cost in 2009 dollars. What about projected costs to implement plan? . If lake associations, COLA's, etc. mentioned as partners, and potentially the biggest partner, in the document why is there no reference to them in the implementation section?
(Jerry Lerom, Association of Cass County Lakes)

Response: *This plan is a framework for any entity to use for their organization or area. Each entity, whether government or non-governmental can develop an implementation table to reflect their needs and levels of effort. Implementation tables should reflect the ongoing and proposed actions. When the implementation tables are completed they will be entered into a database that can be used to calculate the costs of ongoing implementation and an amount for implementing new desired actions. Tables were not completed because all the strategies and actions had not been finalized. The reference to 2009 dollars was removed because it was confusing to reviewers. It was intended to reflect the change in the value of funds over time and that funds needed for future years would be show in 2009 "values" not funds. It was not intended to suggest that the plan was only for actions that were funded in 2009.*

Comments on Programs and Regulatory Authorities

- The section, Programs and Regulatory Authorities, provides a reasonable overview. While perhaps not required in MISAC's charge, it would be useful to evaluate the effectiveness of the programs in preventing the introduction and establishment of AIS as well as their management and control. (Minnesota Waters)
- The U of Minnesota does not fund research on its own, but USGS, USFW, Sea Grant, NSF all can be mentioned as funders. (Peter Sorensen, U of Minnesota)

Comments on Lists of Species

- In the course of reviewing the draft of the State Invasive Species Plan it appears to me that a serious omission exists in the list of invasive species. I'm referring to the introduced non-native salmonids---steelheads, cohos, Kamloops, browns, et al. Over the decades these exotics have had a measurable deleterious impact on Lake Superior and in the rivers along Minnesota's North Shore that feed into Lake Superior.

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Historically, little scientific information was available on the scarcity of prey species in this oligotrophic water body when the stocking began. And I am unaware of any studies that suggest a niche existed that would provide food for the introduced salmonids without reducing forage for indigenous species.

I would be willing to provide additional specific information gathered for more than a decade on the forgoing. It would be immensely gratifying to learn that the failure to address the problem of the invasive exotic salmonids was simply an oversight and that it will be remedied and become an integral part of the identified invasive species list. (Glenn Maxham, Duluth)

- As always, MNLA has concerns about "losing" quality plants from the nursery and landscape trade. Prior to regulation, we urge adherence to careful evaluation processes that are based upon environmental, scientific and economic considerations. Some of the plants on the various lists within the plan may deserve to be highly regulated; others may need a higher level of best management practices applied; and still others may not be invasive here even if there are in other parts of the country. Among the terrestrial plants included on various lists within the plan, the following are currently in the commercial trade:

<i>Gypsophila Paniculata</i>	<i>Coronilla Varia</i>	<i>Convallaria majalis</i>
<i>Euonymus Alatus</i>	<i>Berberis Vulgaris</i>	<i>Acer ginnala</i>
<i>Lathyrus Latifolius</i>	<i>Robinia Pseudocacia</i>	<i>Morus alba</i>
<i>Digitalis Purpurea</i>	<i>Acer Platanoides</i>	<i>Hemerocalus fulva</i>
<i>Phellodendron Amurense</i>	<i>Rosa Multiflora</i>	<i>Sorbus acuparia</i>
<i>Lonicera Japonica</i>	<i>Phalaris arundinacea</i>	<i>Aegopodium podagraria</i>
<i>Ampelopsis Brevipedunculata</i>	<i>Tanacetum vulgare</i>	<i>Populus alba</i>
<i>Filipendula Ulmaria</i>	<i>Lonicera tatarica</i>	<i>Eleagnus angustifolium</i>
<i>Rosa Rugosa</i>	<i>Viburnum opulus</i>	<i>Alnus glutinosa</i>
<i>Quercus Accutissima</i>	<i>Berberis thunbergii</i>	<i>Galium odoratum</i>

Response: *The ranking of species as described earlier in the plan is not for the purpose of regulating species. It may lead to subsequent risk assessments for regulatory designations of species*

- Regarding the terrestrial species list, I suggest surveying people who actively control invasive exotics in natural areas to determine the level of invasion and aggressiveness of spread of genera. I think there may be surprises regarding a few species, particularly Phellodendron sp., Euonymus alatus, and Acer ginnala. Otherwise, it is a very good and thorough list. (Jeffrey L. Johnson, commenting as a private citizen. I am however, a University of Minnesota employee, working at the Minnesota Landscape Arboretum)

Response: *The ranking of species included in the plan was developed by MISAC independent of the plan and was include as a reference for identifying threats to the state. It is a dynamic database that will be amended as more information about the species currently included becomes available and distributions of the species change. New species will be evaluated in the future and added to the database. MISAC is always interested in receiving new information about the species that may affect the rankings.*

- For the database, it would be helpful to have pictures of the different stages of the invasive species and even those on the watch list, or links to pictures, etc. (Sharon Natzel, northern lake association, New Hope)

Response: *Comprehensive information about, and photographs of, invasive species was not included in the plan because there are numerous species and the information continues to change. This information is available at several MISAC members' Web sites. The MISAC Website has a section on profiles of invasive species at www.mda.state.mn.us/plants/pestmanagement/misac/profiles.htm. Other Web sites are:
DNR - www.dnr.state.mn.us/invasives/index.html
Minnesota Sea Grant - www.seagrant.umn.edu/ais/index*

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MDA - www.mda.state.mn.us/plants/default.htm

Comments on Coordination

- I would like to see this document more directly guide MISAC's actions in describing how we as a group are going to facilitate the proposed work. I'd also like to see MISAC take on a more umbrella approach in its planning efforts to help track, share and integrate all of the various invasive species plans out there. It's tough to know what all is out there and which if any overlap our specific project areas. Where can we save time by borrowing from or building on existing plans? Where can an existing plan be adapted to fit new situations? (Susan Burks, DNR Forestry)

Response: *This plan is an overall framework that also calls for other plans. Coordinating development and implementation of plans appears to be something that, as you point out, may be helpful for MISAC to take on as a role.*