DEPARTMENT OF NATURAL RESOURCES

INVASIVE SPECIES | 2020 ANNUAL REPORT

Photo on cover:
A DNR fisheries biologist holding a silver carp captured in Pool 8 in October 2020.

DEPARTMENT OF NATURAL RESOURCES

ECOLOGICAL AND WATER RESOURCES
500 Lafayette Road, St. Paul, MN 55155-4025
888-646-6367 or 651-296-6157
mndnr.gov

For current invasive species regulations, a list of infested waters, species information, and local DNR contacts, visit mndnr.gov/ais.

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Note from the Program

The Minnesota Department of Natural Resources (DNR) is pleased to submit the 2020 Invasive Species Annual Report to the governor, legislature and people of Minnesota. This report summarizes our efforts to prevent the introduction and spread of invasive species of aquatic plants and animals in Minnesota.

The report provides an overview of program activities, finances, prevention and management efforts, goals, highlights, partnerships, and future needs and plans for individual program areas.

Contents

A Letter from the Invasive Species Program

Welcome to the 2020 Minnesota Department of Natural Resources (DNR) Invasive Species Program annual report. The report highlights the accomplishments of the Invasive Species Program and keeps you up to date with new issues facing the program as we work to reduce impacts of invasive species on Minnesota's outdoor traditions.

Great work was accomplished in 2020, with the help of our partners. Some highlights include:

- The Aquatic Invasive Species (AIS) surcharge on watercraft licenses was increased from $5.00 to $10.60 during the 2019 legislative session. This increase allowed us to address the fund deficit and reinstate $528,950 in invasive aquatic plant management grants in the 2020 season and respond to newly discovered zebra mussel and starry stonewort populations.
- Invasive Species Program staff issued 344 permits to control invasive aquatic plants, completed 55,590 watercraft inspections and trained 756 local government watercraft inspectors who accomplished an additional 545,183 watercraft inspections. Staff provided technical support to counties that received AIS Prevention Aid, and offered $60,000 in grants to local groups to support their work in behavior change around AIS prevention. Staff worked with the public at lake association meetings, conferences, and outdoors shows and financially supported the inventory and management of terrestrial invasive species on 2,331 acres of state and adjacent land. Conservation officers completed 11,506 hours of invasive species education and enforcement.
- The DNR is coordinating a new carp netting exercise in Pool 8 of the Mississippi River with partners including the Wisconsin DNR, the U.S. Geological Survey and the U.S. Fish and Wildlife Service for spring of 2021. The DNR secured funding from the U.S. Fish and Wildlife Service to support research at Lock and Dam 5 and convened internal experts to begin the process to update the Invasive Carp Action Plan that will include working closely with stakeholders.
- The DNR has partnered with the Minnesota Pollution Control Agency (PCA), the Minnesota Department of Agriculture (MDA), the University of Minnesota, the Minnesota Aquatic Invasive Species Research Center (MAISRC), local units of government, and wastewater treatment plants to move towards eradicating nonnative *Phragmites* from Minnesota and has received additional funding for this work from the Great Lakes Restoration Initiative administered by the U.S. Fish and Wildlife Service.
- The DNR has continued working to educate the public about jumping worms, an invasive worm that can dramatically change soils, giving it a unique texture similar to coffee grounds and rendering it unable to support plant life. The DNR is partnering with the University of Minnesota and the Wisconsin DNR to make homeowners and businesses such as garden centers aware of jumping worms and the need to report them to the DNR.
- The DNR, in cooperation with local partners, arranged for a rapid response to manage a new discovery of starry stonewort. This discovery was made during Starry Trek, an annual statewide search for new populations of starry stonewort organized by MAISRC and the University of Minnesota Extension.

Thank you for partnering with the Invasive Species Program this year. We look forward to working with you in 2021 as we search for new technologies, create new partnerships, and strengthen current partnerships to protect Minnesota from invasive species.

Heidi Wolf, Invasive Species Program Supervisor
Minnesota Department of Natural Resources

Program Overview

Invasive species have serious economic, environmental and recreational impacts in Minnesota. In 1991, the Minnesota Legislature directed the DNR to establish an Invasive Species Program. The program is tasked with preventing the spread of invasive species and managing invasive aquatic plants and wild animals (Minnesota Statutes 84D).

In 2020, the Invasive Species Program included 24 full-time positions, plus affiliated staff in DNR offices across Minnesota whose work is primarily or partly focused on invasive species. In the summer, the DNR hired 67 watercraft inspection staff.

Program staff work with many partners, including:

- Local government units.
- Tribes, states, provinces, multi-jurisdictional and national groups.
- Researchers, including the Minnesota Aquatic Invasive Species Research Center (MAISRC) and the Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) at the University of Minnesota.
- The DNR AIS Advisory Committee.

DNR Operational Order 113, which applies to staff and contractors, provides policies and guidance for including invasive species prevention measures in their work.

The program tracks invasive species in other areas of North America and the world, works with partners to understand and manage pathways of spread, and works to reduce the potential for their introduction and spread in Minnesota.

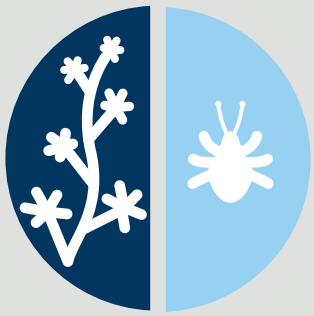
Examples of key invasive species not known to be in Minnesota include:

- Hydrilla, an invasive aquatic plant.
- Water chestnut, an invasive aquatic plant.
- Northern snakehead, an invasive fish.

The program addresses invasive species in Minnesota, such as Eurasian watermilfoil, purple loosestrife, zebra mussel, spiny waterflea, starry stonewort and invasive carp. Efforts in this area include working to prevent further spread and to manage impacts from invasive populations.

DNR prevention and management activities depend on collaboration with Tribes; other states; local governments including counties, cities and townships; agencies and other partners with similar concerns. Coordinated prevention efforts reduce the spread of invasive species and buy time needed for research and management that may provide long-term control solutions.

The program also addresses terrestrial invasive species on DNR-managed lands and provides information for private landowners. The program works to enhance the ability of DNR field staff to prevent and manage terrestrial invasive species effectively.



GOALS

- Prevent the introduction of new invasive species into Minnesota.
- Prevent the spread of invasive species within Minnesota.
- Reduce the impacts caused by invasive species to Minnesota's ecology, society and economy.

KEY STRATEGIES

1. Creating and maintaining effective invasive species regulations across the state and working with enforcement to ensure compliance.

2. Deepening partnerships with local governments, research institutions, interest groups, lake associations, related businesses and others.

3. Coordinating watercraft inspection and decontamination with counties, tribal governments and entities, lake associations, resort owners and DNR Enforcement.

4. Verifying and responding to all new reports of possible invasive species as soon as possible.

5. Coordinating invasive species management efforts and inventories, and sharing knowledge of aquatic and terrestrial invasive species.

HIGHLIGHTS

- An increase to the AIS surcharge on watercraft licenses from $5.00 to $10.60 was passed during the 2019 legislative session. This increase addressed the fund deficit and allowed the Invasive Species Program to award $528,950 in invasive aquatic plant management grants. These grants were used to respond to newly discovered zebra mussel and starry stonewort populations during the 2020 open water season.
- Level one and level two watercraft inspectors hired by the DNR, and 66 Local Units of Government with delegated authority from the DNR, accomplished more than 600,000 watercraft inspections in 2020. This is an increase of 100,000 from 2019, giving Minnesota the second-most watercraft inspections in the nation.
- The University of Minnesota Department of Fisheries, Wildlife and Conservation Biology, and MAISRC finalized an assessment to support a strategic coordinated response to invasive *Phragmites (Phragmites australis* subsp. *australis)* in Minnesota in 2019. In 2020, the DNR has partnered with the Pollution Control Agency (PCA), the Department of Agriculture (MDA), University of MN, MAISRC, local governments, and wastewater treatment plants to move towards eradicating nonnative *Phragmites* from Minnesota. The program received additional funding from the Great Lakes Restoration Initiative administered by the U.S. Fish and Wildlife Service.
- The Great Lakes Restoration Initiative also funded a DNR project in June 2019 focused on trade pathways for AIS. In 2020 we reached out to more than 3,500 businesses in the pet, horticulture, food and biological supply trades in Minnesota to provide information about invasive species regulations, invite participation in a survey, and encourage sign-up for an email list for continued communication. Additionally, new web resources were developed specifically for businesses and their customers.
- The DNR partnered with MAISRC, University of Minnesota Extension and many counties and local partners on an annual statewide search for new populations of starry stonewort, called Starry Trek. In 2020, 210 volunteers searched 238 Minnesota lakes. One new confirmation of starry stonewort was made, in Lake Carnelian in Stearns County. The DNR, in cooperation with local partners, arranged for a rapid response of hand pulling followed by algaecide treatment of the starry stonewort.
- The DNR has continued working to educate the public about jumping worms, an invasive worm that can dramatically change soils, giving it a unique texture similar to coffee grounds and rendering it unable to support plant life. The DNR is partnering with the University of Minnesota and the Wisconsin DNR to make homeowners and businesses such as garden centers aware of jumping worms and the need to report them to the DNR. As a part of this work the DNR created two videos on jumping worms titled “Invasive jumping worms: Impacts and prevention” and “Jumping worms: What anglers should know”. They can be found on the DNR jumping worm webpage and have been viewed more than 14,000 times by October of 2020.

- AIS prevention planners continued to build a network of support with local AIS program managers who oversee the use of their counties' AIS prevention aid funds. The planners hosted four workshops around the state that attracted 87 attendees, including local government staff, local stakeholders, statewide partners and DNR staff. The planners also hosted a virtual workshop in August, where 57 partners discussed on how their AIS prevention programs have adjusted during COVID-19. The DNR also saw a significant increase in the number of counties submitting a voluntary template summarizing their work from 39 in 2018, to 65 in 2019.
- DNR watercraft inspection staff worked to modify watercraft inspection training for County and local unit of government watercraft inspection programs so that staff could be trained in a safe, socially distant manner. This involved creating online training and testing and developing field procedures to keep DNR and local unit of government staff safe. This distance-learning process trained 756 level 1 and 98 level 2 watercraft inspectors.
- The Invasive Species Program, with funding from the Great Lakes Restoration Initiative administered by the U.S. Fish and Wildlife Service, continued to work with experts in the science of behavior change to better understand what motivates people in Minnesota to practice AIS prevention behaviors. The DNR has awarded 13 grants totaling $60,000 to local groups to pilot AIS prevention strategies in their communities.
- The DNR implemented a partial response to invasive carp captures that occurred just prior to the initiation of Covid-19 restrictions. The DNR is coordinating a new carp netting exercise in Pool 8 of the Mississippi River with partners including the Wisconsin DNR, the U.S. Geological Survey and the U.S. Fish and Wildlife Service for spring of 2021. The DNR secured funding from the U.S. Fish and Wildlife Service to support research at Lock and Dam 5 and convened internal experts to begin the process to update the Invasive Carp Action Plan that will include working closely with stakeholders.
- The Invasive Species Program continued to foster key partnerships with organizations and agencies in other jurisdictions to help Minnesota stay aware of threats coming from other connected watersheds, like the Mississippi River and the Great Lakes basin. The DNR participates in regional groups to provide mutual support of interjurisdictional AIS prevention and management efforts, share information and experience, and contribute to regional AIS efforts.


MN 0263

Program Finances

TIME FRAME

The other chapters in this report cover activities that took place in calendar year 2020. However, to provide a comprehensive review of expenditures and to coordinate with the state funding cycle, this chapter refers to expenditures incurred in fiscal year 2020: July 1, 2019 to June 30, 2020.

FUNDING SOURCES

The Invasive Species Program was mostly supported by state funds in fiscal year 2020, with additional funding from the U.S. Fish and Wildlife Service.

State Funds

$4,924,000 from a general fund appropriation, of which $4,645,000 supported the Aquatic Invasive Species Program and $279,000 supported the Terrestrial Invasive Species Program.

$4,173,000 from the invasive species account, including the following funding:

- $2,849,827 from a $10.60 surcharge on watercraft registration (valid for three years) in Minnesota.
- $1,170,343 from a $5 fee on non-resident fishing licenses.
- $152,830 from monies appropriated in the 2020–2021 biennium.

Federal Funds

Funds from the U.S. Fish and Wildlife Service, including those from the Great Lakes Restoration Initiative, supported the implementation of the Minnesota State Management Plan for Invasive Species. Federal funds helped support public awareness efforts, enforcement, watercraft inspections, invasive carp management, work with behavior change experts and the new staff position focusing on organisms in trade. In fiscal year 2020, expenditures from federal sources totaled $831,628.

