



Minnesota Early Detection and Response Plan for Aquatic Invasive Species

Invasive Species Program
Ecological and Water Resources Division

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Contents

- Preface.....3
- Plan Purpose.....3
- Minnesota Experience with Aquatic Invasive Species Response3
- Steps in Aquatic Invasive Species Early Detection and Response4
 - Step 1. Detection of aquatic invasive species8
 - Step 2. Receiving and investigating reports of suspected aquatic invasive species9
 - Step 3. Communication to partners and the public9
 - Step 4. Assessment of risk9
 - Step 5. Population assessment..... 10
 - Step 6. Make action recommendations 10
 - Step 7. Implement response actions 13
- Resources and Authorities..... 13
- Related Federal Plans and Requirements 14
- Literature Cited..... 15
- Appendix A – List of Acronyms and Glossary 16
- Appendix B – Contacts and Experts by Topic 16
- Appendix C – Details regarding Incident Command Systems 17

Preface

This plan describes the Minnesota Department of Natural Resources (DNR) process for early detection of and response to suspected new infestations of aquatic invasive species (AIS). It provides guidance to DNR staff and aims to make the DNR process transparent to tribal governments, local units of government, and other partners who may be involved in AIS response activities. The state's comprehensive approach to AIS prevention and management, beyond early detection and response, is outlined in the State Management Plan for Invasive Species. This early detection and response plan was originally developed in 2013 and revised in 2021.

Plan Purpose

This plan describes the DNR's approach to early detection of and response to potential new infestations of aquatic invasive plants and wild animals. It does not address issues and efforts associated with preventing AIS introduction and spread, nor does it describe processes for responding to novel diseases or pathogens. The primary focus of this plan is the actions the DNR takes leading up to and following reports of potential new AIS infestations.

The DNR Invasive Species Program's goals are to prevent introductions of new invasive species into Minnesota, prevent the spread of invasive species within Minnesota and to reduce the impacts caused by invasive species to Minnesota's ecology, society and economy. Successful prevention depends on the public, industry and a wide variety of partners consistently practicing AIS prevention behaviors (e.g., properly cleaning watercraft, preventing release or escape of pets and plants, etc.). Gaps in implementation of these behaviors can lead to AIS introductions.

Early detection of new AIS populations provides managers with a crucial second line of defense to prevent establishment and minimize the ecological and economic impacts of a new AIS infestation (NISC 2008; CDFG 2008). Effective AIS early detection monitoring combined with AIS reporting programs for alerting managers to potential AIS increases the DNR's ability to respond to new populations of AIS. This plan describes the steps that the DNR will take following the report of a potential new AIS population, including how the DNR will work with local partners to determine potential next steps.

Experience so far has shown that once an AIS has become established and widespread, eradication efforts are expensive and unlikely to be successful (Lodge et al. 2006). If not eradicated, control efforts to limit the distribution, abundance and impacts of AIS can become ongoing, costly programs (e.g., sea lamprey control in the Great Lakes and Eurasian watermilfoil in Minnesota lakes). Therefore, adaptive management is critical in AIS response efforts.

Minnesota Experience with Aquatic Invasive Species Response

Natural resource managers in Minnesota have attempted to eradicate newly discovered AIS populations in many cases. In almost all cases, it was not possible to actually eradicate the target AIS population. However, in many cases, persistent effort significantly reduced the distribution and abundance of the species in the affected water

body. In general, the success of these efforts depends on the initial abundance and distribution of the species at the time of detection as well as the management tools available.

In the case of Eurasian watermilfoil, Crowell (1999) reported that early attempts at eradication were unsuccessful in 31 different lakes. The tool used in those cases was a granular formulation of 2,4-D, which was not effective in deeper water. Subsequent work with other herbicides has been much more successful in reducing the abundance and distribution of Eurasian watermilfoil lakewide.

