Minnesota
DEPARTMENT OF NATURAL RESOURCES

Invasive Species of Minnesota

Annual Report for 2013

DNR Contact Information

DNR Ecological and Water Resources in St. Paul: 500 Lafayette Road, Box 25, St. Paul, MN 55155, 651-259-5100.
For current AIS regulations, a list of infested waters, species information, and local DNR contacts, visit www.mndnr.gov/AIS.

DNR Information Center

Twin Cities: 651-296-6157
Minnesota Toll Free: 1-888-646-6367
Telecommunication device for the deaf (TDD): 651-296-5484
TDD Toll Free: 1-800-657-3929

This information is available in an alternative format on request.
Equal opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available regardless of race, color, national origin, sex, sexual orientation, marital status, status with regard to public assistance, age, or disability. Discrimination inquiries should be sent to Minnnesota DNR, 500 Lafayette Road, St. Paul, MN 55155-4031; or the Equal Opportunity Office, Department of the Interior, Washington, DC 20240.

Submitted to:
Environment and Natural Resources Committees of the Minnesota House and Senate
This report should be cited as follows: Invasive Species Program. 2013. Invasive Species of Aquatic Plants and Wild Animals in Minnesota: Annual Report for 2013. Minnesota Department of Natural Resources, St. Paul, MN. All images in this report are ©MNDNR unless otherwise credited.

The total cost to produce this report: Preparation $9,962.50, Printing $2,855.00 for 500 copies.

Front cover:
K-9 'Brady' searches for zebra mussels with his partner Julie Siems, DNR Water Resources Enforcement Officer.

Executive Summary

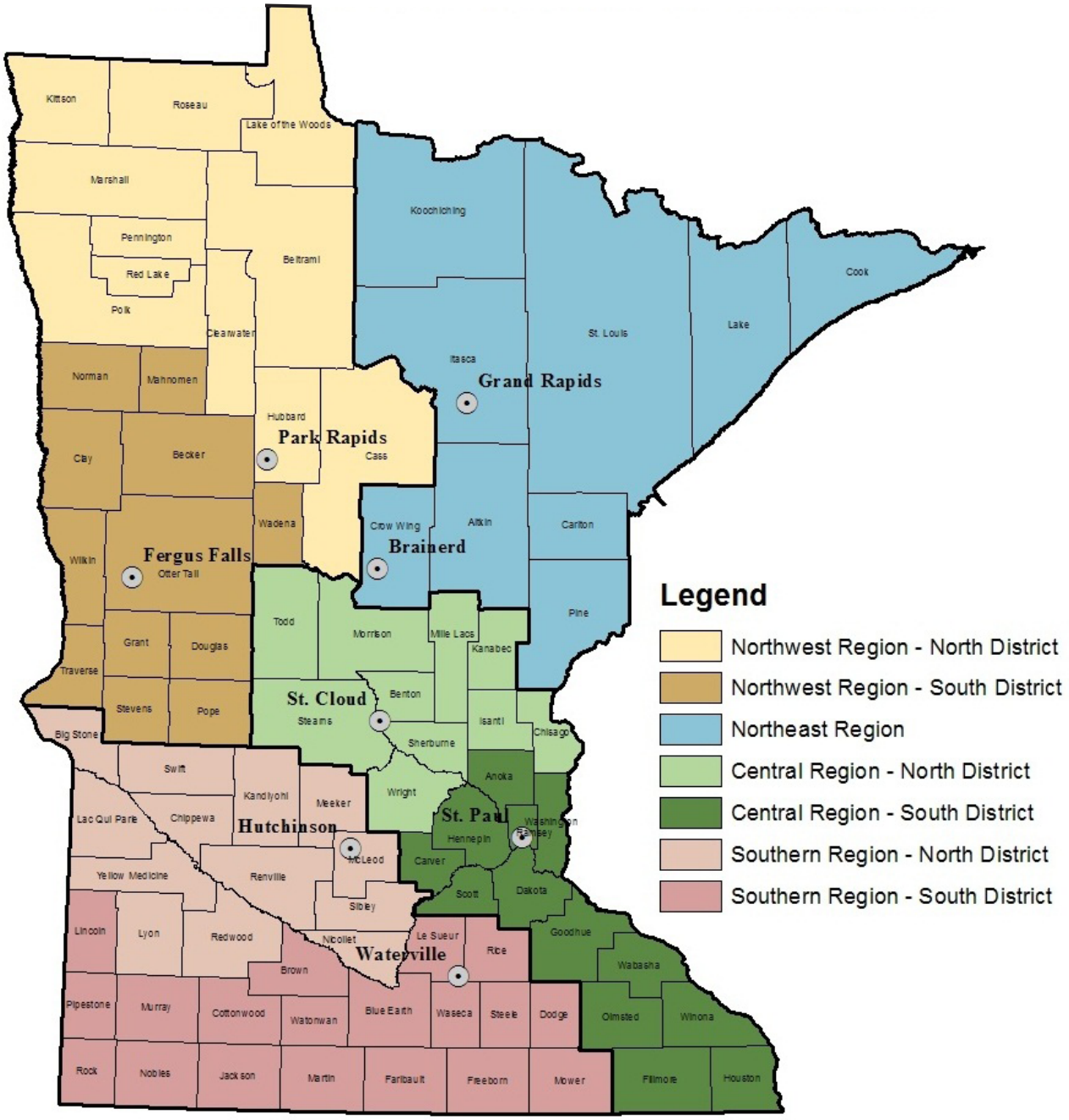
The Minnesota Department of Natural Resources (DNR) is pleased to submit the 2013 Invasive Species Annual Report to the governor, legislature, and citizens of Minnesota. This report summarizes the prevention and management efforts we have pursued to contain and control invasive species of aquatic plants and wild animals in Minnesota.