AQUATIC INVASIVE SPECIES WATERCRAFT SURCHARGE INCREASED

In 2007 the Minnesota Legislature created the Invasive Species account in the state treasury to prevent the introduction of new invasive species to Minnesota, prevent the spread of invasive species within Minnesota and to reduce the impacts of invasive species on Minnesota's environment, society and economy. The funds came from a $5 surcharge on each 3-year watercraft registration, a $5 fee on each non-resident fishing license and a $750,000 transfer from the water recreation account. An increase

Continued on page 10

Photo on left:
Conservation officer Julie Siems works with zebra mussel detection canine Brady to inspect a watercraft in April 2019.

Aquatic Invasive Species Watercraft Surcharge Increased continued from page 9

to the AIS surcharge on watercraft licenses from $5.00 to $10.60 was enacted in 2019. At the same time the transfer from the water recreation account was reduced to $375,000 to help restore water recreation funds for purposes such as supporting watercraft accesses. The AIS Surcharge increase addressed a fund deficit in the invasive species account and allowed the Invasive Species Program to reinstate $528,950 in invasive aquatic plant management grants, increase support of watercraft inspectors around the state, and respond to new zebra mussel and starry stonewort infestations in the state.

FISCAL YEAR 2020 EXPENDITURES

Invasive Species Unit expenditures on invasive species activities during fiscal year 2020 (July 1, 2019 - June 30, 2020) totaled $9,784,042.

The pie chart on the following page provides a broad look at how invasive species funding was spent in fiscal year 2020. The funds are focused on the prevention and management of invasive species, with Inspection/Enforcement and Education/Public Awareness falling under prevention, Management/Control falling under

COST ACCOUNTING

Minnesota Statutes 2020, section 84D.02, subdivision 6 identifies five expenditure categories that must be reported annually: Administration, Education/Public Awareness, Management/Control, Inspections/Enforcement, and Research. A sixth category, State and Regional Coordination, covers a variety of program-wide activities that do not fit easily into the five reporting categories required by statute.

ADMINISTRATION includes general office supplies, office rent, telephones, workers' compensation fees, computer support fees, the state accounting system fees, departmental operational support costs, as well as clerical and administrative support costs. Staff leave time (time used for holidays, sick leave, and vacation) has been apportioned across all categories based on the proportion of staff time invested in that category.

EDUCATION/ PUBLIC AWARENESS includes staff time, in-state travel expenses, fleet charges, mailings, supplies, printing and advertising costs, and radio and TV time to increase public awareness of AIS. The costs of developing and producing pamphlets, public service announcements, videos, and similar material are included, as are the costs of developing and maintaining invasive species information on the DNR website.

MANAGEMENT/CONTROL includes staff time, in-state travel expenses, fleet charges, commercial applicator contracts, and supplies to survey the distribution of AIS in Minnesota and to prepare for, conduct, supervise, and evaluate control activities. Funds provided to local government units and organizations to offset the cost of Eurasian watermilfoil, flowering rush and/or curly-leaf pondweed management efforts also are included.

INSPECTIONS/ ENFORCEMENT includes the costs that conservation officers incur enforcing invasive species rules and laws, the costs of implementing watercraft inspections at public water accesses, and staff time and expenses associated with promulgation of rules, development of legislation, conducting risk assessments, and other efforts to prevent the introduction of additional invasive species into Minnesota.

RESEARCH includes staff time, travel expenses, fleet charges, supplies, and contracts with the University of Minnesota and other research organizations to conduct research. These include efforts to develop new or to improve existing control methods, better understand the ecology of invasive species, improve risk assessment tools, and evaluate program success.

STATE AND REGIONAL COORDINATION includes general program planning, preparation of state plans and reports, and general invasive species coordination with a wide variety of groups. This category also includes the work of program staff as well as various managers in the Ecological and Water Resources Division who periodically work on invasive species issues. Expenditures primarily represent staff time spent on these activities, as well as staff time and out-of-state travel expenses to work with regional and federal partners on AIS issues; work activities that staff participate in to improve their skills, direct co-workers, or help on other projects; and fleet costs and the cost to purchase and repair boats, trailers, computers, and similar items.

management and State and Regional Coordination divided among prevention and management.

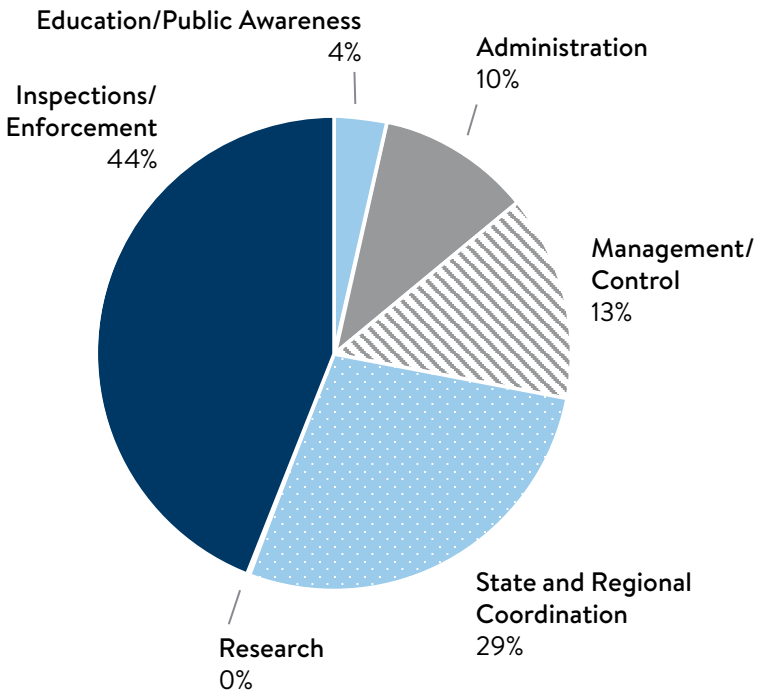
Funding for Management/Control was spent on Eurasian watermilfoil, starry stonewort, zebra mussels and curly-leaf pondweed inventory and control, as well as grants for starry stonewort management monitoring.

The table below lists expenditures from the Invasive Species account and General Fund account, along with spending from other accounts including grants received from various state or federal funding sources, such as the U.S. Fish and Wildlife Service.

The terrestrial invasive species program expended $279,000 in fiscal year 2020. The work was funded exclusively from the general fund.

The program spent $4,034,828 from the Invasive Species account in fiscal year 2020, slightly less than the $4,173,000 appropriated by the Legislature. General Fund expenditures were $4,602,677, slightly less than the $4,924,000 appropriated by the Legislature. Unspent funds from both funds will roll to the second year of the biennium.

INVASIVE SPECIES PROGRAM SPENDING



FISCAL YEAR 2020 INCOME

State and Local Funding Invasive Species Account	$4,173,000
State and Local Funding General Fund	$4,924,000
Federal Funding: Implement State Management for Aquatic Nuisance Species	$943,849

FISCAL YEAR 2020 EXPENDITURES

	Invasive Species Account	General Fund	Environmental and Natural Resource Trust Fund	Federal/Other	Total Expenditures
Administration	$444,502	$513,515		$2,254	$960,271
State/Regional Coordination	$1,234,245	$1,387,533		$191,545	$2,813,323
Education/Public Awareness	$22,964	$215,281		$108,884	$347,129
Management/ Control: Aquatic	$441,896	$708,009	$146,460	$234,347	$1,530,712
Management/ Control: Terrestrial		$165,735			$165,735
Inspections/ Enforcement	$1,890,135	$1,606,370		$450,736	$3,947,241
Research: Aquatic	$1,086	$6,234		$12,311	$19,631
Total Expenditures	$4,034,828	$4,602,677	$146,460	$1,000,077	$9,784,042

Prevention

GOALS

- Prevent the introduction of new invasive species to the state.
- Prevent the spread of AIS within Minnesota.

HIGHLIGHTS

- Invasive species staff worked to prevent the introduction and spread of new AIS in Minnesota by working with partners locally, statewide, regionally, nationally, and internationally. DNR invasive species prevention work includes outreach, enforcement, regulations, permitting, collaboration, and coordination.

Prevention Activities

In 2020, invasive species staff:

- Conducted outreach to businesses operating in trade pathways for invasive species and worked across agencies to optimize trade-pathway invasive species prevention efforts.
- Surveyed lakes for AIS and reviewed reports from lake users about suspected AIS.
- Searched for zebra mussels and other AIS on water-related equipment on lakes and at public water accesses. Staff occasionally worked with a DNR Enforcement AIS detection dog.
- Built relationships with local program managers utilizing their county's AIS Prevention Aid funds. Invasive species staff provided technical guidance on AIS prevention and management activities.
- Increased public awareness of AIS by sharing expertise with radio, newspaper and television outlets.

Photo on left:
A dock company team works to install a large dock and lift system in May 2016.

Permits

The DNR has authority to issue permits to allow the public to conduct certain activities with invasive species or in listed infested waters that would otherwise be prohibited under state regulations. The DNR provides training to permittees on how to reduce the risk of spreading AIS. Permit conditions require permittees to take actions to prevent the spread of AIS.

DNR permits related to AIS include:

- Lake service provider permits.
- Infested waters permits.
- Prohibited invasive species permits.
- Bait harvest permits.

LAKE SERVICE PROVIDER PERMITS

Legislation authorizing a permit program for lake service providers (LSPs) to help prevent the spread of AIS in the state took effect in 2012.

Lake service provider business owners are required to complete AIS prevention training and receive a Lake Service Provider Permit before conducting work that involves decontaminating, installing, removing, or renting water-related equipment from or in state waters. Employees who work for a LSP must also successfully complete a free online training course and receive a training certificate. Permits and certificates are valid for three calendar years.

The Lake Service Provider Program offered classroom and online permit training, as well as online employee certificate training. Although demand for in-person training has diminished since the launch of online permit training in 2017, there are business owners with limited or no online access. In January and February of 2020 the DNR piloted individual training via video conferencing at some DNR regional offices as one way to meet this need.

TOTAL STATEWIDE CERTIFICATIONS AND LSP PERMITS

3,088
certified LSP employees

992
permitted LSPs

Photo above:
A lake service provider employee cleans out a rental boat in August 2016.

2020 Activities

- The DNR completed in-person and online permit trainings for 206 LSP business owners and managers, issuing 197 permits.
- 671 LSP employees completed mandatory online certificate training.
- 992 businesses were permitted LSPs at the end of 2020. The current list of businesses is on the DNR website.

Future Plans

- Assess ways to improve the LSP permit training course.

INVASIVE SPECIES AND INFESTED WATERS PERMITS

People need a permit to divert or transport water from listed infested waters (Minnesota Rules, part 6216.0500). In 2020, the Invasive Species Program issued thirteen infested waters permits. Permits for water appropriation and work in public waters issued through the DNR Permitting and Reporting System (MPARS) also include invasive species conditions.

People need a permit to possess, transport, sell, purchase, or import prohibited invasive species. The Invasive Species Program issued 21 prohibited invasive species permits in 2020.

Individuals can access several general permits on the DNR website, for example: to possess certain preserved specimens of prohibited invasive species; for fire departments using infested waters for training purposes; to transport water for water quality sampling; and to transport certain equipment away from a water body to a cleaning or storage location.

PERMITS TO HARVEST BAIT FROM INFESTED WATERS

In Minnesota, commercial bait harvesters need a permit to work in listed infested waters. DNR Fisheries issues permits to licensed minnow dealers who work in infested waters. Permittees must successfully complete AIS training and comply with permit conditions to prevent the spread of AIS from infested waters. For example, permitted commercial bait harvesters must attach tags to equipment used in infested waters and they may not use that gear in waters other than those identified by the tag.

In general, people cannot harvest bait for personal use from waters listed as infested with AIS.

Regulations

Regulations, including laws and rules, are an important part of Minnesota's AIS prevention strategy that complement our education and outreach efforts. The Invasive Species Program works to review and refine state regulations to prevent the introduction and spread of invasive species and to clarify regulations for the public. That includes establishing new and revising existing regulations to address pathways of AIS spread, designating certain nonnative species as prohibited or regulated invasive species, and listing water bodies as infested with AIS within our existing authorities.

Minnesota state law governing AIS is primarily located in Minnesota Statutes, chapter 84D. Authorities and prohibitions related to AIS also can be found in: chapter 86B, Water Safety and Watercraft; chapter 97C, Fishing; and chapter 103G, Waters of the State. The administrative rules related to AIS are primarily found in Minnesota Rules, chapter 6216.