In another case, the submersed aquatic plant Brazilian waterweed (*Egeria densa*) was discovered in a Minneapolis lake in 2007. This remains the only known introduction of that species in Minnesota to date. The DNR's response successfully eradicated the plant from the lake. Brazilian waterweed has not been observed either in that lake or elsewhere since 2007.

In a few cases in which zebra mussels were newly detected in apparently limited areas, the DNR has permitted control efforts using pesticides. Post-treatment monitoring of these lakes continues, but as of 2021, open-water treatment has not proven successful in eradicating zebra mussel populations in Minnesota.

Adaptive management and communication are critical to an effective invasive species response. Monitoring of AIS populations and the surrounding aquatic community is needed for evaluation of control efforts. If monitoring indicates that control efforts are not meeting management objectives or non-target species are significantly affected, managers should consider whether to modify the control efforts or halt control periodically or indefinitely. Communication and prevention are also key components of invasive species response. Even when control approaches are unavailable or unlikely to be effective, notifying the public of newly discovered AIS helps prevent additional spread. Effective communications also help set reasonable and realistic expectations concerning the control effort outcomes. Prevention is further supported through watercraft inspection and the promotion of beneficial AIS prevention behaviors, such as cleaning or drying docks and lifts (see the [DNR community-based social marketing webpage](#) for additional information).

Steps in Aquatic Invasive Species Early Detection and Response

The following table outlines steps associated with early detection and response to suspected new aquatic invasive plant and wild animal (AIS) populations. It primarily describes steps taken by the DNR. Collaboration and coordination with local organizations throughout the process is essential and typical for most detections and response efforts. There is some variability in the order of actions taken both within and across the steps; the order of bullet points presented in the table may not represent the exact order of actions taken in each response scenario. Step 3 typically occurs concurrently with steps 4 and 5. The sections following the table provide more detail for each step.

The species discovered determines whether all or only some of the steps described in this section are taken or led by DNR staff. Resource availability and staff capacity are the primary reasons for these differences in the response process. For species that are widespread in the state, DNR staff typically take a lead role in the process through most of steps 1 through 3, sometimes excluding issuance of a news release. DNR staff continue to assist with components of steps 4 and 7, such as delineation of the population if there will be a control response,

issuance of permits for control work, providing technical assistance and evaluating incorporation of the newly infested water body into watercraft inspection plans. In these cases, components of the process that cannot be led by DNR staff are often led by local organizations. Some examples of widespread species that fall into this category include Eurasian watermilfoil and curly-leaf pondweed. DNR staff must prioritize AIS based on their impacts, sometimes leading throughout the entire response process and providing funding for control of AIS with severe impacts that are not yet widespread in Minnesota.

Summary of the Aquatic Invasive Species (AIS) Early Detection and Response (EDR) Process

EDR Steps	Associated tasks
<p>1. Detection of AIS</p>	<ul style="list-style-type: none"> • Members of the public make observations of suspected AIS in new locations. • DNR invasive species staff monitor for AIS in Minnesota, following the DNR’s Guidance for Conducting Aquatic Invasive Species Early Detection and Baseline Monitoring in Lakes (2018). • Natural resources professionals from local organizations, federal agencies or other DNR programs make observations of suspected AIS in new locations.
<p>2. Receiving and investigating reports of suspected AIS</p>	<ul style="list-style-type: none"> • DNR staff, staff from partner organizations or members of the public enter reports into EDDMapS Midwest to notify other individuals skilled in identifying the suspected AIS (i.e., EDDMapS verifiers), including DNR invasive species specialists. • DNR staff obtain samples or photos and detailed information from the person who reported the find. • If necessary, DNR staff recover physical samples during subsequent searches in order to determine the species’ identify. • DNR staff verify the species’ identity. Non-DNR taxonomic experts may be consulted, and a genetic test may be required. If the species detected is not confirmed to be invasive, this is communicated to affected parties, the report is recorded as “negative” in EDDMapS and the EDR process ends here.
<p>3. Communication to partners and the public</p>	<ul style="list-style-type: none"> • DNR regional and central office communications staff may coordinate with invasive species staff to draft a news release. • DNR staff informs all interested parties of the results of the investigation; if a DNR news release will be issued, this occurs before the release is distributed. • DNR staff who confirmed the species identity will enter information into EDDMapS, verify the location and release the information to the public on the distribution map. • For certain AIS, the DNR AIS Prevention Consultant will add the water body to the infested waters list. DNR staff post orange “Invasive Species Alert” signs at public water accesses on those water bodies.
<p>4. Assessment of risk</p>	<ul style="list-style-type: none"> • DNR staff may assess risk by reviewing scientific literature and consulting experts from academia and state and federal agencies. Particular attention is given to Minnesota’s current and projected climate.
<p>5. Population assessment</p>	<ul style="list-style-type: none"> • DNR staff, sometimes with the assistance of local partners or contractors, continue to search the water body to assess the full extent of the population, especially if a control response might be warranted. • If an aquatic plant treatment is a potential action, a delineation survey is done, following DNR’s Delineation Guidance (2020).