The first few chapters provide an overview of program activities, finances, and prevention efforts, followed by goals, highlights, partnerships, and future needs for individual program areas.

This report covers activities that took place in Calendar Year 2013: January 1 to December 31, 2013. However, to provide a comprehensive review of expenditures (and meet the report's January 15, 2013 due date), we include expenditures incurred in Fiscal Year 2013: July 1, 2012 to June 30, 2013.

Table of Contents

Minnesota Department of Natural Resources Administrative Regions



Map of DNR Administrative Regions

Invasive Species Program Overview

Invasive species have the potential to cause serious problems in Minnesota. Evidence from numerous locations in North America, and from around the world, demonstrates that these nonnative species are a threat to the state's natural resources and local economies that depend on natural resources.

Keegan Lund, DNR AIS Specialist, inspects a dock for invasive species with the homeowner looking on.

To address the problems caused by invasive species, the 1991 Minnesota Legislature directed the Minnesota Department of Natural Resources (DNR) to establish the Invasive Species Program. The program is designed to implement actions to prevent the spread of invasive species and manage invasive aquatic plants and wild animals (Minnesota Statutes 84D).

Most of the invasive species prevention and management activities are conducted or directed by staff from DNR's Division of Ecological and Water Resources – Invasive Species Program. In addition, the program hires approximately 150 seasonal staff during the summer to inspect boats at public water accesses and help implement management activities. In total, the equivalent of more than 25 full-time positions is focused on invasive species work.

Goals

The three primary goals of the DNR Invasive Species Program are to:

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

The DNR's Invasive Species Program addresses many species that are present in Minnesota, such as Eurasian watermilfoil, purple loosestrife, zebra mussels, and spiny waterfleas. The program also attempts to prevent the introduction of invasive species that have the potential to move into Minnesota, for example, hydrilla and water chestnut. To do so, the program identifies potentially invasive species in other areas of North America and the world, predicts pathways of spread, and develops and implements solutions that reduce the potential for introduction and spread.

Prevention activities are often undertaken in collaboration with other states, agencies, and partners with similar concerns. Prevention efforts today not only reduce the spread of invasive species, but also buy critical time needed for research and management that may provide long-term control solutions.

The program also addresses terrestrial plant species on DNR-managed lands. Within the DNR, our goal is to enhance the ability of field staff to manage terrestrial invasive plants effectively. Key strategies include:

1. Coordinate inventories of public lands for the presence of invasive species;
2. Gather, maintain, and share knowledge of integrated pest management (chemical, mechanical, and biological control) for terrestrial invasive plants;
3. Fund management efforts on state-managed lands; and
4. Develop or improve management practices through research (i.e., biological control).

Highlights

- In 2013, businesses offering decontamination services were added to the definition of lake service provider in Minnesota Statutes. Over the summer, the DNR offered three hot-water/high-pressure decontamination skills training sessions. More than 20 participants attended these trainings.

Rich Rezanka, DNR AIS Specialist, focuses on plankton sampling at Mille Lacs Lake.

- Minnesota participated in the development of a multi-state public service announcement video promoting the importance of preventing the spread of aquatic invasive species.

- The DNR designed a completely new invasive species exhibit for the Minnesota State Fair featuring the *Stop Aquatic Hitchhikers!* and *PlayCleanGo* campaigns.

- In the spring of 2013, the Enforcement Division launched a new AIS canine unit consisting of three trained zebra mussel detecting dogs.