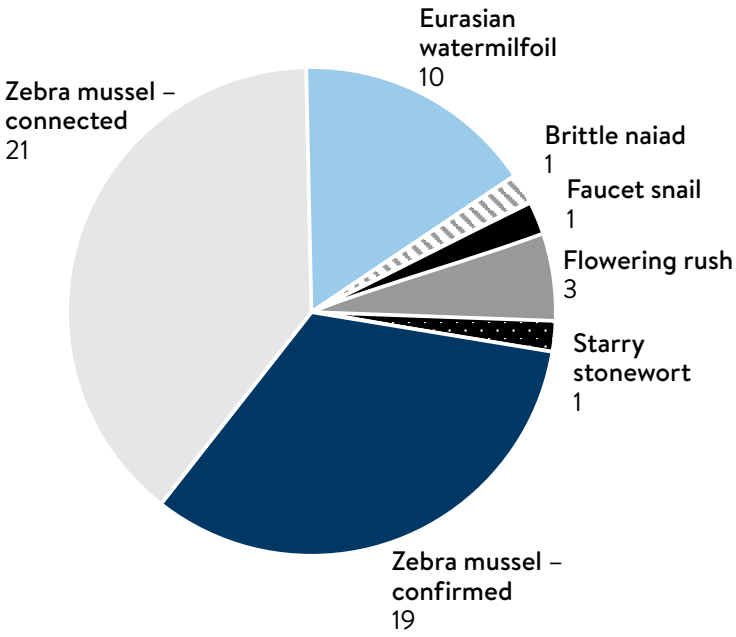
Past annual reports of the program are also a good source of summaries of changes to statute and rule related to invasive species; many of these are available from the Minnesota Legislative Reference Library. The two most recent reports are available on the DNR website.

There were no changes to invasive species statutes or rules in 2020. The Invasive Species Program is proposing rule changes that would add species to the prohibited invasive species list. This will help align invasive species classifications with the Great Lakes St. Lawrence Governors and Premiers "Least Wanted Aquatic Invasive Species" list and fill critical gaps created by a 2015 legal decision that reinterpreted provisions of the national Lacey Act related to interstate species transport. The formal rule making process will continue into 2021 and includes a public comment period.

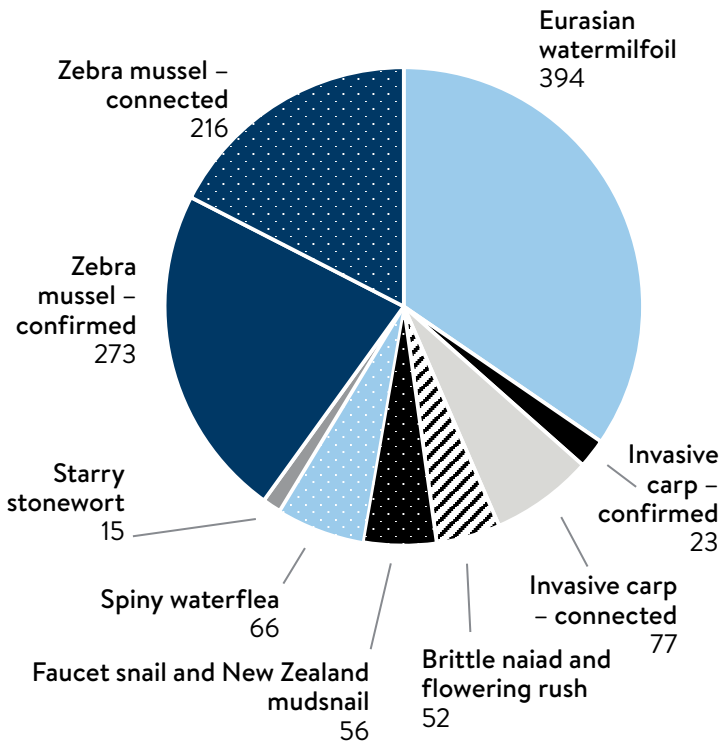
Infested Waters

The DNR will add a lake, river, pond or wetland to the infested waters list if it contains certain AIS that could spread to other waters. The DNR may also list a lake, river, pond or wetland as infested if it is connected to a body of water where an AIS is present. To reduce the risk of spreading AIS, activities like bait harvest, commercial fishing, and water use are managed differently in infested waters.

NEW WATER BODIES LISTED AS INFESTED IN 2020



TOTAL WATER BODIES LISTED AS INFESTED



For more information on waters listed in 2020, see Appendix B.

Not included in the summary chart:

- One lake listed as infested with red swamp crayfish.
- Lake Superior, the St. Louis River estuary, and other Superior tributaries are listed as infested with VHS, round goby, ruffe and white perch.

INVASIVE SPECIES IN TRADE

The Invasive Species Program hired a full-time, temporary staff person in June 2019 to focus on trade pathways for invasive species, using funding from the Great Lakes Restoration Initiative, administered by the U.S. Fish and Wildlife Service. Since then, significant strides have been made to conduct outreach and assess risks and policies in this area. Efforts have focused on known trade pathways for invasive species, such as the aquarium, water garden, live food, biological supply and bait trades. Initial assessment of the above-listed pathways yielded the following findings:

- Roughly 66% of Minnesota prohibited invasive species and 75% of regulated invasive species have been documented in these trades, either in the scientific literature or through online search.
- Some essential requirements for preventing invasive species introductions through these trades include:
    - Further risk analysis
    - Education and outreach to businesses and their customers
    - Collaborating with industry to understand and address concerns, motivations and practices

Important steps toward partnering with businesses and customers of these trade pathways were taken in 2020. We designed online and print resources to educate and empower these audiences to help prevent invasive species introductions. More than 3,500 business were also contacted directly through mail and email with basic information regarding invasive species regulations. The mailing also included an invitation to sign up for trade-specific email lists for continued communication and an opportunity to complete an invasive species survey. The survey results will help guide future efforts by providing a glimpse of businesses perspectives, concerns and needs. Further efforts to collaborate with businesses and their customers and a report summarizing the survey results will be completed in 2021.

Photo above:
Parrot feather (Myriophyllum aquaticum) is a regulated invasive species available in the water garden trade.

The program also worked across state agencies to leverage existing resources and expertise in trade-pathway invasive species prevention efforts. We partnered with the Minnesota Department of Health (MDH) and Minnesota Department of Agriculture (MDA) to identify businesses for outreach. We also trained MDA food and nursery regulators to identify invasive species they may come across during inspections. Discussions with MDH and the DNR Enforcement Division also informed approaches for addressing issues associated with the consumption of invasive crayfish.

PARTNERSHIPS

The Invasive Species Program partners with other people and organizations in Minnesota, regionally, and nationally to help prevent the introduction and spread of AIS.

Invasive Species Program staff represent the state on two regional panels of the federal Aquatic Nuisance Species Task Force: the Great Lakes Panel on Aquatic Nuisance Species and the Mississippi River Basin Panel on Aquatic Nuisance Species. These panels provide an opportunity to share Minnesota's prevention priorities with other jurisdictions in those regions, and to hear about emerging AIS threats in locations further downstream to inform adaptive management actions in Minnesota.

Invasive Species Program staff also coordinate with partners such as Minnesota Sea Grant and MAISRC. The U.S. Fish and Wildlife Service provides funding for AIS prevention projects and provides scientific expertise about the risk of AIS to Minnesota.

FUTURE NEEDS AND PLANS

Over the next year, the DNR will continue to:

- Work with partners and stakeholders to plan and implement prevention activities.
- Monitor the distribution of AIS in the state.
- Assess the risk of spreading AIS during different activities.
- Improve and refine the DNR AIS prevention program and supporting regulations.

Education and Public Awareness

GOALS

- Help Minnesota residents and visitors understand their role in preventing the spread of AIS.
- Provide clear actions to prevent the introduction and spread of AIS, including both the Clean, Drain, Dispose steps required by Minnesota law and other specific behaviors recently identified by the DNR and partners.
- Heighten understanding of aquatic invasive species' potential negative impacts on natural resources that are central to Minnesota's ecology, economy, recreation, identity and overall quality of life.
- Increase awareness of the DNR's AIS research, management and prevention efforts.
- Inform stakeholders, residents and other agencies of available training, funding and educational resources.

HIGHLIGHTS

- The Invasive Species Program continued leading a multi-year effort focused on positive messaging to build community norms around desirable behaviors. Expanding on a "community-based social marketing" model, the program and an expert research group identified which behaviors would have the greatest impact on AIS prevention, the barriers and benefits associated with those behaviors, and effective strategies for implementation. All project results are available on the new "Behavior Change for AIS Prevention" webpage.
- With $60,000 in funding from the Great Lakes Restoration Initiative administered by the U.S. Fish and Wildlife Service, the program awarded behavior change grants for AIS prevention to 13 local units of government across the state. The grants support pilot projects that address proper bait disposal, cleaning boats and drying of docks and lifts for 21 days before being moved to another water body.
- Program staff transitioned in-person public engagement efforts online due to the COVID-19 pandemic.
- Businesses involved with the live aquatic plant and animal trades were engaged through letters, emails, online surveys, website content and digital fliers.
- Two short videos were created about invasive jumping worms.

Photo on left:
A boy gazes over Lake McCarrons in Ramsey County in July 2020.

Strategic Communications

DNR information officers continued the integration of news and media relations, web, social media publications and graphic design, public access signs, advertising and public interactions.

Promoting Behavior Change

The DNR Invasive Species Program, in consultation with behavior change experts, continued to utilize "community-based social marketing" (CBSM) methodologies to promote AIS prevention behaviors in Minnesota. CBSM is a social science approach to foster sustainable, environmentally beneficial behaviors, providing a step-by-step process for assessing risks and identifying opportunities for long-term change. People may be aware of an issue such as invasive species, but they don't always act, and adopt or consistently practice desired behaviors over the long-term. We want to understand what people know, believe and currently do about aquatic invasive species, to build community norms around effective prevention actions.

The program and partners identified five major pathways of focus: watercraft, live bait, gear/equipment, aquarium trade and aquatic plant trade. Online surveys of anglers and shoreline residents in 2019 showed that the DNR is a trusted source of information about invasive species. They also showed that respondents are highly motivated to take actions to prevent the spread of AIS and to make a positive difference in their community and for the environment.

In March 2020, the Invasive Species Program announced a grant opportunity for tribal and local governments to support behavior change initiatives. This grant program was made possible through $60,000 in funding from the Great Lakes Restoration Initiative. Thirteen of the 14 applicants were awarded approximately $5,000 to implement pilot projects through 2021. Projects will address behaviors that support proper bait disposal, the drying of docks and lifts for 21 days before moving them to another water body, and thorough cleaning of boats and trailers at public accesses. The combination of baseline behavioral data and local pilot projects will help Minnesotans and visitors adopt desirable AIS prevention behaviors and create positive social norms around AIS prevention throughout Minnesota.

Informational Materials

The program continued to assess and revise informational materials for public distribution. Program staff worked with DNR Creative Services Unit staff to create the following new materials:

- Digital "Invasive Species and Your Business" flier for horticulture species.
- Digital "Invasive Species and Your Business" flier for pet and aquarium species.
- Short video "Invasive jumping worms: Impacts and prevention."
- Short video "Jumping worms: What anglers should know."

Staff provided invasive species content and advertising for the 2021 Minnesota Fishing Regulations handbook. The handbook includes information about AIS laws and watercraft inspections, species identification information, advertising to remind anglers to help prevent the spread of AIS and information about the infested waters list. More than 900,000 copies of the fishing regulations will be distributed beginning in February.

Advertising

The program continues its research into the most effective traditional and new media advertising channels.

Web/Digital

The program made greater use of social media and other new media platforms, in addition to continued traditional media. Numerous web pages were updated with new information and new pages to more effectively reach customers and businesses involved in the horticulture, pet and aquarium, bait, biological supply, internet and live food trades (www.dnr.state.mn.us/invasives/trade-pathways.html). A new web page was also created to disseminate results of the behavior change project (www.dnr.state.mn.us/invasives/ais/prevention/behavior-change.html).

Media Relations

In 2020, the program continued to expand placement of more stories about innovations and new steps to reduce the spread of invasive species. Along with information about new AIS confirmations, news releases created greater awareness of proactive steps the program is taking, such as aggressive actions to prevent the spread of invasive carp, advances in research and technologies, and the broad range of partnerships with stakeholders across the state. DNR news releases focused more attention on the unique dynamics of each lake and river, including the distribution of a population of AIS in the water body.

Public Engagement in an Online World

Staff participated online in conferences, water festivals and many other special events throughout the year to educate the public. Program staff participated on the planning committee and presented on a variety of topics at the online Upper Midwest Invasive Species Conference in November 2020. Staff also made online presentations to lake associations and community groups to answer questions and discuss invasive species issues and activities.

PARTNERSHIPS

Statewide Aquatic Invasive Species Advisory Committee

This committee plays a vital role in reviewing and guiding the AIS prevention and management work of the Invasive Species Program. Members are appointed by the DNR Commissioner. They bring a range of personal and professional experience to the discussion on preventing the spread and managing impacts of invasive aquatic plants and animals in Minnesota. Their interest and engagement with other stakeholders informs the program regarding policy, outreach, research, operations and other stakeholder interests. Visit mndnr.gov/aisadvisory.

Minnesota Aquatic Invasive Species Research Center

MAISRC, at the University of Minnesota, is a valuable partner, working closely with the program on research and advances in AIS management and related information. The DNR's Deputy Commissioner is a member of the Center's Advisory Board (CAB), she and the program supervisor attend quarterly CAB meetings. The EMP section manager and program supervisor also have monthly coordination meetings with MAISRC's director and assistant director. Many Invasive Species Program staff attended an online version of the center's annual showcase and explored new ways to work together. Visit maisrc.umn.edu.