EDR Steps	Associated tasks
6. Make action recommendations	<ul style="list-style-type: none"> • DNR staff assess risks to endangered species populations associated with potential response actions. • DNR makes an action recommendation as described in Step 6. • DNR staff determine if the response decision warrants Incident Command System organizational structure.
7. Implement response actions	<ul style="list-style-type: none"> • The regional DNR watercraft inspection supervisor reviews inspection plans to potentially include the new water body as appropriate. • A response guidance group discusses funding, control options and monitoring needs. • When applicable, the DNR may issue a permit for control. • When applicable, the DNR may propose changes to regulations, including revisions to permit conditions, to prevent further spread of the newly discovered AIS. • DNR coordinates with local partners for initial control, monitoring effectiveness of control efforts and potentially follow-up control and meetings with local partners.

AIS Early Detection and Response Process Flowchart

This is a basic visual representation of the process. Real-life scenarios are complex and each will require a unique response.

Detect

A person reports a suspected aquatic invasive species in a new location to the DNR.

These steps will likely happen concurrently and are typically led by the DNR with support from partners.

Communicate

Partner organizations are engaged by the DNR throughout this process to coordinate, collaborate and assist with implementation of one or more of these steps.

Gathering accurate and detailed information takes time.

Stakeholders are notified as information about the verification, population assessment, risk assessment and management decisions become available. Public communications include signage, news releases, EDDMapS, and the infested waters list.

Verify

The report is entered into EDDMapS. Photos and/or specimens are submitted to the DNR. If necessary, additional samples are collected. The DNR verifies the species identity.

Assess Population

The DNR and partners survey the water body to assess and map the full extent of the population. Connected and nearby water bodies may also be searched.

Assess Risk

The DNR reviews current risk assessments of the species or conducts risk assessments as needed in consultation with experts in the field.

Make Action Recommendations

The DNR makes an action recommendation.

Implement Response

Action is taken by partner organizations, stakeholders, and/or the DNR.



Adaptive Management

As new information is gathered about the species, population, risks, initial response results, resources, etc., the steps in this process may be repeated until goals are achieved.

Step 1. Detection of aquatic invasive species

Many people and entities have been identified as potential observers of new AIS populations. For aquatic species, lake residents and organizations, boaters, anglers and lake service providers are important resources for reporting information and conducting surveys. The DNR website has instructions for [reporting suspected new AIS populations](#).