- In addition to DNR inspectors, the DNR provided watercraft inspection training to 298 tribal and local government unit (LGU) authorized inspectors working throughout the state.

- Results from research projects conducted by University of Minnesota researchers (and partially funded by the DNR) to study the impact of lake-wide herbicide treatment of curly-leaf pondweed were published in 2012. The DNR is using this information to help guide its Invasive Aquatic Plant Management Program.

- To help prevent the migration of Asian carp into southwest Minnesota through the Iowa Great Lakes, Minnesota partnered with the Iowa DNR to install an electric barrier at the outlet of Lower Gar Lake, near the Minnesota-Iowa border.

- Preliminary work was started to examine the amount of water left in a typical watercraft (with the drain plug removed) to determine if veligers were present in the residual water.

Partnerships

Invasive species are one of the top conservation challenges of our time and a high priority for the DNR. To address these challenges, the department works in partnerships at many levels.

Local Partnerships

- Local entities, including LGUs, tribal governments, lake associations, and recreationalists, among others, play a key role in managing invasive plants, and providing prevention activities, including authorized inspections and enforcement, public awareness, and educational activities.

Departmental and other State Entity Partnerships

- Staff from the DNR divisions of Fish and Wildlife and Enforcement, and the Office of Communication and Outreach contribute significantly to the implementation and coordination of invasive species activities

Emerald ash borer. Photo: David Cappaert, Michigan State University, Bugwood.org.

- The DNR and the Minnesota Department of Agriculture (MDA) administer prevention and control programs for other invasive species in Minnesota. The DNR's Division of Forestry, working in cooperation with the MDA, is charged with surveying and controlling forest pests, including nonnative organisms such as bark beetles.

- The MDA is the lead regulatory agency to address terrestrial invasive species – e.g., noxious weeds, gypsy moth, emerald ash borer, and sudden oak death – under authority in Minnesota Statutes, Chapter 18G, H, J and Chapters 18 and 21. Information about control, prevention, and regulatory programs for several terrestrial invasive species, plant pests, and noxious weeds may be obtained from the MDA.

- The University of Minnesota Sea Grant Extension has an Aquatic Invasive Species Information Center in Duluth. The center promotes education and outreach to prevent the spread of aquatic invasive species in the state.

- The DNR also works in close partnership with the newly formed Minnesota Aquatic Invasive Species Research Center at the University of Minnesota providing input and feedback on research needs aimed at managing the AIS challenge.

Participation in Statewide, Regional, and National Groups

- In late 2012, the DNR convened the AIS Advisory Committee. This committee was appointed by DNR Commissioner Tom Landwehr to help the DNR maintain strong relationships with AIS stakeholders and garner their advice and recommendations on program activities.

- The Invasive Species Program, along with other agencies in the state, participates in statewide groups such as the Minnesota Invasive Species Advisory Council (MISAC) and the Noxious Weed Advisory Committee.

- The Invasive Species Program participates in multiple regional and federal activities regarding invasive species. Membership on panels, such as the Mississippi River Basin and Great Lakes Panels on aquatic nuisance species, helps keep program staff informed of regional and federal efforts regarding invasive species and provides a voice for Minnesota interests.

- In addition, the DNR is involved with several regional groups, including but not limited to:
  - Asian Carp Regional Coordination Committee;
  - Association of Fish and Wildlife Agencies - Invasive Species Committee;
  - St. Croix River Zebra Mussel Task Force (see Appendix B);
  - National garlic mustard biocontrol working group; and
  - Council of Great Lakes Governors' Aquatic Invasive Species Task Force.

Implementation of a Statewide Invasive Species Management Plan

After several years of development by MISAC, the *Minnesota State Management Plan* for Invasive Species was completed in November 2009. The plan provides a framework for addressing both aquatic and terrestrial invasive species and includes strategies and actions to address the main issues related to invasive species:

- Prevention of new introductions into the state;
- Early detection and rapid response to new introductions;
- Containment of populations; and
- Management of established populations to reduce their harm.

The plan also provides opportunities for improved coordination and partnerships between federal, state and local governments, tribes, conservation organizations, and others working to minimize the impacts caused by invasive species in the state. The DNR continues to work to implement the plan.

Wild parsnip is a prohibited noxious weed. It can cause severe burns if you get the sap on your skin and your skin is exposed to sunlight.

Program Finances

Timeframe

This report covers activities that took place in calendar year 2013: January 1 to December 31, 2013. However, to provide a comprehensive review of expenditures and to coordinate with the state funding cycle, we include expenditures incurred in fiscal year 2013: July 1, 2012 to June 30, 2013.