Minnesota Sea Grant

Minnesota Sea Grant continues to partner with the DNR and other organizations to help prevent the spread of invasive species. Through scientific research and public education programs, Minnesota Sea Grant works to enhance Minnesota's coastal environment and economy. Visit seagrant.umn.edu.

Wildlife Forever

This nonprofit organization leads the Clean, Drain, Dry Initiative in Minnesota and works with multiple partners to post highway billboards, print ads and PSAs throughout Minnesota and across the country. Visit wildlifeforever.org.

FUTURE NEEDS AND PLANS

- Apply behavior change findings and related messaging to communications planning and implementation.
- Deepen engagement with behavior change experts and trained partners and staff across the state to more effectively build community norms and encourage desirable behaviors.
- Develop and use surveys, pilot testing and focus group instruments to better understand and measure effectiveness of communication efforts.
- Continue to teach Invasive Species Program staff about plain language, behavior change, electronic information accessibility and other communication techniques.
- Continue to work collaboratively with MAISRC, Minnesota Sea Grant, Wildlife Forever and other stakeholders to pursue research and secure funding through National Sea Grant, the Great Lakes Restoration Initiative, U.S. Fish and Wildlife Service, foundations and other sources for additional invasive species public awareness efforts.


CONSERVATION OFFICER
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Natural Resources

Division of Enforcement Activities

GOALS

- Provide advanced training to conservation officers and train local law enforcement to effectively enforce AIS laws.
- Analyze the DNR AIS laws and work with stakeholders on legislative issues to give law enforcement necessary tools to assist in AIS prevention.
- Continue to emphasize AIS as priority work and a core responsibility.
- Work with lake associations, user groups and media to raise awareness about controlling the spread of invasive species. This includes attending statewide public input meetings to maintain and increase dialogue with concerned stakeholders.
- Continue inspections by conservation officers to reduce the risk of spreading AIS by water-related equipment. Assist Level 1 and Level 2 watercraft inspectors at public access sites and investigate violations reported by inspectors.
- Continue to analyze data, develop protocols and secure equipment to administer AIS check stations safely and effectively.
- Investigate pathways for spreading AIS such as equipment and watercraft, food markets, bait dealers, aquatic plant dealers, etc.
- Train and educate commercial entities to increase compliance with invasive species regulations.
- Continue the transition to aerial helicopter fish stocking in remote lakes, as it is a “no contact” method for the entire process eliminating possible unintended AIS transfer.

Photo on left:
Conservation Officer Joel Heyn inspects a watercraft at a public access during the 2019 waterfowl season.

HIGHLIGHTS

- DNR conservation officers provided 11,506 hours of AIS enforcement and education.
- The Enforcement Division conducted media interviews on the importance of AIS regulation compliance.
- The Enforcement Division's two zebra mussel detection canine officers assisted conservation officers and AIS inspectors. The dogs improved the efficiency of conservation officers and inspectors, with faster and more thorough inspections of water-related equipment. The canine teams provided educational demonstrations at several public events.
- Four conservation officers, designated as Water Resource Enforcement Officers (WREO), continued to dedicate a significant portion of their work toward aquatic invasive species enforcement. Currently, there are two WREO vacancies; these positions will be filled once budgets allow.
- Due to COIVD-19, no conservation officers attended or staffed any AIS booths at major sport and outdoor shows.
- DNR Enforcement pilots worked with the Minnesota Seaplane Association to develop recommendations to prevent the spread of AIS by seaplanes.
- DNR Enforcement pilots assisted the DNR's Fish and Wildlife Division with spraying hybrid invasive cattails.

ENFORCEMENT CONTACTS (CITATIONS/WARNINGS)

Numbers vary due to officer staffing levels, public compliance, length of open-water season, local law enforcement involvement and outreach efforts.

Citations/Warnings	2020	2019	2018	2017	2016	2015
Citations issued	61	98	95	127	123	244
Warnings	365	485	476	557	671	911

AQUATIC INVASIVE SPECIES CHECK STATIONS (SPRING TO FALL 2020)

In 2020, due to the COVID-19 pandemic, the DNR did not use roadside check stations to inspect watercraft and watercraft equipment transported in Minnesota.

Statewide Open Water Season Enforcement Results

Review of data from DNR Enforcement check stations shows the compliance with invasive species regulations has risen every year since the first year of check stations back in 2012.

PARTNERSHIPS

Enforcement of Minnesota's invasive species regulations is essential to preventing invasive species' spread into and across Minnesota. Conservation officers continue to work with local law enforcement, lake associations, local government units, user groups and other DNR divisions to assist in controlling the spread of invasive species.

FUTURE NEEDS AND PLANS

The Division of Enforcement continues to focus its efforts on enforcement and education, both critical tactics in preventing the introduction and spread of invasive species.

The Division of Enforcement will continue to monitor and evaluate our actions to provide the most effective measures available. We will work with the public and private entities on legislative initiatives to provide law enforcement with the tools necessary to prevent the spread of AIS.

The Division of Enforcement will continue to emphasize invasive species enforcement as priority work and a core responsibility.

Photo on left:
A conservation officer (Hannah Mishler) and a zebra mussel-sniffing K9 (Storm) inspect watercraft at a public access area during the summer of 2019.


TUCKER

Watercraft Inspections

GOALS

- Conduct watercraft inspections at public water accesses throughout Minnesota and require watercraft users to decontaminate their watercraft if AIS or water are found.
- Increase public awareness about AIS and reduce the potential for boaters to transport species to other water bodies.
- Increase education efforts with stakeholder and user groups.
- Distribute information at events throughout the state.
- Employ Level 1 and Level 2 watercraft inspectors.
- Provide training and support to local government inspection programs.

HIGHLIGHTS

- Hired 64 watercraft inspectors for the 2020 season.
- Created a new online training program for local government inspection staff. This distance-learning process trained 756 Level 1 inspectors and 98 Level 2 inspectors.
- Completed a record high 606,000 incoming and outgoing watercraft inspections with the DNR and local government watercraft inspectors.
- 349,000 incoming watercraft were in compliance with state laws. Two percent of incoming watercraft were found with plants, invasive animals, mud or water.
- 97% incoming watercraft arrived in compliance with state drain plug laws.

Photo on left:
A Level 2 inspector (Tyler Fougner) checks water temperature during an engine decontamination in the summer of 2019.

Transportation of Invasive Species

Boaters in Minnesota remove drain plugs from watercraft and livewells to reduce the risk of transporting AIS like spiny waterflea or zebra mussel larvae, as required by the state's "drain plug law." People in Minnesota also may not transport aquatic plants under most circumstances. This helps prevent the spread of invasive plants as well as other AIS that can be attached to plants, like zebra mussels.

In 2020, watercraft inspectors observed that the majority of people arriving at accesses were in compliance with state AIS prevention laws.

- 97% of people arriving at accesses had removed drain plugs from their watercraft.
- 98% of people arrived at accesses with watercraft and trailers that were free of aquatic plants.
- Watercraft inspectors found zebra mussels on 109 incoming watercraft (2019 had 191 occurrences). Seventeen were at water bodies not known to be infested with zebra mussels.

DNR-authorized watercraft inspectors took the following actions to follow-up with the few individuals who were in violation of state laws.

- Watercraft inspectors instructed owners not to launch until watercraft passes inspection.
- Zebra mussel violations are forwarded to DNR Enforcement for follow-up.
- Watercraft inspectors required decontamination prior to launching for any watercraft with vegetation or attached zebra mussels attempting to enter a water body. Decontamination methods include hand removal, draining or a high-pressure, hot water treatment.

Decontamination Units

The Watercraft Inspection Program hires Level 2 watercraft inspectors to decontaminate watercraft with high-pressure, hot-water wash units. DNR staff used 23 portable wash units around the state to perform 880 decontaminations. Local inspection programs operated an estimated 34 decontamination units in addition to DNR operated units. Partner units decontaminated an additional 2,531 watercraft. DNR decontamination units were located at high-use watercraft accesses on zebra mussel-infested water bodies.

DNR Volunteer Training

The Watercraft Inspection Program conducts AIS volunteer training sessions to teach people how to educate watercraft users at waters where they live or recreate. In 2020, due to COVID-19, no volunteer trainings were held and no volunteers were present at accesses. Volunteers receive classroom training every three years, with an online refresher course each year between classroom training. Volunteers must pass a yearly background check.

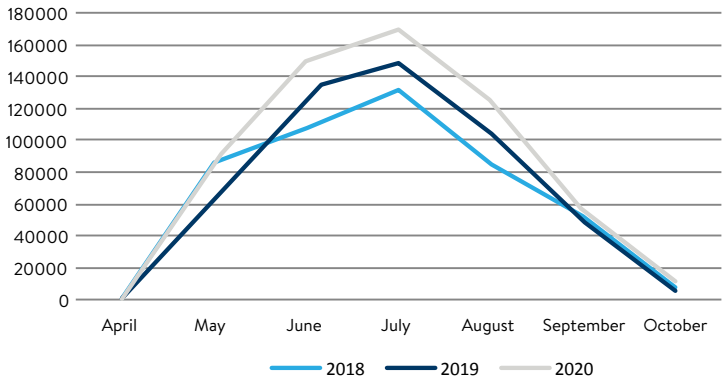
NUMBER OF DNR WATERCRAFT INSPECTIONS

	2020	2019	2018	2017	2016	2015	2014
Inspections	56,813	70,762	66,833	84,824	102,445	103,500	119,000
Inspection Hours	19,509	25,451	21,826	29,400	38,000	35,000	49,550
Inspections per Hour	2.91	2.78	3.06	2.88	2.7	2.96	2.42

NUMBER OF DNR WATERCRAFT INSPECTIONS BY REGION

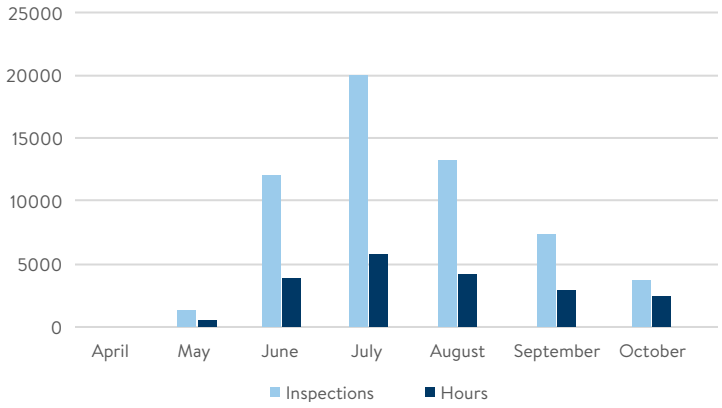
DNR Region	2020	2019	2018	2017	2016	2015	2014
Northwest - 1	18,121	19,437	13,539	17,857	23,575	20,250	26,500
Northeast - 2	7,093	8,152	7,266	11,413	13,770	12,450	14,100
Central - 3	27,797	40,623	43,653	51,513	62,150	67,800	74,900
Southern - 4	3,778	2,550	2,375	4,041	2,950	3,000	3,600
Total Inspections	56,813	70,762	66,833	84,824	102,445	103,500	119,100

DNR AND LGU INSPECTIONS PER MONTH: 2018-2020



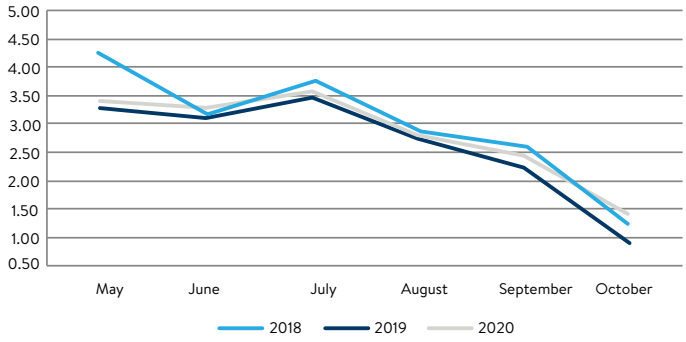
Authorized watercraft inspections typically start in early April, peak in July, and fall off in October when most inspection programs end and boat activity reduces.

DNR INSPECTIONS AND HOURS PER MONTH: 2020



Inspections are performed statewide from April through October. The number of inspections peak in July, while staff presence remains fairly consistent.

DNR INSPECTIONS PER HOUR, BY MONTH



DNR inspections per hour have followed a consistent pattern each year since 2018.

PARTNERSHIPS

Local and Tribal Governments

Local and tribal governments can partner with the DNR through a delegation agreement. This agreement allows governments to hire authorized watercraft inspectors to support local watercraft inspection programs. There were 66 active delegation agreements during the 2020 season. These programs hired an additional 756 watercraft inspectors. This compares with 60 active delegation agreements and 922 trained inspectors in 2019.