Monitoring efforts include:

- Baseline monitoring and early detection; Invasive Species Program staff monitoring for AIS in Minnesota waters follow the DNR's [Guidance for Conducting Aquatic Invasive Species Early Detection and Baseline Monitoring in Lakes \(2018\)](#). Common early detection surveys include aquatic plant meander surveys and snorkel or wading searches.
- Boater surveys; Watercraft Inspection Program staff completing surveys at boat landings follow the [DNR's Watercraft Inspection Manual](#) to report suspected new AIS populations.
- Invasive carp sampling on Minnesota's major rivers; the DNR annually monitors for all life stages of invasive carps on major rivers, such as the Mississippi, St. Croix and Minnesota rivers, using carp-specific gears and techniques.
- Lake Superior AIS monitoring; several entities including the DNR, the U.S. Environmental Protection Agency (EPA) and the U.S. Fish and Wildlife Service (USFWS) conduct monitoring in Lake Superior and the St. Louis River estuary. The USFWS has developed monitoring protocols for detecting nonnative fish and the EPA has protocols for other aquatic species. The DNR surveys the fish populations in Lake Superior annually. The DNR communicates with these agencies to coordinate monitoring efforts and share information.
- Fish and invertebrate sampling on large inland lakes; the DNR collects zooplankton samples from large lakes in Minnesota. The samples are analyzed by experts in identifying zebra mussel veligers, spiny waterfleas and other aquatic invertebrate species. DNR Fisheries also monitors fish populations annually in large Minnesota lakes.
- Other inland lake monitoring.
 - Zebra mussel monitoring volunteers check equipment removed from lakes in the fall and report any suspected zebra mussels to DNR aquatic invertebrate biologists.
 - [Volunteer AIS Detectors](#), local lake associations and local governmental units often survey lakes for AIS and report findings to the DNR. The DNR, Minnesota Sea Grant and University of Minnesota Extension staff have provided AIS identification training to those groups.
 - In addition to ongoing AIS-specific monitoring programs, various DNR staff and external partners conduct aquatic plant and animal surveys throughout Minnesota for various purposes (e.g., the DNR's sentinel lakes program, academic researchers' surveys). These efforts can also result in the identification of new AIS populations.
- The DNR's Invasive Species Operational Order 113 directs DNR staff to report invasive species encountered during their work.

Step 2. Receiving and investigating reports of suspected aquatic invasive species

The DNR is the state agency responsible for investigating reports of new AIS populations. This is often done with assistance from state, federal, and local partners using [EDDMapS Midwest](#) (or the U.S. Geological Survey's [Nonindigenous Aquatic Species Database](#) for invasive carp), where individuals with expertise in identifying suspected AIS can review the report and verify the species identity. Primary contacts at the DNR are regional AIS specialists located throughout the state. Reports outside of EDDMapS to any other entity or DNR office should be sent to the regional AIS specialist for response. Contact information for the AIS specialists is on the [DNR Invasive Species Program website](#) and respective staff roles are described in [Appendix B](#). Verification of reports is done by AIS specialists using photographs submitted by the reporter and/or physical specimens, with assistance from other DNR Invasive Species Program staff (e.g., management consultant, prevention consultant, aquatic invertebrate biologist), DNR Fisheries staff and from non-DNR species experts when appropriate.

Step 3. Communication to partners and the public

When new AIS populations are confirmed, the DNR may choose to draft a news release. DNR news releases must be reviewed and approved by agency and state communications staff prior to distribution. To respect DNR review and approval processes and ensure thoughtful messaging about the new population, DNR staff may wait to share information about findings with external partners until the news release has been distributed. However, DNR staff may follow up with the original reporter for more information and communicate about the new population with external partners assisting with the investigation. Reporters using EDDMapS will be able to see when their record has been verified. The DNR will make an effort to notify interested external partners just before a DNR news release is distributed: external partners may include tribal natural resources agencies, federal agencies, local governments, academic researchers and educators, and lake associations and lake improvement districts. If the DNR decides that no news release will be distributed by the DNR, DNR staff may communicate with external partners about the new population following a positive verification of the reported AIS.

If the AIS discovery warrants addition to the [infested waters list](#), as is done for certain species, “Invasive Species Alert” signs with decal(s) indicating the AIS known to be present in the water body are posted at the public water accesses on the new infested water. When possible, the signs and decals are also provided to owners of private water accesses.