Funding Sources

Funding for the Invasive Species Program comes from a variety of sources, including:

State Funds

- $1.3 million from a $5 surcharge on watercraft registration in Minnesota $765,000 from a $5 fee on non-resident fishing licenses.
- $1,618,000 from a general fund appropriation (of this amount, $300,000 supported the terrestrial invasive species program).
- $1 million from the Heritage Enhancement Fund.
- $2,513,000 from the Environment and Natural Resources Trust Fund (ENRTF).

Federal Funds

- Funds from the U.S. Fish and Wildlife Service (USFWS) support the implementation of the *Minnesota State Management Plan for Invasive Species* including, public awareness efforts, enforcement, and watercraft inspections. In 2013, federal expenditures totaled $400,000.

Local Funds

- During 2013, local groups provided funding totaling $1.1 million to control aquatic invasive plants. Local groups also provided funds for local watercraft inspections and education, however this amount is not recorded by the DNR.

Cost Accounting

Minnesota Statute (M.S. 84D.02 Subd. 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.

1. **Administration** – includes general office supplies, office rent, telephones, workers' compensation fees, computer support fees, 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.

2. **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 aquatic invasive species. 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's website.

3. **Management/Control** – includes staff time, in-state travel expenses, fleet charges, commercial applicator contracts, and supplies to survey the distribution of aquatic invasive species 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 or curly-leaf pondweed management efforts also are included.

4. **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.

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

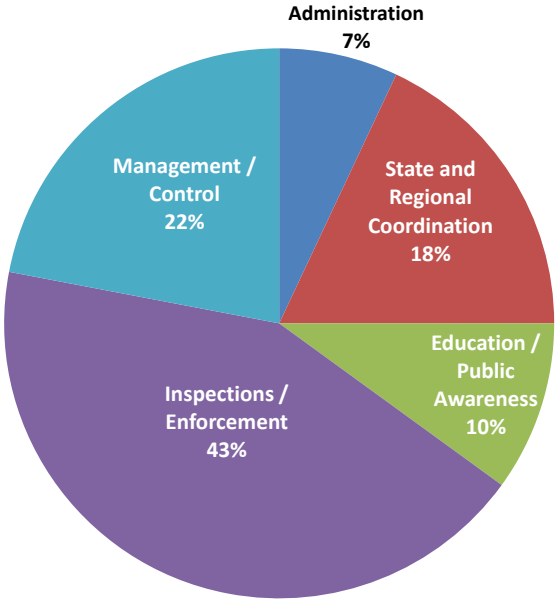
6. **State and Regional Coordination** – includes general program planning, preparation of state plans and reports, and general invasive species coordination with a wide variety of groups. This category includes the work of program staff, as well as various managers in the Division of Ecological and Water Resources, 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 aquatic invasive species issues; work activities that staff participate in to improve their skills, direct co-workers, or help on other projects; as well as fleet costs and the cost to purchase and repair boats, trailers, computers, and similar items.

Fiscal Year 2013 Expenditures by Category

Expenditures on aquatic invasive species activities during Fiscal Year 2013 (July 1, 2012 to June 30, 2013) totaled $8,537,891.

The pie chart below provides a broad look at aquatic invasive species spending by category. The Inspections/Enforcement category represents the largest segment of the budget, accounting for over 43% of expenditures. These funds supported a substantial effort in enforcement and watercraft inspections relative to prevention efforts. Individual chapters of this report provide details on the activities accomplished with these funds. The focus on inspections and enforcement, along with Education/Public Awareness (which represents an additional 10% of FY13 spending), reflects the priority the DNR places on efforts to prevent the spread of invasive species and to help manage the problems those species cause.

Most of the funding for Management/Control was spent on Eurasian watermilfoil and curly-leaf pondweed. Funding was used for inventory, control, and grants for management of these two species.



Fiscal Year 2013 Invasive Species Program spending (Invasive Species Account, General Fund, Heritage Enhancement Fund, the Environment and Natural Resources Trust Fund, and federal dollars) by major categories.

Fiscal Year 2013 Income and Expenditures

The table below lists income from federal, state, and local sources, and expenditures from the Invasive Species Account and General Fund account. It also lists spending from other accounts, including grants received from various state or federal funding sources, such as ENRTF recommended appropriations and the USFWS.

The terrestrial invasive species program expended $298,377 in FY13. The work was funded exclusively from the General Fund and by grants from other organizations. Accomplishments for terrestrial invasive species management activities begin on page 49.