The local and tribal government employees follow the DNR's watercraft inspection process using DNR survey questions. The findings are reported to the Watercraft Inspection Program through a statewide watercraft inspection mobile application.

FUTURE NEEDS AND PLANS

In 2021, the Watercraft Inspection Program will work with partners to improve the program's online inspection trainings to ensure programs are ready to start at their desired times. This year set a new record for the most inspections completed by DNR and local unit of government watercraft inspectors in a single boating season. As these numbers grow, increased training and communication with partners is essential to ensuring each watercraft inspection is done correctly.

Program staff are improving online training modules to ensure trainees are engaged in the remote-learning process and are prepared to conduct thorough inspections at public accesses. Additional materials, guidance and tools will be available to local inspection partners for their staff during the open water season.

The program will review 2020 data to refine the DNR's watercraft inspection survey process and adjust the hours and days spent at watercraft accesses to try to increase our inspections per hour. The program will train local units of government staff to conduct AIS education at local watercraft accesses and work to expand the number of partnerships with tribal and local governments in an effort to increase total watercraft inspection capacity throughout the state.

Aquatic Invasive Species Prevention Aid

The Minnesota Legislature provides $10 million directly to Minnesota counties to help prevent the spread of aquatic invasive species: AIS Prevention Aid. The funds are allocated based on each county's share of watercraft trailer launches (50%) and watercraft trailer parking spaces (50%).

Each county board and/or designated local government decides how to use the funds. Each county submits a copy of its guidelines for use of the funding to the DNR by December 31 of each year. The Invasive Species Program has two full-time staff dedicated to working with these local programs.

GOALS

- Annually review and document county AIS plans and resolutions.
- Provide opportunities for local government staff to share and learn from one another's collective experiences.
- Provide opportunities for local government staff to maintain strong relationships with stakeholders such as other local governments, tribal governments, state and federal agencies, nonprofits, businesses, lake associations, outdoor recreation groups, etc.
- Provide technical support and training to local governments and their partners as they develop, implement and evaluate their local prevention strategies.
- Provide opportunities for local government staff to infuse their AIS prevention programs with behavior change strategies.

HIGHLIGHTS

- In January 2020, facilitated four regional workshops statewide, attracting 87 attendees. Workshops were designed to help local AIS program managers and their partners be more successful in their AIS prevention work.
- Worked with counties to revise and put into practice a metrics template designed to capture data and stories about local AIS prevention programs. This information helps demonstrate the statewide impact of AIS Prevention Aid.
- Hosted a virtual workshop with local AIS coordinators from across the state in August 2020. Fifty-seven people participated in discussions about how their AIS prevention programs have adjusted during COVID-19.
- Awarded 13 behavior change grants to local units of government across the state. The grants support pilot

Continued on page 32

Photo on left:
The DNR hosts a two-day AIS Behavior Change Workshop in October 2019 for local government staff, statewide partners, and DNR staff. Participants brainstorm ideas on sticky notes, organize them onto flip chart paper, and present their ideas to the group.

HIGHLIGHTS continued from page 31

projects dealing with bait disposal, drying of docks and lifts for 21 days before being moved to another water body, and making cleaning tools easily accessible at public accesses.

Technical support

- Provided technical support to local governments and their partners as they develop, implement and evaluate their AIS prevention strategies.
- Received guidelines including plans and resolutions from the 83 Minnesota counties receiving funds and provided feedback on those guidelines to counties.
- Provided information on DNR AIS programs (e.g., public outreach, watercraft inspection, invasive aquatic plant management, behavior change). This included updating key resources and promoting available support from the DNR on the AIS Prevention Aid webpage (www.mndnr.gov/invasives/ais/prevention).
- Played an advisory role on county AIS task forces and advisory committees.
- Developed guidance documents and online resources as well as hosting workshops and providing presentations as ways to relay information to counties and their local stakeholders.
- Provided feedback on communication materials developed by local AIS program managers to promote consistent messages about AIS and prevention steps (e.g., Clean, Drain, Dispose).
- Revised a template of metrics based on comments received from counties. The template provides a voluntary way for local AIS program managers and their partners to track accomplishments and demonstrate how AIS Prevention Aid is making a difference in their communities. Participation increased from 39 counties in 2018 to 65 counties submitting a template summarizing their work in 2019. We learned that 945 paying jobs were created and supported with AIS Prevention Aid and $1,692,000 in additional funds was leveraged to support AIS prevention activities. In addition, 57,000 residents and visitors were educated about AIS, and 31,000 children were taught about AIS in schools across Minnesota.

Engaged local governments and partners

- Maintained a network and community of support by continuously updating a primary contact list of county AIS program managers online and encouraged them to use the list to collaborate with one another. DNR planners used the list to disseminate timely and relevant information about AIS Prevention Aid funding and requirements, new resources, innovative activities, learning/collaboration opportunities, DNR program updates, etc.
- In January 2020, held four in-person regional workshops in Park Rapids, New Ulm, Arden Hills, and Duluth. The 87 attendees included at least one representative from 47 counties, 18 people from partner organizations, and 21 DNR staff. The workshops brought neighboring counties together to share their AIS prevention experiences, discuss successes and challenges, support collaborative efforts, and build stronger inter-county relationships.
- Due to COVID-19, hosted an online workshop in August with 57 local AIS coordinators from across the state. DNR planners facilitated discussions about local program efforts around public engagement watercraft inspection, creative initiatives, and safety during the COVID-19 pandemic.
- Presented AIS Prevention Aid information to a variety of audiences including the DNR Statewide AIS Advisory Committee. Provided general AIS education to groups such as lake associations, college natural resources students, and assorted youth events.

PARTNERSHIPS

Creating new and deepening existing partnerships at all scales with a diversity of stakeholders is the heart of the AIS Prevention Aid program.

- Continued to provide technical support to a group of AIS leads from the 12 counties that receive the most AIS Prevention Aid. This self-organized group meets to brainstorm ideas on how they can work together to have a greater statewide impact.

- Awarded grants to 13 local governments to implement behavior change intervention pilot projects through 2021. Grantees received funds to design, implement, and evaluate their pilot projects, which focused on high-priority target audiences (anglers and shoreline residents) and associated AIS prevention behaviors. These efforts will ultimately help promote the adoption of desirable AIS prevention behaviors and create positive social norms around AIS prevention throughout Minnesota.

Photo above:
In January 2020 the DNR hosts a workshop in Duluth to provide local government staff and their partners an opportunity to share and learn from each other's experiences.

FUTURE NEEDS AND PLANS

AIS Prevention Aid funded programs are diverse, at different stages of development and implementation, and cover a spectrum of AIS activities. As the needs of the programs change, so will the technical support provided.

- Work to improve online resources, like the DNR's Local Aquatic Invasive Species Prevention Aid web page, to provide a "one-stop shop" of resources local governments and their partners can use to develop and implement their programs.
- Support implementation of local projects that employ behavior change strategies.
- Continue to support communication and collaboration among local program managers about AIS prevention strategies. For example, continue to host workshops and learning sessions in a safe manner.
- Continue to provide technical support, tools, and resources to help local governments achieve their goals and run successful AIS prevention programs.

Invasive Aquatic Plant Management

GOALS

- Reduce the impacts of invasive aquatic plants on Minnesota's ecology, society and economy.
- Prevent the spread of invasive aquatic plants within Minnesota.

We are committed to working with our partners to meet these goals by:

- Providing technical assistance to individuals and organizations.
- Permitting management with herbicides or mechanical control.
- Providing grants to help fund costs of control done by partners as funding allows.
- Supporting and using research that leads to improved aquatic invasive species control techniques.

HIGHLIGHTS

- In 2020, starry stonewort *(Nitellopsis obtusa)* was confirmed in one new lake in Minnesota, Lake Carnelian in Stearns County. It was located there by volunteers during Starry Trek. The DNR, in cooperation with local partners, arranged for a rapid response of hand pulling followed by algaecide treatment of the starry stonewort.
- The DNR continued to work with cooperators to implement recommendations from the University of Minnesota's Assessment to Support Strategic Coordinated Response to Invasive *Phragmites (Phragmites australis* subsp. *australis)* in Minnesota. The DNR began a statewide nonnative *Phragmites* control effort. The DNR's control efforts are focused on areas of the state where it occurs in a limited number of small infestations. This fall the DNR worked with local partners to treat nonnative *Phragmites* in small sites in Stearns and Kandiyohi counties.
- The DNR made $528,950 in grants available for the control of Eurasian watermilfoil, curly-leaf pondweed, and flowering rush. Those funds provided grants to 175 local organizations for both pre-treatment delineation surveys and chemical and/or mechanical control of those invasive species.

Photo on left:
Starry stonewort hand pulled from Lake Carnelian in Stearns County.

Management

Invasive aquatic plant management is an attempt to reduce the abundance or distribution of an invasive plant in a water body or wetland. The DNR's invasive plant management program supports efforts to minimize harmful effects caused by invasive plants, while also protecting natural resources. The program works to preserve and enhance the native aquatic plant community for the ecological benefits those plants provide. Sometimes, invasive plant management is done to help prevent the spread of that species to other uninfested water bodies.

Plant management is complex and reductions in invasive plants often require long-term and resource-intensive efforts. Management that involves either mechanical removal of plants or application of herbicides to public waters requires a permit from the DNR. Permits may be issued to property owners, lake organizations and local governments. Permit applications are accepted through the Minnesota DNR Permitting and Reporting System (MPARS). While the number of permits issued for the management of invasive aquatic plants varies from year to year, the total number has remained fairly constant since 2015. Commonly managed aquatic invasive plants include:

- Eurasian watermilfoil *(Myriophyllum spicatum)*
- Curly-leaf pondweed *(Potamogeton crispus)*
- Flowering rush *(Butomus umbellatus)*

The Invasive Species Program has provided grants for the control of Eurasian watermilfoil and/or curly-leaf pondweed since 2006. The program was not able to offer invasive species control grants in 2019 due to funding constraints. An increase in the AIS surcharge on watercraft registrations enacted in 2019 enabled the DNR to offer these grants again in 2020. In 2020, the DNR was able to offer 175 grants to local organizations for the control of curly-leaf pondweed, Eurasian watermilfoil, and/or flowering rush, for a total grant offer of $528,950. Those grants helped fund both pre-treatment delineation surveys and chemical and/or mechanical control of the invasive species.

In 2020, the DNR confirmed starry stonewort *(Nitellopsis obtusa)* in one new lake in Minnesota, Carnelian Lake in Stearns County. The plant was found widely distributed around the public access. Over 1,000 pounds of starry stonewort (wet weight) were removed from the lake by scuba divers before the area was treated with an algaecide. Starry stonewort was first confirmed in Minnesota in Lake Koronis and connected Mud Lake in Stearns County in 2015. Since the initial discovery, treatment methods have included chemical treatment with herbicides or algaecides, Diver Assisted Suction Harvesting (DASH), suction dredging, and hand-pulling followed by chemical treatment.

Hand pulling of starry stonewort has been very successful in Grand Lake (Stearns County). The DNR, in cooperation with local partners, has hand pulled starry stonewort in Grand Lake several times a summer every year since then it was found in 2017. These treatments have been very effective at reducing the extent and biomass of starry stonewort since its initial discovery. No starry stonewort has been located in any other area of the lake. Biomass pulled from the area where it is located (by the public water access) has fallen from an approximate wet weight of 360 pounds in August 2017 to only 10 pounds in July 2020.

The DNR, in cooperation with local and county organizations, also participated in starry stonewort control efforts on Medicine Lake in Hennepin County. A 15-acre area by the public water access was treated with chemical algaecide for the third year in a row. Similar to last years' treatment, this treatment reduced starry stonewort to very low levels. Unfortunately,

INVASIVE AQUATIC PLANT MANAGEMENT PERMITS ISSUED BY REGION IN 2020

Species	Northwest	Northeast	Central	Southern	Total
Curly-leaf pondweed	16	15	131	29	191
Eurasian watermilfoil	12	17	67	16	112
Curly-leaf pondweed and Eurasian watermilfoil	0	0	3	0	3
Flowering rush	6	1	6	0	13
Purple loosestrife	0	0	3	0	3
Nonnative *Phragmites*	0	1	7	2	10
Yellow iris	0	0	1	0	1
Starry stonewort	2	0	9	0	11
Total	36	34	227	47	344

starry stonewort was found in several other areas of the lake in 2020.

Staff worked with permit applicants and contractors to provide permits for work, advice on best management practices for treatments, and assistance in monitoring the results of the management projects.

PARTNERSHIPS

The DNR again participated with MAISRC and the University of Minnesota Extension, along with counties and local partners, in a statewide search for waters infested with starry stonewort. The event, called Starry Trek, involved more than 210 trained volunteers searching 238 Minnesota lakes. As mentioned earlier, participants found one new waterbody with starry stonewort this year during Starry Trek, Lake Carnelian. The DNR, in cooperation with local partners, arranged for a rapid response of hand pulling followed by algaecide treatment of the starry stonewort found in Lake Carnelian.