The report is entered into the [EDDMapS](#) database, [LakeFinder](#) (for lakes and large river pools) and, if appropriate, the [infested waters list](#) on the DNR website.

Step 4. Assessment of risk

For species that are not yet widespread in the state, DNR staff typically continue to lead the process through this step and those that follow. In other cases, these steps may not be taken or local organizations may take the lead, with DNR staff providing assistance as needed.

DNR staff may conduct a species risk assessment for the new AIS if the ecological or economic risks of the AIS are not understood. DNR staff have already evaluated risks associated with all species classified as prohibited or regulated invasive species. Regardless of species classification and whether or not a species evaluation has been completed, DNR staff will consider current and projected changes in climate in the event of an AIS introduction. Climate change may allow different nonnative species to establish in Minnesota waters. Minnesota's projected climate, the species preferred climate and history of invasiveness are key considerations in determining the appropriate response to an AIS introduction.

Step 5. Population assessment

Once the species' identity has been confirmed, a field assessment may be conducted to delineate the extent of the introduced species' distribution, its potential for further distribution, and to contain or prevent spread from the area if possible. Aquatic plant introductions will be delineated using the DNR's [Delineation Guidance \(2020\)](#). If the field assessment determines that the species' distribution is sufficiently limited to attempt eradication, then the assessment will be expanded to include a review of potential management options for the size and location of the introduction. If the species' distribution is too wide spread for control strategies to be effective, then alternative management options and containment actions should be recommended to decision makers. This information will be necessary in the Make Action Recommendations phase of the response. As described above, for new populations of AIS that are widespread in the state, DNR staff may not complete field assessments or may they be led by local organizations rather than DNR staff.

Step 6. Make action recommendations

When an AIS is first discovered in a water body, an initial choice must be made of how to manage that species. There are three basic options to choose from (Netherland and Schardt, 2014):

1. no attempt to control,
2. control efforts to attempt to eradicate the population, and
3. some level of intermediate control that is either incomplete or temporary.

Each of these options come with potential benefits and potential challenges. A number of factors must be considered when making a recommendation to initiate a control response or to recommend no control. As the size of a new population increases, the complexity and cost of a response will increase and the chance for success will often decrease. Potential control of AIS can quickly become complicated because of: the mobility of the species; the unseen nature of aquatic species and their response to management actions; the open nature of many water bodies; the potential for a response to be a multijurisdictional issue; and the high value and sensitivity of aquatic habitats. The action recommendation can be difficult, as it may require balancing conflicting social, political and legal issues with limited information. Decisions will depend on the quality of available information and science concerning the available control methods, the potential negative effects of the AIS, potential negative effects of AIS control efforts on native species and the potential of the AIS to spread from the area where it was located.

Management Response Decision Considerations

A “no attempt to control” management response will be characterized by:

- No need to deploy funds or obtain permits for control efforts;
- No negative non-target impacts on co-occurring species from control efforts;
- The potential for the AIS to spread within the water body where it occurs and to become more abundant, if it does not already occur in all of the areas where it could establish in the water body;
- The potential for the AIS to spread to other water bodies, if the species is easily spread by water activities, and if it is located in an area conducive to spread; and
- The potential for the AIS to cause the ecological and economic damage associated with nuisance levels of the species.
- Possible implementation of monitoring efforts to assess the likelihood of potential spread and track the status of the AIS population from year-to-year.

According to Netherland and Schardt (2014)¹ an “attempt to eradicate” management response will be characterized by:

- Sustained and multi-year efforts to attempt to insure elimination of the population;
- Small-scale efforts to control relatively few invasive organisms;
- Control costs on a per acre basis can be quite high;
- The overall impact of repeated control efforts on the infested water body is continually weighed against the regional threat posed by the AIS and the negative non-target impacts on co-occurring species from control efforts; and
- Control efforts may eventually be reduced; however, vigilant monitoring remains key to success.
- The potential for the AIS to spread within the water body, to other water bodies and to cause ecological and economic damage, though this may be less likely than for a “no attempt to control” management response.