In FY13, $3,311,889 was spent from the Invasive Species Account; which is less than the $3,742,000 appropriated by the Legislature. The unspent FY13 funds remain in the Invasive Species Account. General Fund expenditures were $1,813,363; slightly more than the $1,618,000 appropriated due to roll forward of unspent funds in FY12.

FY 2013 Income						**Total**
Federal Funding: Implement State Management for Aquatic Nuisance Species						$400,000[1]
State and Local Funding	Invasive Species Account	General Fund	Local Contributions	LCCMR	Heritage Enhancement	
	$3,742,000	$1,618,000	$1,100,000	$2,513,000	$1,000,000	$9,973,000[2]

FY 2013 Expenditures						
	Invasive Species Account	General Fund	Local Contributions	LCCMR	Heritage Enhancement	Other
Administration	$335,777	$112,078		$73,656	$50,700	$24,867[3]
State / Regional Coordination	$583,940	$221,255		$579,385		
Education/Public Awareness	$98,465				$449,300	$273,279
Management/Control - Aquatic - Terrestrial	$927,021	$207,010 $298,377	$1,100,000	$533,327		
Inspections/Enforcement	$1,303,686	$974,643		$639,067	$478,102	$309,956[3]
Research - Aquatic - Terrestrial	$63,000					
TOTAL EXPENDITURES: Federal, State, and Local	$3,311,889	$1,813,363	$1,100,000	$1,825,435	$978,102	$608,102

[1]Federal grant to implement State Management Plan for Aquatic Nuisance Species, awarded in 2013 – will be used for 2014 calendar year.
[2]Total includes local match for invasive aquatic plant control.
[3]Federal grant to implement State Management Plan for Aquatic Nuisance Species, awarded in 2012.

Prevention and Containment

Goals

The desired outcomes for prevention and containment are to:

- Seek to prevent the introduction of new invasive species in Minnesota; and
- Continue to contain infestations where eradication is not possible.

Highlights

Early Detection and Rapid Response

No new aquatic invasive species (AIS) were discovered in the waters of the state in 2013. In cooperation with the White Earth Reservation, the DNR checked approximately 45 leeching ponds in Becker County (Region 1) and found no new infestations of faucet snails.

Prevention Grants

In 2013, the DNR continued to provide grants to local groups and government entities to help prevent the spread of aquatic invasive species into Minnesota waters. Below are the types of grants available through the DNR's Prevention Grant Program. Look for detailed information about these grants in the relevant chapters of this report.

- **Aquatic invasive plant control**: 158 grants were awarded in 2013. While we have not received final accounting for all control projects, reimbursements to date total $580,000. We anticipate paying out an additional $60,000 for work completed in 2013.
- **Public awareness**: 22 groups received a total of $74,452 in grants for advertising and educational material.
- **AIS signage for water accesses**: approximately 8 large *Stop Aquatic Hitchhikers!* signs and 10 small signs were provided in 2013.
- **Watercraft inspections**: 27 local entities received DNR staff time valued at $77,856 for watercraft inspections, providing a total of 10,046 hours. An additional 22 grants totaling $223,933 were provided to local government units (LGUs) to hire their own watercraft inspectors during 2013.

These grants help lake associations, local citizen groups, coalitions of lake associations (COLAs), and LGUs (e.g., conservation districts, lake improvement districts, watershed districts, and counties) implement locally focused AIS prevention activities. Local entities are encouraged to dovetail their actions with other ongoing statewide aquatic invasive species prevention efforts.

One example of a statewide prevention effort is the *Stop Aquatic Hitchhikers!* campaign, which is being implemented by the DNR, Minnesota Sea Grant, Wildlife Forever, and the U.S. Fish and Wildlife Service.

New Infestations of Aquatic Invasive Species

New infestations of aquatic invasive species already known to occur in Minnesota – such as zebra mussels, spiny waterfleas, and Eurasian watermilfoil – were discovered in 2013. AIS can move through flowing waters or attach to watercraft transported through connecting channels. For this reason, the DNR may designate downstream or connected water bodies as a precaution, even though AIS have not been confirmed in that particular lake or river.