Dr. Ryan Wersal at Minnesota State University, Mankato completed research on starry stonewort control. The DNR and the Great Lakes Restoration Initiative provided funding and logistical support for this project. Dr. Wersal evaluated the effectiveness of various algaecides and herbicides using a series of lab and field trials. He also evaluated the potential harm these products may cause to native plant species. Dr. Wersal completed the field and lab trials for this research in the fall of 2020; a final report will be available in early 2021.

The management of nonnative *Phragmites (Phragmites australis* subsp. *australis)* in Minnesota has been an area of ongoing research by MAISRC at the University of Minnesota. The DNR began work with the center in 2015 to identify gaps in knowledge about the extent, distribution and genetic diversity of *Phragmites* in the state. In 2020 the DNR began collaborating with MAISRC on next steps for management of this invasive species. The DNR has received $180,000 in Great Lakes Restoration Initiative (GLRI) funds to develop a statewide management plan to prioritize nonnative *Phragmites* management and to manage nonnative *Phragmites* statewide based on those priorities. These management efforts focus on "clearing counties" by targeting management in areas of the state with a limited number of small infestations. These GLRI funds also fund researchers at MAISRC to provide technical and extension support to local efforts to manage nonnative *Phragmites* statewide. This technical support includes both monitoring and training in best management practices. Extension efforts began in the summer of 2020. DNR funded management efforts began in the fall of 2020. The DNR worked with partners to treat nonnative *Phragmites* in small sites in Stearns and Kandiyohi counties.

FUTURE NEEDS AND PLANS

- Continue to work with stakeholders and refine issuing permits and grants for the control of invasive aquatic plants.
- Work with partners to manage invasive aquatic plants.
- Monitor the distribution of invasive aquatic plants in the state, with emphasis on verification of reports of new occurrences.
- Assess risks posed to Minnesota by various nonnative aquatic plants.
- Continue to work with researchers to improve our understanding of the ecology and management of invasive aquatic plants, including nonnative *Phragmites*, the macroalgae starry stonewort, and hybrids of Eurasian watermilfoil.
- Review and revise best management practices for herbicide treatment of aquatic invasive plants, in light of results from ongoing research and pilot projects.

Photos above: *Three commonly managed invasive aquatic plants in Minnesota; Eurasian watermilfoil, flowering rush, and curly-leaf pondweed.*

Invasive Aquatic Animals — Zebra Mussels

GOALS

- Prevent the introduction of zebra mussels *(Dreissena polymorpha)* to lakes and rivers in Minnesota.
- Support, assist and conduct research on zebra mussel ecology, biology, life history and other aspects to help manage and prevent spread.

HIGHLIGHTS

- DNR staff worked on assessing and providing technical expertise for a proposed filtration system to prevent veliger movement from water transfer in northern Minnesota.
- DNR staff provided technical expertise to MAISRC in prioritizing research needs for an upcoming proposal process.
- DNR staff worked with a county AIS program to document expansion of zebra mussel population in Lake Sarah, Murray County.

Photo on left:
Zebra mussels attach to one another in a clump on the sandy bottom of Lake Winnibigoshish.

Photo above:
Even small amounts of aquatic plant material can have many small zebra mussels attached, highlighting the importance of cleaning boats and recreational equipment to prevent spread.

Photo above right:
Zebra mussels can be many sizes. A quarter helps show the varying sizes.

Research

DNR staff continued working with a national boating group examining boat design to change recreational watercraft so there are fewer risks of movement of zebra mussels and other AIS.

DNR biologists continued monitoring zebra mussels in lakes throughout Minnesota. Notable work included:

- Monitored the zebra mussel population size in White Bear Lake (Washington County).
- Continued research monitoring number and size of zebra mussels in Green Lake (Kandiyohi County).

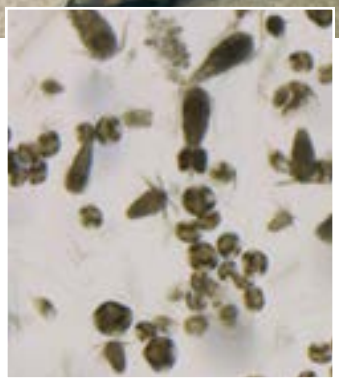
Volunteer Zebra Mussel Monitoring Program

Volunteers with the Zebra Mussel Monitoring Program monitor lakes or rivers. They regularly look at docks, lifts, boats, recreational equipment, shorelines and other objects. Volunteers provide important help in tracking zebra mussel distribution throughout the state. People who live and recreate on lakes in Minnesota are often the first to discover and report new zebra mussel populations.

PARTNERSHIPS

Minnesota Aquatic Invasive Species Research Center – University of Minnesota

DNR biologists continued to provide technical assistance, expertise and input on zebra mussel project proposals, the inclusion of zebra mussels and the evaluation of other species for potential inclusion in the MAISRC priority species list and publications from zebra mussel research.



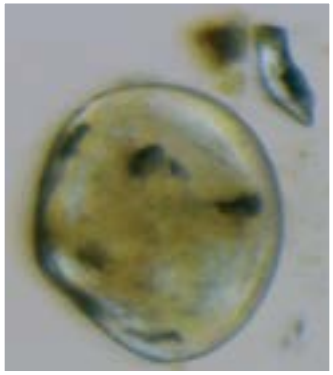


Photo above:
DNR staff collect water samples for MAISRC research on veliger movement in residual water in recreational watercraft during the summer of 2019.

Photo left:
Veligers can reach high abundance in lake waters.

Photo bottom left:
Microscopic view of a zebra mussel veliger found in residual water.

DNR biologists have provided technical assistance and expertise to both public and private researchers investigating eDNA as a developing detection method for zebra mussels.

FUTURE NEEDS AND PLANS

- Examine potential uses of pesticides to control zebra mussels as opportunities arise.
- Monitor, with partners, the post-treatment efficacy of control projects.
- Work with stakeholder groups to provide control advice and education.


USGS
USGS

Invasive Aquatic Animals — Carp

GOALS

- Prevent or limit the range expansion of the following invasive carp: bighead carp *(Hypophthalmichthys nobilis)*, black carp *(Mylopharyngodon piceus)*, grass carp *(Ctenopharyngodon idella)*, and silver carp *(Hypophthalmichthys molitrix).*
- Monitor Minnesota waters for changes in population sizes, range expansion and reproduction.
- Encourage and support research on control strategies.

HIGHLIGHTS

- The DNR invasive fish coordinator continues to participate in regional efforts to prevent the expansion of invasive carp populations.
- Fifty one invasive carp were captured in Mississippi River Pool 8 by a commercial fisher.
- The DNR tagged five silver carp in Mississippi River Pool 8 during October to aid future netting efforts.

Photo on left:
A DNR biologist is sorting through fish captured during a commercial netting effort on the Mississippi River in March 2020.

Photo on far left:
A U.S. Geological Survey biologist and a U.S. Fish and Wildlife biologist biologist surgically implanting a tag into a silver carp. The fish was released into Mississippi River Pool 8 in October 2020.

New Detections of Adult, Juvenile, and Larval Invasive Carp

The DNR relies on six methods to detect and monitor the expansion of invasive carp into Minnesota:

- Traditional fisheries monitoring programs
- Targeted sampling
- Contracted commercial fishing
- Monitoring the commercial catch
- Public reported sightings
- Tagging

The invasive carp monitoring crew received 11 encounter reports from the public in 2020. All reports were investigated in person, by phone or via e-mail.

- Two reports were confirmed as an invasive carp.
- One report was confirmed not to be invasive carp based on photographs.
- Five reports were unlikely to be invasive carp based on discussions.
- Follow up sampling was conducted on three of the reports. Two additional carp were captured from follow up sampling.

Eighty-three invasive carp were captured in 2020, the largest annual catch to date. This higher number was driven by one occurrence, the capture of 51 fish in Mississippi River Pool 8 by a commercial fisher in early March. The DNR responded by deploying its contracted commercial fisher in Pool 8 and nearby pools. Following issuance of Emergency Executive Order 20-20 on March 25, 2020 directing Minnesotans to Stay at Home, the DNR temporarily suspended contract commercial fishing, targeted netting, targeted electrofishing, and work with partner agencies on all Minnesota waters including Pool 8. These activities were brought back online as appropriate safety measures and guidance were developed. DNR netting activities and electrofishing were brought back in a limited capacity beginning in May with contract commercial fishing resuming in October. The reduced number of seasonal staff impacted the amount of invasive carp monitoring done in 2020.

INVASIVE CARP CAPTURES IN 2020

Location	Species	Date of Capture	Number	Method of Capture
Mississippi River Pool 6	Silver Carp	3/8/2020	1	Commercial Fisher
Mississippi River Pool 8	Grass Carp	3/9/2020	10	Commercial Fisher
Mississippi River Pool 8	Silver Carp	3/9/2020	35	Commercial Fisher
Mississippi River Pool 8	Grass Carp	3/12/2020	2	Commercial Fisher
Mississippi River Pool 8	Hybrid Silver-Bighead	3/12/2020	3	Commercial Fisher
Mississippi River Pool 8	Silver Carp	3/12/2020	1	Commercial Fisher
St. Croix River Point Douglas	Bighead Carp	3/25/2020	1	Commercial Fisher
St. Croix River Anderson Bay	Silver Carp	5/26/2020	1	Commercial Fisher
Round Lake Outlet	Bighead Carp	7/8/2020	12	MN DNR Seine
Round Lake Outlet	Grass Carp	7/8/2020	1	MN DNR Seine
Round Lake Outlet	Silver Carp	7/8/2020	5	MN DNR Seine
Mississippi River Pool 5A	Silver Carp	8/21/2020	1	Bowfisher
Mississippi River Pool 8	Silver Carp	10/13/2020	3	Contracted Commercial Fisherman
Mississippi River Pool 8	Silver Carp	10/21/2020	1	Contracted Commercial Fisherman
Mississippi River Pool 8	Silver Carp	10/23/2020	1	Contracted Commercial Fisherman
Mississippi River Pool 8	Silver Carp	10/29/2020	1	Contracted Commercial Fisherman
Mississippi River Pool 4	Silver Carp	11/3/2020	1	Contracted Commercial Fisher
Lake Okamanpeedan	Grass Carp	11/23/2020	1	Commercial Fisher
Mississippi River Pool 7	Silver Carp	11/24/2020	2	Commercial Fisher

Invasive Carp Tracking

The Minnesota Legislature granted the DNR authority to tag invasive carp for research. This allows the DNR to better understand the movements of individual fish and leads researchers to other invasive carp. The DNR tagged is first fish, a bighead carp, in the St. Croix River on July 28, 2017. The bighead carp is still alive and fish biologists continue tracking its movement using active boat tracking and the passive receiver array. Full 2020 tracking data will be analyzed in late December 2020 and January 2021.

During contracted commercial fishing efforts in Pool 8 in October, five additional silver carp were captured and implanted with tags. The U.S. Fish and Wildlife Service provided the tags and conducted the surgeries. Tagged fish will be actively tracked when river conditions allow. The Wisconsin DNR and U.S. Fish and Wildlife Service are providing assistance with this effort. Movement and habitat data from these fish will be used to inform future detection and removal efforts. This project has received funding to maintain its dedicated tracking crew in 2021.

PARTNERSHIPS

Minnesota Aquatic Invasive Species Research Center

The DNR is an active partner with MAISRC at the University of Minnesota. The DNR serves on both the advisory board and the technical committee. Technical committee responsibilities include prioritizing AIS research needs, scoring project proposals, and providing comments on research project plans. Invasive carp continues to be a priority for the center. Please visit the MAISRC website, https://www.maisrc.umn.edu/asiancarp-research, for past, current, and future projects.

The DNR also continues to support research being conducted by Dr. Peter Sorensen's lab at the University of Minnesota. Among other areas, this lab is researching the use of underwater acoustics to deter invasive carp from swimming upstream. More information can be found at: https://www.maisrc.umn.edu/team-sorensen. The DNR provided Dr. Sorensen with a letter of support in 2020 to the Legislative-Citizen Commission on Minnesota Resources for proposed invasive carp work at Lock and Dam 5 on the Mississippi River. The DNR communicates regularly with Dr. Sorenson and provides staff assistance and logistical support as they are available.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service leads environmental DNA (eDNA) sampling for invasive carp. 2020 eDNA sampling was impacted by COVID-19 related restrictions. The most recent and past results can be viewed at fws.gov/midwest/fisheries/edna.html.

Upper Mississippi River Collaboration

The DNR is an active partner in a multi-state and federal agency collaboration working on preventing the expansion and reducing the impacts of invasive carp. This workgroup operates at an Upper Mississippi River basin level rather than the individual state level to develop projects and strategies to meet objectives. This includes a system-wide detection and evaluation program, implementing a commercial harvest program at the reproduction front, and deploying a deterrent strategy. The DNR represents the collaboration at federal briefings, meetings, and conferences.