An “intermediate level of control” management response will be characterized by:

- The persistence of the AIS in the water body;
- Routine management efforts to control the invasive population, including periods where the species occurs at low levels and no management is done, as well as periods when the species becomes a nuisance and large-scale management efforts are undertaken;
- Management efforts that can be increased or decreased depending on available funds and the severity of problems caused by the species; and

¹ While this reference is focused on aquatic plant control, the basic concepts apply for response to invasive animals as well.

- Management may be done by managing the entire population at the lowest feasible level that money and technology allow or it can be done by waiting until the species becomes a significant nuisance (Netherland and Schardt, 2014).
- The potential for the AIS to spread within the water body, to other water bodies and to cause ecological and economic damage, though this may be less likely than for a “no attempt to control” management response.

Response Recommendation Considerations

DNR staff consider the following factors, among others, to determine which initial management action a new population warrants. This is a simple list of considerations, rather than a strict, formal or quantitative process for decision-making. Depending on the situation and species discovered, some factors may be given more weight than others or may not need to be considered, depending on the conclusion for other factors (e.g., if no control methods are available, it would not be necessary to consider if funds are available for the control effort).

- Does the new population pose a particular new risk of spread of the species across the landscape or to other water bodies? Is the new population in an area of the state with few other population of that species? Is it by a public water access?
- Can control be conducted successfully considering the:
 - Location and size of population?
 - Available control methods?
 - Risk of doing more harm than good with a control effort?
 - Available resources for control?
- Considering the factors that can affect the success of control, is there agreement that the benefits of control outweigh the costs and potential risks of a control attempt?
 - Is there recognition and acceptance that a potential eradication effort can be a highly complex long-term effort, with few examples of eradication success in the case of plants or other organisms with resistant resting stages?
 - Is there support for the effort by affected parties, including the public?

Incident Command System decision

The decision by the DNR to implement a response beyond the communication step will initiate the formation of an Incident Command System (ICS) organizational structure in the following situations:

- it involves federal funding or participation;
- it is multi-jurisdictional and includes other states, Canadian provinces; or
- it involves tribes.

Formation of an ICS organizational structure may also be initiated for particularly challenging or time-sensitive AIS response efforts.

The DNR must decide whether to pursue a single command response with one Incident Commander (IC), or in the case of a multiagency or multi-jurisdictional response, a Unified Command (UC) in which multiple agencies

share incident management responsibilities (CDFG 2008). An initial UC meeting is conducted to begin to establish a course of action. During the UC meeting the response objectives are developed and individuals are identified to fill the Command and General Staff positions that form the remainder of the Incident Management Team (IMT). The initial UC meeting completes the Initial Response phase.

Inter-jurisdictional response plans that may be used to help guide inter-jurisdictional response actions include the Great Lakes Regional AIS Response Framework, Great Lakes Fisheries Commission Council of Great Lakes Fisheries Agencies Invasive Fishes Communications Protocol and the Great Lakes Commission Interstate Early Detection and Rapid Response Communications Framework.

Step 7. Implement response actions

A response guidance group made up of DNR staff, local resource managers, local organization representatives and other experts as needed is convened. They discuss available funding, the pros and cons of various control options, and monitoring that will be needed. A control and monitoring plan is developed and when applicable, DNR staff issue a permit for control. Pre- and post-control monitoring may be required for control projects. Funding and other assistance may be available from the DNR for monitoring work, as well as other components of the response effort. The DNR coordinates with local partners for control, monitoring effectiveness of control efforts and follow-up meetings and control work as needed. Follow-up control and monitoring may or may not be done by DNR staff. The response guidance group may continue to meet following control to discuss results and the need for adaptive management.

At this stage, the regional DNR watercraft inspection supervisor also revises inspection plans to include the new water body, when appropriate. In some cases, the DNR may propose changes to regulations to prevent further spread of the newly discovered AIS as well.