Region	Water Body Name	County Name
Northwest - 1		
Zebra mussels	Lake Latoka, Lake Mary, Lake Maple. *Also designated as infested: Skoglund Slough, Lake Grill, Lake Lobster, Lake Mina, Unnamed (21-0479 & 21-0440); Lake Turtle, Lake Long, Lake Reno (Douglas and Pope counties)*	Douglas
	Lake Lida. *Also designated as infested: Lake Venstrom*	Otter Tail
Eurasian watermilfoil	Lake Round	Douglas
	Lake Scandinavian	Pope
Northeast - 2		
Zebra mussels	Winnibigoshish Lake	Cass
	Sand Lake, Little Sand Lake	Itasca
	Whitefish Chain of Lakes: Arrowhead, Bertha, Big Trout, Clamshell, Cross, Daggett, Island, Little Pine, Loon Lake, Lower Hay, Pig, Rush-Hen, Whitefish. *Also designated as infested: Big Pine Lake, Pine River (from base of Cross Lake Dam to the confluence with Pelican Brook*	Crow Wing
Spiny waterfleas	Shagawa Lake. *Also designated as infested: Fall Lake*	Stearns
Central - 3		
Zebra mussels	Watab Lake, Watab River (downstream), Rosier Lake, Lower Watab Lake	St. Louis
Eurasian watermilfoil	Gervais Mill Pond	Ramsey
	Ham Lake	Anoka
	Goodview Lake	Winona
	Mink/Somers Lake	Wright
Flowering rush	Bald Eagle Lake	Ramsey
Brittle naiad	Purgatory Wetland	Hennepin
Southern - 4		
Eurasian watermilfoil	Clear Lake	Meeker
Flowering rush	Horseshoe Lake	LeSueur
	Sprague Lake	Rice

Regional Prevention Activities

Region 1

- In addition to completing 22,908 inspections at 44 water accesses, the program provided watercraft inspection grants to LGUs in the following counties: Otter Tail (696 inspections), Douglas (1,196 inspections), Ida Township (1,179 inspections), and Hubbard (11,017 inspections).
- Partnered with DNR Enforcement to run three AIS checkpoints. The checkpoints were successful in restricting boats illegally transporting water, vegetation, and other debris.
- Staff provided technical guidance to various counties working on AIS prevention and rapid response plans, and participated in several public awareness events and outdoor shows.

Region 2

- Posted AIS alert signs in tributaries around Mille Lacs Lake for the commercial bait harvesting industry.
- Conducted training/testing for: commercial bait dealers (Brainerd, Baudette); lake service providers (Brainerd, Grand Rapids, Bena, Duluth, Ely); decontamination training (Brainerd); volunteers provided education at water accesses (six sessions, 156 AIS volunteers); LGU employee inspectors (five sessions, 46 authorized inspectors).
- Assisted DNR Enforcement in eight roadside checkpoints.
- DNR watercraft inspectors made 26,595 contacts with the public at water accesses.

Region 3

- Posted six new AIS signs at public water accesses.
- Wrote 13 prohibited and regulated invasive species permits and issued six infested water appropriation, diversion, and transport permits.
- Conducted three training sessions for lake service providers.
- Provided technical assistance and information to numerous lake associations, LGUs, and other interested parties on invasive aquatic plant management, purple loosestrife, and prevention activities.

Region 4

- Conducted 7,202 watercraft inspections over 2,200 hours – along with two DNR Enforcement checkpoints.
- Performed public awareness activities and provided technical assistance to numerous local units of governments and citizen organizations.
- Participated in several television and radio interviews to increase public awareness of invasive species.
- Conducted five training sessions for lake service providers.

Lake Service Provider Program

Legislation authorizing a permit program for lake service providers to help prevent the spread of aquatic invasive species between waters in the state took effect in 2012. Service providers are required to enroll in AIS training and acquire a Lake Service Provider Permit before conducting work that involves placing or removing water-related equipment from any state waters. Individuals who work for a service provider must take online training and receive a training certificate. Permits and certificates are valid for three calendar years.

The Lake Service Provider Program continued to adjust and improve in its second year.

Activities

- Offered 27 statewide trainings and issued 183 permits for lake service provider owners and managers; 900 lake service provider employees completed mandatory online training.
- The current list of permitted lake service provider businesses is posted online. This list is updated automatically as training requirements are completed and permits are issued. The list included 1,008 businesses at the end of 2013.
- Improved the navigation and design of the lake service provider website at mndnr.gov/lsp and initiated lake service provider e-news updates to permitted businesses.
- Streamlined and updated the lake service provider permit process to make it easier to understand. The updated permit gives all businesses the authority to transport equipment to decontamination sites with prohibited aquatic invasive species attached.
- Offered three, free hot-water/high-pressure decontamination skills trainings to 24 participants from 19 lake service provider businesses.

Future plans

- Increase outreach to remaining lake service provider business not yet permitted, including a special emphasis on businesses that rent water-related equipment (this group was added to the legal definition of lake service providers as of July 2013).
- Pilot new lake service provider training methods, content, and testing to improve training experience, including more effective employee online training.
- In accordance with Minnesota Statutes 86B.13 AIS Prevention Program, the DNR issued a Request for Proposals to create an online AIS training and trailer decal for anyone trailering water-related equipment in Minnesota. Proposals will be reviewed and selected in January 2014 to begin work on the training for implementation in 2015.
- Prepare for an additional 900+ attendees for the 2015 training season.
- Develop an online training option for lake service provider permit holders to renew their permits every three years.