Asian Carp Regional Coordinating Committee (ACRCC)

The ACRCC was formally established in early 2010 and represents the collective efforts of international, federal, state and municipal agencies to combat the spread of invasive carp into the Great Lakes. The ACRCC provides oversight and coordination of interagency prevention activities through development and implementation of an annual Asian Carp Action Plan and complementary Monitoring and Response Plan. The work of the ACRCC is supported by the Great Lakes Restoration Initiative, as well as partner agency resources. The ACRCC works to ensure a sustainable population of invasive carp does not become established in the Great Lakes by funding monitoring, control and technological development for invasive carp. The DNR is an active member of the committee. The ACRCC maintains a webpage at asiancarp.us with background information, recent news, resource materials, action plans, and reports.

FUTURE NEEDS AND PLANS

The DNR and its partners will be updating the Minnesota Invasive Carp Action Plan, implementing large, targeted netting efforts, and tracking tagged fish. Continued funding is needed for these and other prevention, monitoring and response projects. An updated action plan will help quantify future resource needs.

Terrestrial Invasive Species Program

GOALS

- Improve or enhance the ability of DNR staff to effectively manage terrestrial (land-based) invasive species on DNR-managed lands.
- Prevent or limit the negative impacts on Minnesota's ecology, economy and human health that can result from terrestrial invasive species such as Oriental bittersweet, wild parsnip, buckthorn, garlic mustard, earthworms, emerald ash borer and gypsy moth.
- Prevent and manage terrestrial invasive species to protect and/or restore native plant communities, rare plant species and natural features, and biological diversity.
- Prevent and manage terrestrial invasive species to protect and/or restore habitats for wildlife species, especially those species in greatest conservation need.
- Engage partners in invasive species prevention, management, inventory, outreach, communication, and research.

HIGHLIGHTS

Prevention

Jumping worms (*Amynthas agrestis* and related species) are a new type of invasive earthworm reported in Minnesota that damage plants and soils. They are called "jumping worms" because of their unusual behavior: active when disturbed, they move like a snake and sometimes appear to jump. The program continued to work with partners to examine how regulations, research, and outreach can prevent jumping worm spread in Minnesota. Visit mndnr.gov/invasives/terrestrialanimals/jumping-worm.

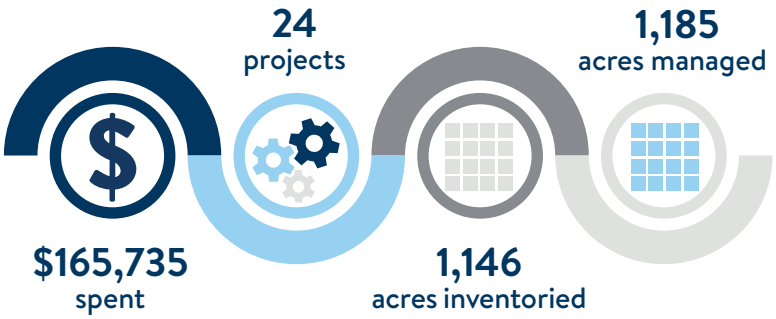
The program worked with DNR staff to ensure they have the training and equipment needed to prevent the spread of invasive species during the course of DNR activities.

Management and Inventory

The Invasive Species Program initiated a funding program in 2006 for the management and inventory of terrestrial invasive plant species on state managed lands. In fiscal year 2020 this program provided $165,735 to DNR divisions and regions for high priority activities. Priorities include treatment of early detection invasive plants and management on high quality habitats.

Photo on left:
In 2020, winged burning bush (Euonymus alatus) was regulated by the Minnesota Department of Agriculture and DNR staff created a DNR webpage on winged burning bush.

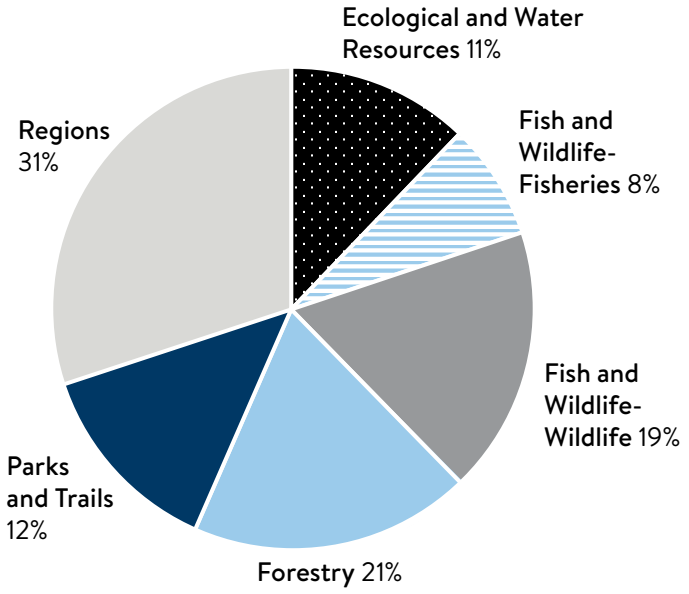
FISCAL YEAR 2020



FUNDING HISTORY AND RESULTS

Fiscal Year/s	Dollars Spent	Acres (Inventoried and Managed)	Number of Projects
2006-2007	$365,000	27,375	31
2008	$435,660	26,523	32
2009	$610,807	40,000 est.	47
2010	$606,777	27,955 + 40,000 from aerial survey	42
2011	$438,000	18,258	33
2012	$178,340	24,989 + 13,500 from aerial survey	26
2013	$160,000	7,547	22
2014	$144,249	11,860	18
2015	$270,674	12,994	26
2016	$192,339	5,501	23
2017	$219,834	5,755	21
2018	$173,824	6,592	24
2019	$245,727	6,186	21
2020	$165,735	2,331	24

FISCAL YEAR 2020 FUNDING DISTRIBUTION



The following species were inventoried and/or managed in fiscal year 2020 projects:

Amur maple, bigleaf lupine, bird's foot trefoil, Bohemian knotweed, bull thistle, burdock, Canada thistle, common buckthorn, crown vetch, garlic mustard, glossy buckthorn, Japanese hops, Japanese knotweed, leafy spurge, meadow hawkweed, meadow knapweed, moth mullein, nonnative bush honeysuckles, orange hawkweed, Oriental bittersweet, ox-eye daisy, poison hemlock, Queen Anne's lace, reed canary grass, Russian olive, Siberian elm, Siberian peashrub, spotted knapweed, tansy, and wild parsnip.

Outreach and Communication

The Invasive Species Program worked with the DNR Forestry Division to update the DNR terrestrial invasive plant webpages including the homepage and more than 50 individual plant species pages. From January 1, 2020 to September 29, 2020, the terrestrial invasive plants homepage had 22,566 views, the buckthorn webpages had 57,371 views, and the individual species webpages (not including buckthorn) had 83,870 views.

The DNR created two videos on jumping worms and posted them online. They are titled: "Invasive jumping worms: Impacts and prevention" and "Jumping worms: What anglers should know". The DNR issued a news release about jumping worms on August 31, 2020. Page views of the DNR jumping worm webpage increased more than 150% over the previous year, hundreds of people contacted the DNR with questions and reports, and by October 2020 the videos had been viewed more than 14,000 times. More than 140 confirmed reports were shared using EDDMapS.org.

Research

In 2017, the Technical Advisory Group for Biological Control Agents of Weeds recommended that the root mining weevil, *Ceutorhynchus scrobicollis* be released for the biological control of garlic mustard in the United States. As of 2020, the U.S. Department of Agriculture continues to work with the U.S. Fish and Wildlife Service on the next regulatory steps. The University of

Minnesota (U of MN) completed additional research on biological control weevils.

The program collaborated with U of MN researchers in the launch of the "Jumping worms in Minnesota" research project that focuses on detecting jumping worms, understanding their survival and pathways of spread, and studying potential management methods.

The program collaborated with U of MN researchers in the launch of the "Forecasting life cycles of Japanese knotweed and wild parsnip for better management in Minnesota" research project that tracks phenology of these plants through experiments and community science.

The DNR also partnered on the ongoing U of MN projects "Using plants to control buckthorn" and "Will future weather favor Minnesota's woody invaders?" by providing information on site selection and other data available through the department.

Research funding for these five projects was supported by the Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC), through an appropriation from the Environmental and Natural Resources Trust Fund.

PARTNERSHIPS

Minnesota Department of Agriculture

The Minnesota Department of Agriculture (MDA) is the state regulatory lead for terrestrial invasive plant pests (such as emerald ash borer and gypsy moth) and noxious weeds. Visit mda.state.mn.us.

The DNR is a member of the Noxious Weeds Advisory Committee convened by the MDA to evaluate plant species for invasiveness, difficulty of control, cost of control, benefits, and amount of injury caused by the species. For each species evaluated, the committee recommends to the MDA commissioner whether the species should be placed on a noxious weed list. Visit mda.state.mn.us/plants/pestmanagement/weedcontrol/mnnwac.

Minnesota DNR's Forest Health Program

The DNR Forest Health Program in the Forestry Division is responsible for surveys, evaluations, and impact assessments of forest pests and diseases as well as technical assistance on tree and forest health and invasive species. Visit dnr.state.mn.us/treecare/forest_health.

PlayCleanGo

The PlayCleanGo program is built around partnering and using consistent messaging to prevent the introduction and spread of invasive species. As of October 2020, PlayCleanGo had 647 partners in the United States, Canada and Mexico. Visit playcleango.org.

Minnesota Invasive Species Advisory Council

The Minnesota Invasive Species Advisory Council (MISAC) continues to provide a mechanism for interagency and inter-organization communication and collaboration on invasive species issues. The program collaborated with MISAC members in the development of the "MISAC Ratings of Invasive Species of Concern to Minnesota". MISAC produced a 2021 wall calendar highlighting 12 invasive species and issues of concern to Minnesotans. Visit mninvasives.org.

Minnesota Invasive Terrestrial Plants and Pests Center

The Minnesota Invasive Terrestrial Plants and Pests Center (MITPPC) at the University of Minnesota focuses on science-based solutions to protect Minnesota's prairies, forests, wetlands, and agricultural resources. Funding for this work is provided by the Environment and Natural Resources Fund (ENRTF). Five MITPPC projects are highlighted in the research section of this chapter. In total, 14 projects involve a level of coordination and collaboration between MITPPC researchers and DNR staff. Visit mitppc.umn.edu to view current research projects.

FUTURE NEEDS AND PLANS

There is an ongoing need to expand awareness, data, tools and resources to reduce impacts of terrestrial invasive species in Minnesota. The DNR's future focus includes continuing outreach on jumping worms, updating the DNR's invasive species operational order, assisting in the update of MISAC's statewide invasive species management plan, verifying invasive species reports in EDDMapS.org, updating additional DNR terrestrial invasive species webpages, and preparing for the 2021 state fair. Funding for terrestrial invasive species work has decreased since 2010. The terrestrial invasive species program plans to continue to work to meet the growing needs for outreach materials, data, tools and resources.