Resources and Authorities

DNR Staff and Funds

In the event of an AIS response scenario, the DNR Invasive Species Program may have federal funds available, as well as funds in the Invasive Species Account (as established under Minnesota Statutes, section 84D.15) or Invasive Species general funds. Other resources include staff from the DNR Invasive Species Program within the Ecological and Water Resources Division, Enforcement Division, and the Fisheries Section in the Fish and Wildlife Division.

AIS response efforts are typically led by AIS specialists, regional Ecological and Water Resources Division supervisors and other regional DNR staff, with input from the Invasive Species Program supervisor, invasive species prevention coordinator, AIS management coordinator and sometimes the aquatic invertebrate biologist. The watercraft inspection coordinator, Ecological and Water Resources Division district managers, Enforcement Division water resources enforcement officers, conservation officers and local enforcement officers also provide assistance in some cases.

When responses are to address new populations of invasive fish species, DNR Fish and Wildlife Division staff and resources may also be available to assist with expertise, staff time, surveillance and potential eradication resources (Hirsch 1998).

Authorities

There are authorities in Minnesota Statutes, chapter 84D, and Minnesota Rules, chapter 6216 that can aid in responses to new AIS populations.

Other Resources and Funding

The Minnesota legislature provides \$10 million to counties each year to support AIS prevention (Minnesota Statutes, section 477A.19). Funds are currently distributed among Minnesota counties based on the number of watercraft trailer launches and watercraft trailer parking spaces. Some counties may have funding, resources and/or staff available for AIS response efforts through this Local AIS Prevention Aid funding.

Resources may be available from other state, federal, tribal, or local sources for AIS responses. If a large-scale project is needed, a special appropriation could be sought from the state legislature or grant funds sought for a response project. The Great Lakes St. Lawrence Governors & Premiers have signed a [Mutual Aid Agreement](#) that protects the region from AIS by fostering mutual aid among the States and Provinces to respond to serious threats from AIS and encouraging cooperative actions by the States and Provinces to combat AIS.

Related Federal Plans and Requirements

This plan was developed such that early detection and response to AIS occurs in concert with the following federal and regional plans, reports and requirements.

Federal and Regional Plans

- [Great Lakes Restoration Initiative \(GLRI\) Action Plans I-III](#)
- [Lake Superior Lakewide Action and Management Plan 2015-2019](#)
- [Lake Superior Aquatic Invasive Species Complete Prevention Plan](#)
- [Lake Superior Climate Change Impacts and Adaptation](#)
- [Great Lakes Fisheries Commission Council of Great Lakes Fisheries Agencies Invasive Fishes Communications Protocol](#)
- [Great Lakes Commission Interstate Early Detection and Rapid Response Surveillance Framework](#)

Incident Command Systems

Incident Command Systems (ICS) provides an organizational structure for incident management and guides the process for planning, building, and adapting that structure. It provides a systematic approach to guide departments and agencies at all levels of government, nongovernmental organizations and the private sector to

work seamlessly to respond to an AIS introduction, regardless of cause, location or complexity. Details regarding ICS for invasive species response may be found in [Appendix C](#).

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Appendix A – List of Acronyms and Glossary

AIS – means aquatic invasive species

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

DNR – means Minnesota Department of Natural Resources

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

EPA – means U.S. Environmental Protection Agency

EWR – means the DNR Ecological and Water Resources Division

ICS – means Incident Command Systems

Invasive species - 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 ([Minnesota Statutes, chapter 84D.01](#)).

Native species - species naturally present and reproducing within this state or that naturally expands from its historic range into this state ([Minnesota Statutes, chapter 84D.01](#)).

Nonnative species – means a species that is not a native species ([Minnesota Statutes, chapter 84D.01](#)).

USFWS – means United States Fish and Wildlife Service

Appendix B – Contacts and Experts by Topic

Contact information for DNR staff listed below can be found on the [AIS staff webpage](#).