Permits

The DNR has authority to issue a number of permits that allow us to help prevent the spread of AIS. Conditions are added to permit language, and training is offered, instructing permittees on the actions needed to prevent the spread of AIS. DNR permits related to AIS include: Lake Service Provider Permits mentioned earlier in this chapter, Aquatic Plant Management Permits discussed on page 37, and the permits highlighted below. A variety of changes affecting permits were made in 2013. See the Regulations chapter for details.

Infested Waters Permits

Minnesota Rules, Chapter 6216 prohibits the diversion and transport of water from designated infested waters except by permit. In 2013, permits were requested to transport infested water and to divert infested waters.

Prohibited Invasive Species Permits

State law prohibits the possession, transport, sale, purchase, and import of prohibited invasive species except by permit. In 2013, permits with conditions to avoid spread were issued to entities that carry out research, education, or control related to prohibited invasive species in the state.

Permits to Harvest Bait from Infested Waters

Under state statutes and rules, the commercial harvest of bait from infested waters is prohibited, except by permit. DNR Fisheries issued permits to bait dealers who attended training in the past three years and passed a written test in the current year. Permits are issued with several conditions to prevent the transfer of invasive species from infested waters, including a requirement that nylon tags must be attached to equipment used in infested waters and that same gear may not be used in non-infested waters.

Future Needs

Prevention and containment are key elements in the state's plan to manage invasive species. Over the next year, we plan to continue the following efforts:

- Work with partners and stakeholders to implement prevention activities;
- Monitor the distribution of invasive species in the state;
- Assess the risks posed to Minnesota's lakes and rivers by various water-related activities; and
- Improve and refine our prevention program.

Education and Public Awareness

Goals

- To heighten public awareness of the important recreational and economic value of Minnesota's lakes, rivers, streams, and wetlands.
- To provide the public with clear actions they must take to prevent the introduction and spread of aquatic invasive species (AIS) through an understanding of the laws and best practices.
- To raise public awareness of the negative environmental and economic impacts caused by aquatic invasive species across Minnesota.
- To increase awareness of the DNR's AIS research, management, and prevention efforts, and inform stakeholders, the public, and other agencies of available training, funding, and educational resources.

Highlights

Informational Materials

- Created new materials to inform water recreationists about invasive species laws and how to prevent the spread of aquatic invaders. New products include the *Help Protect Minnesota Waters* brochure, a pocket license holder, and an updated *Purple Loosestrife* brochure. *Dear Boater* information cards explaining state AIS laws also were updated and distributed by watercraft inspectors, conservation officers, and other partnering groups.
- Updated invasive species content in the *2013 Minnesota Fishing Regulations* book, including the list of infested waters, species identification, and a back cover ad highlighting key Minnesota AIS laws. More than 900,000 copies of the fishing regulations were printed and distributed.
- With the goal of providing consistent messaging in all DNR publications, edited AIS copy in the *Mississippi River Guide*, Parks and Trails publications, the *Boating & Water Safety Workbook*, and the *Minnesota Boating Guide*. This guide is updated annually and distributed to more than 300,000 boaters.

- Included information about invasive species prevention in the 2013-14 edition of the *Explore Minnesota Fishing Guide*, a publication of Explore Minnesota Tourism. The guide targets anglers traveling to Minnesota and is widely distributed throughout the Midwest at major outdoor sports shows. It is also distributed at travel information centers across the state and provided to Minnesota outdoor retailers.

- Partnered with the Michigan and Wisconsin departments of natural resources, to create a new 30-second public service announcement (PSA) about preventing the spread of AIS. The video, filmed at landmark locations in all three states, will air beginning in spring 2014.

Advertising

- Partnered with Wildlife Forever to post nearly 50 *Stop Aquatic Hitchhikers!* billboards along key state travel routes to and from lake areas in Minnesota. The billboards were installed beginning in May and continued through September. A customized billboard targeted to waterfowl hunters was installed during the hunting season.

- Print and online advertising focused on AIS laws, highlighting the *Stop Aquatic Hitchhikers!* message, and targeting waterfowl hunters and cabin owners who remove docks in the fall. The ads were placed in specialty publications for boaters, campers, anglers, outdoor enthusiasts, and tourists, as well as outdoors or recreation sections of major daily newspapers statewide.