Ecological and Water Resources Division Districts by County

Northwest Region (1 - Bemidji)

North district: Beltrami, Cass, Clearwater, Hubbard, Kittson, Lake of the Woods, Marshall, Pennington, Polk, Red Lake, Roseau, and Wadena

South district: Becker, Clay, Douglas, Grant, Mahnomen, Norman, Otter Tail, Pope, Stevens, Traverse, and Wilkin

Northeast Region (2 - Grand Rapids)

East district: Carlton, Cook, Lake, and St. Louis

West district: Aitkin, Crow Wing, Itasca, Koochiching, and Pine

Central Region (3 - St. Paul)

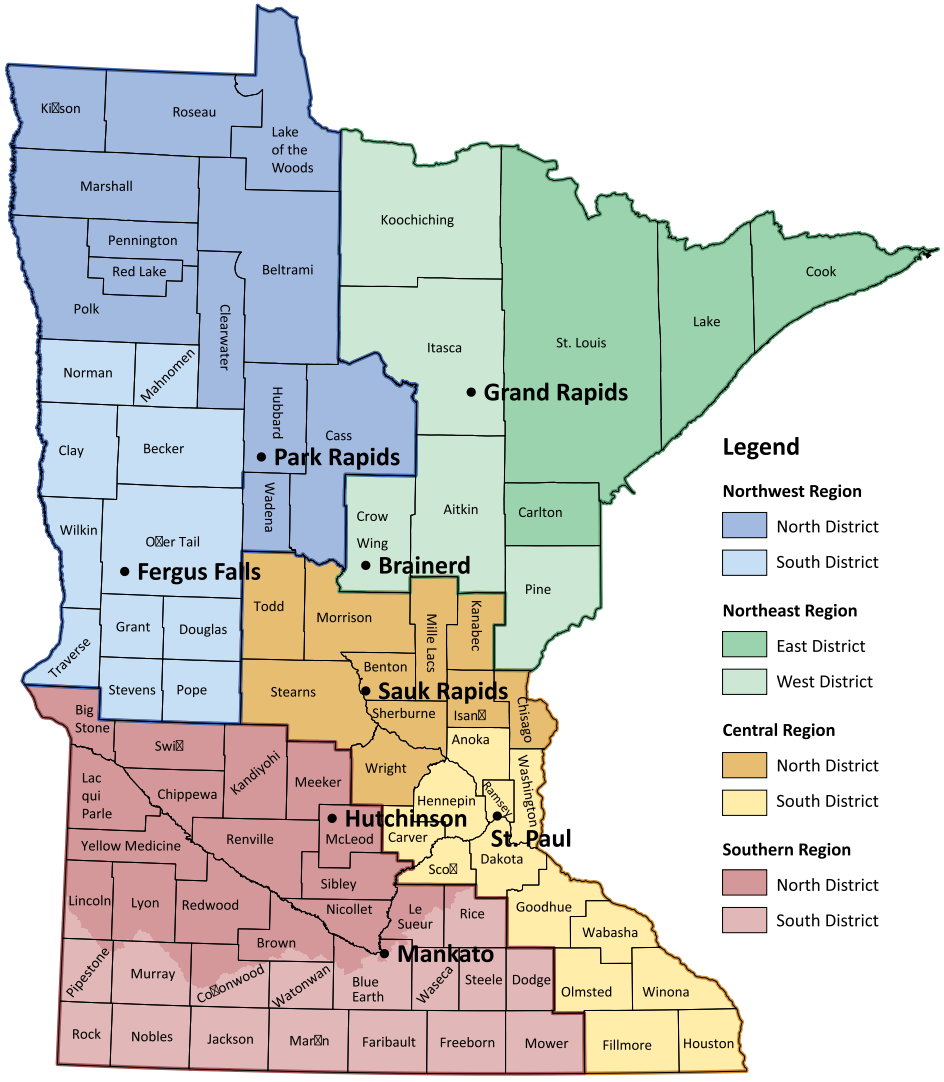
North district: Benton, Chisago, Isanti, Kanabec, Mille lacs, Morrison, Sherburne, Stearns, Todd and Wright

South district: Anoka, Carver, Dakota, Fillmore, Goodhue, Hennepin, Houston, Olmsted, Ramsey, Scott, Wabasha, Washington, and Winona

Southern Region (4 - New Ulm)

North district: Big Stone, Brown, Chippewa, Cottonwood—north of the Minnesota River, Kandiyohi, Lac qui Parle, LeSueur—north of the Minnesota River, Lincoln, Lyon, McLeod, Meeker, Nicollet, Redwood, Renville, Sibley, Swift, and Yellow Medicine

South district: Blue Earth, Cottonwood—south of the Minnesota River, Dodge, Faribault, Freeborn, Jackson, LeSueur—south of the Minnesota River, Martin, Mower, Murray, Nobles, Pipestone, Rice, Rock, Steele, Waseca, and Watonwan



Appendix A INVASIVE SPECIES PROGRAM STAFF

Felix Amenumey
Aquatic Invasive Species Trainer
Central and Southern Regions

Chelsey Blanke
Pathways and Plans Analyst
Central Office, St. Paul

Michael Bolinski
Watercraft Inspection
Program Supervisor
Northwest Region, Fergus Falls

Kylie Cattoor
Natural Resource Specialist
Central Region, South district,
St. Paul

Wendy Crowell
Aquatic Invasive Species
Management Consultant
Central Office, St. Paul

Adam Doll
Watercraft Inspection
Program Coordinator
Central Office, St. Paul

Tina Fitzgerald
Aquatic Invasive Species
Prevention Planner
Central and Southern Regions

Jessamyn Foley
Watercraft Inspection
Program Assistant
Northeast Region, Brainerd

Nick Frohnauer
Invasive Fish Coordinator
Central Office, St. Paul

Emelia Hauck-Jacobs
Natural Resource Specialist
Central Region, North district,
Sauk Rapids

Christine Hokkala-Kuhns
Watercraft Inspection Program
Supervisor
Central Region, Sauk Rapids

Jeannine Howland
Watercraft Inspection
Program Assistant
Central Region, St. Paul

Keri Hull
Watercraft Inspection
Program Supervisor
Northeast Region, Brainerd

Phil Hunsicker
Aquatic Invasive Species
Prevention Planner
Northeast and Northwest Regions

Greg Husak
Communications/Information
Officer
Central Office, St. Paul

Christine Jurek
Invasive Species Specialist
Central Region, North district,
Sauk Rapids

Eric Katzenmeyer
Invasive Species Specialist
Southern Region, North district,
Hutchinson

Travis Kinsell
Watercraft Inspection Supervisor
Southern Region, Hutchinson

Nicole Kovar
Invasive Species Specialist
Northwest Region, North district,
Park Rapids

April Londo
Natural Resource Specialist
Central Region, South district,
St. Paul

Keegan Lund
Invasive Species Specialist
Central Region, South district,
St. Paul

Carrie Maurer-Ackerman
Aquatic Invasive Species Trainer
Northeast and Northwest Regions

Gary Montz
Research Scientist 2
Central Office, St. Paul

Anna Ness
Watercraft Inspection
Program Assistant
Northwest Region, Fergus Falls

Kelly Pennington
Aquatic Invasive Species
Prevention Consultant
Central Office, St. Paul

Tim Plude
Invasive Species Specialist
Northeast Region, West district,
Brainerd

Mark Ranweiler
Invasive Species Specialist
Northwest Region, South district,
Fergus Falls

Richard Rezanka
Invasive Species Specialist
Northeast Region, East district,
Grand Rapids

April Rust
Training Coordinator
Central Office, St. Paul

Laura Van Riper
Terrestrial Invasive
Species Coordinator
Central Office, St. Paul

Carli Wagner
Invasive Species Specialist
Southern Region, South district,
Mankato

Jake Walsh
Research & Grants Coordinator
Central Office, St. Paul

Heidi Wolf
Invasive Species
Program Supervisor
Central Office, St. Paul

Jan Shaw Wolff
Ecosystem Management and
Protection Section Manager
Central Office, St. Paul

Appendix B

WATER BODIES LISTED AS INFESTED IN 2020

This table includes all water bodies added to the infested waters list in 2020. Explanations of the last two columns are below:

- **Year species was first confirmed**, or connected water body: Either 1) the year in which we first confirmed a population of the aquatic invasive species in the water body, or 2) "connected" to indicate that we listed the water body because it is connected to a water body where the aquatic invasive species has been confirmed; this column may also contain the name and/or Lake ID number of the connected, confirmed water body.
- **Lake ID number:** an identifying number the DNR uses for lakes. Ponds and wetlands that are not on the public waters inventory are listed with "none" in the number column. Most rivers and streams on the public waters inventory are listed without a number or "NA" in the number column; some river pools are identified with a Lake ID number.

WATER BODY NAME	COUNTY OR COUNTIES	LISTED FOR AQUATIC INVASIVE SPECIES	YEAR SPECIES WAS FIRST CONFIRMED, OR CONNECTED WATER BODY	LAKE ID NUMBER
Aaron	Douglas	zebra mussel	2020	21-0242
Armour #2 Mine	Crow Wing	zebra mussel	2020	18-0438
Ball Club	Itasca	zebra mussel	2020	31-0812
Big	Sherburne	zebra mussel	2020	71-0082
Big Elk	Sherburne	Eurasian watermilfoil	2020	71-0141
Big Mantrap	Hubbard	Eurasian watermilfoil	2020	29-0151
Big Pine	Otter Tail	zebra mussel	connected to East Loon (56-0523)	56-0130
Big Watab	Stearns	zebra mussel	2020	73-0102
Birch	Sherburne	Eurasian Watermilfoil	2020	71-0057
Boulder	Hubbard	faucet snail	2020	29-0162
Bowstring	Itasca	zebra mussel	2020	31-0813
Bowstring River between Bowstring and Sand (31-0826)	Itasca	zebra mussel	connected to Bowstring Lake (31-0813)	NA
Bryant	Hennepin	brittle naiad	2020	27-0067
Carnelian	Stearns	starry stonewort	2020	73-0038
Dade	Cass	zebra mussel	connected to Sylvan (11-0304)	11-0214

WATER BODY NAME	COUNTY OR COUNTIES	LISTED FOR AQUATIC INVASIVE SPECIES	YEAR SPECIES WAS FIRST CONFIRMED, OR CONNECTED WATER BODY	LAKE ID NUMBER
Duck	Hennepin	Eurasian watermilfoil	2020	27-0069
Elk River downstream from Lake Orono (71-0013) to the Mississippi River	Sherburne	zebra mussel	connected to Orono (71-0013)	
Farm Island	Aitkin	zebra mussel	2020	01-0159
Jolly Ann	Otter Tail	zebra mussel	connected to Eagle (56-0253)	56-0370
Little Pine	Aitkin	zebra mussel	connected to Farm Island (01-0159)	01-0176
Little Pine	Otter Tail	zebra mussel	connected to East Loon (56-0523)	56-0142
Little Red Sand	Cass	zebra mussel	connected to Sylvan (11-0304)	11-0318
Long	Hubbard	zebra mussel	2020	29-0161
Long	Becker	zebra mussel	2020	03-0383
Louise Mine Pit	Crow Wing	zebra mussel	2020	18-0440-04
Middle	Otter Tail	zebra mussel	connected to Eagle (56-0253)	56-0252
Minnie Belle	Meeker	zebra mussel	2020	47-0119
Mississippi River, Pool 4	Multiple	flowering rush	2020	79-0005
Mississippi River, Pool 5	Multiple	flowering rush	2020	79-0001
Mississippi River, Pool 8	Multiple	flowering rush	2020	28-0005
Mitchell	Sherburne	zebra mussel	2020	71-0081
Moses	Douglas	zebra mussel	connected to Aaron (21-0242)	21-0245
Mud	Hennepin	Eurasian watermilfoil	2020	27-0186
Mud	Otter Tail	zebra mussel	connected to East Loon (56-0523)	56-0222
Murphy	Scott	Eurasian watermilfoil	2020	70-0010
Nokasippi River, 500 feet upstream from Upper South Long (18-0096)	Crow Wing	Eurasian watermilfoil	conected to Upper South Long (18-0096)	none
Oak	Carver	Eurasian watermilfoil	2020	10-0093

WATER BODY NAME	COUNTY OR COUNTIES	LISTED FOR AQUATIC INVASIVE SPECIES	YEAR SPECIES WAS FIRST CONFIRMED, OR CONNECTED WATER BODY	LAKE ID NUMBER
Orono	Sherburne	Eurasian watermilfoil	2020	71-0013
Orono	Sherburne	zebra mussel	2020	71-0013
Otter Tail River from Big Pine (56-0130) to Rush (56-0141)	Otter Tail	zebra mussel	connected to East Loon (56-0523)	
Pickerel	Ottertail	zebra mussel	2020	56-0475
Pierson	Carver	zebra mussel	2020	10-0053
Pleasant	Wright	zebra mussel	2020	86-0251
Ripple River between Farm Island (01-0159) and Little Pine (01-0176)	Aitkin	zebra mussel	connected to Farm Island (01-0159)	none
Ripple River from Bay Lake to Farm Island Lake	Crow Wing	zebra mussel	connected to Tame Fish (18-0002)	
Serpent Creek between Serpent Lake (18009000) and Armour #2 mine	Crow Wing	zebra mussel	connected to Armour #2 mine	
Smetana	Hennepin	Eurasian watermilfoil	2020	27-0073
St. Clair	Becker	zebra mussel	connected to Long (3-0383)	03-0382
Stream connections from Long Lake (03038300) to Pelican River	Becker	zebra mussel	connected to Long (3-0383)	
stream segment between Aaron (21-0242) and Moses (21-0245)	Douglas	zebra mussel	connected to Aaron (21-0242)	NA
Sylvan	Cass	zebra mussel	2020	11-0304
Tame Fish	Crow Wing	zebra mussel	2020	18-0002
Unnamed	Becker	zebra mussel	connected to Long (3-0383)	03-1162
Unnamed stream between Eagle (56-0253) to Middle (56-0252) to Jolly Ann (56-0370)	Otter Tail	zebra mussel	connected to Eagle (56-0253)	NA

WATER BODY NAME	COUNTY OR COUNTIES	LISTED FOR AQUATIC INVASIVE SPECIES	YEAR SPECIES WAS FIRST CONFIRMED, OR CONNECTED WATER BODY	LAKE ID NUMBER
Unnamed stream between Long (56038800) and the Otter Tail River	Otter Tail	zebra mussel	connected to East Loon (56-0523)	NA
Upper Sakatah	Le Sueur	Eurasian watermilfoil	2020	40-0002
Villard	Pope	zebra mussel	2020	61-0067

DEPARTMENT OF NATURAL RESOURCES

ECOLOGICAL AND WATER RESOURCES

500 Lafayette Road, St. Paul, MN 55155-4025

651-259-5100

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