Submit suspected occurrences

DNR regional AIS specialists

Submit confirmed occurrences

DNR invasive species prevention coordinator

DNR Species Experts

Aquatic invertebrates – DNR aquatic invertebrate biologist (Ecological and Water Resources Division (EWR))

Aquatic plants – DNR AIS management coordinator (EWR)

Fish – DNR invasive fish field lead and invasive fish coordinator (EWR)

Aquatic Pathogens – DNR Pathology Lab supervisor (Fisheries Division)

Other Species Experts and Resources

Aquatic plants

Eurasian watermilfoil

If there is question about whether a sample of Eurasian watermilfoil may be a hybrid with the native northern watermilfoil, a sample may be sent to [the genetics lab](#) at Montana State University for genetic identification. There is a charge for this service.

Hydrilla or perhaps other members of the Hydrocharitaceae

Specimens may be sent to:

ATTN: Research Assistant Scientist, aquatic plant specimen for identification
[UF/IFAS Center for Aquatic and Invasive Plants](#)
US Army Corps of Engineers - ERDC
7922 NW 71st Street
Gainesville, FL 32653

In other cases, e.g., nonnative haplotypes of *Phragmites*, experts will be found and contacted as necessary.

Fish

ATTN: [Curator of Fishes](#), fish specimen for identification
University of Minnesota Department of Fisheries, Wildlife and Conservation Biology
116 Ecology Building
1987 Upper Buford Circle
St. Paul, MN 55108

Appendix C – Details regarding Incident Command Systems

Incident Command Systems (ICS) establishes common processes for planning and managing resources and allows for the integration of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure.

The ICS organizational structure has 5 five major functional elements (i.e., command, operations, planning, logistics, and finance and administrations) and develops in a modular fashion as needed based on the size and complexity of the incident. Responsibility for the establishment and expansion of the ICS modular organization ultimately rests with Incident Command, which bases the ICS organization on the requirements of the situation.

Incident command is accomplished using one of two approaches. When an incident occurs within a single jurisdiction and there is no jurisdictional or functional agency overlap, a single Incident Commander (IC) is

designated with overall incident management responsibility by the appropriate jurisdictional authority. However, when an AIS response involves multiple jurisdictions, a single jurisdiction with multiagency involvement, or multiple jurisdictions with multiagency involvement, Unified Command (UC) allows agencies with different legal, geographic, and functional authorities and responsibilities to work together effectively without affecting individual agency authority, responsibility, or accountability. By working together as a team under UC, all agencies with jurisdictional authority or functional responsibility for the incident jointly provide management direction through a common set of incident objectives and a single planning process. Under UC, a single agency may still be designated as the overall lead and that agency's official identified as the IC for incident management.

Federal Requirement - There are federal requirements, applying to federally funded and inter-jurisdictional (interstate, state/federal) responses that require use of Incident Command Systems (ICS). In order to comply with those requirements in AIS response situations, the following ICS direction applies. As required by the Aquatic Nuisance Species Task Force, this plan will utilize the Incident Command System (ICS), a component of the National Incident Management System (NIMS), to enable a coordinated response among various jurisdictions and functional agencies in the situations when it is appropriate.

ICS in Minnesota - ICS efforts related to AIS in Minnesota will be initiated by DNR enforcement officers who have received ICS training (an [introductory ICS course](#) is available online). Enforcement Division personnel will be assigned at the time of an incident based on the location and situation. These assignments will be made to a District Supervisor or manager.

ICS Training - The DNR Enforcement Division will assist in assuring their staff, such as water resources officers, meets the ICS training requirements. Initial ICS training will be provided to key DNR staff in other divisions that may be involved with planning or implementing an AIS response so staff can develop a familiarity with ICS. They would include: regional AIS specialists, AIS information officer, AIS prevention coordinator, AIS management coordinator, Ecological and Water Resources Division district managers, and regional Fisheries Section managers.