- We purchased advertising on major radio stations to reach large numbers of boaters and anglers in specific locations during the peak summer months. Paid ads and PSAs were aired on Minnesota News Network, reaching nearly 60 commercial radio stations throughout greater Minnesota.

- Our television advertising helps to remind viewers of the continuing concerns about invasive species in the state. A series of 30-second PSAs aired throughout the summer and into the fall on "Minnesota Bound," as well as other fishing and outdoor shows, and during morning and evening newscasts in major television markets. In addition, *Aquatic Invasive Species: Minnesota Waters at Risk* (a DVD produced in 2012) was distributed again this year to media outlets, lake associations, conservation groups, and tourism organizations.

Invasive Species Online

The DNR's web pages – covering both aquatic and terrestrial invasive species – continue to be a valuable resource for the public and partnering organizations. Highlights this year include creating new web pages for the Statewide AIS Advisory Committee, updating the AIS laws and Invasive Species Permits pages, and publishing a redesigned site for the Lake Service Provider program.

Media

Nearly 40 news releases alerting the public about invasive species activities in the state were distributed throughout the year to all major Minnesota media outlets.

We also held several media events to focus on the DNR's ongoing efforts to stop the spread of aquatic invasive species. Topics included announcing the discovery of zebra mussel veligers in Lake Winnibigoshish; discussing results of eDNA testing for invasive carp; the roll-out of invasive carp transmitter implant research; introducing the new zebra mussel detecting canine teams; reminding boaters of invasive species laws prior to the Memorial Day holiday; demonstrating new "clean and drain" areas at public boat launches; and inspecting boats and docks for winter cabin close-up. Reporters from several major media outlets attended the events, and others were able to download video footage, photographs, and additional information from the DNR's website.

Shows and Fairs

A completely new invasive species exhibit was designed for the Minnesota State Fair featuring the *Stop Aquatic Hitchhikers!* and *PlayCleanGo* campaigns. Three distinct recreational areas (a boat launch, a campsite, and a nature trail) were constructed in the DNR building with interactive games, invasive species

Minnesota State Fair visitors explored the world of invasive species and learned how to prevent their spread.

models/samples, and informational handouts. DNR staff and volunteers from partnering organizations answered visitors' questions. On Invasive Species Day, the Theater of Public Policy, a Twin Cities improv group, provided an entertaining and educational look at invasive species while performing on the DNR stage.

Invasive Species Program staff participated in county fairs, sportsmen's shows, and other special events throughout the year to educate the public and distribute literature and information. They also made presentations to lake associations and community groups to answer questions and discuss invasive species issues.

Partnerships

Other agencies and organizations in Minnesota have been cooperatively involved with public awareness efforts to prevent the spread of invasive species, and have partnered with the DNR on a variety of activities.

Wildlife Forever

Wildlife Forever continued to be a key partner to raise awareness about how to prevent the spread of aquatic invasive species. The nonprofit organization leads the *Stop Aquatic Hitchhikers!* campaign and works together with multiple partners to post highway billboards, print ads, and pubic service announcements throughout Minnesota and across the country. Wildlife Forever works with lake associations, tribal organizations, state and federal agencies, sportsmen's clubs, academia, and fishing industry organizations. In 2013, the collaborative highway billboard outreach marketing and messaging campaign they manage reached a potential of nearly 100 million impressions in Minnesota.

Minnesota Sea Grant

Minnesota Sea Grant continued to partner with the DNR, Wildlife Forever, U.S. Fish and Wildlife Service (USFWS), National Park Service, U.S. Forest Service and other organizations to support the *Stop Aquatic Hitchhikers!* and *Habitattitude* campaigns across the Great Lakes region.

- The Great Lakes Sea Grant Network (GLSGN), led by Minnesota, completed the first comprehensive regional outreach campaign in the Great Lakes. Funded through three Great Lakes Restoration Initiative grants, GLSGN and its partners generated 17.5 million impressions since 2010, resulting in more than 300 *Stop Aquatic Hitchhikers!* talks, 80 education tools produced, 200 booths hosted at boat shows and other events educating nearly 170,000 people.

- Social and mass media generated 16.5 million impressions.

- More than 75,000 teachers and students learned about AIS through *Nab the Aquatic Invader!* training workshops, events, and website; efforts supported by 300 partners across the Great Lakes region.

- A new angler survey conducted with Wildlife Forever and the North America Media Group showed that strategic e-communication using *Stop Aquatic Hitchhikers!* messages can raise awareness by 50 percent and change desired behavior to nearly 100 percent.

- A study led by the Kawishiwi Watershed Protection Project conducted with Sea Grant support showed that direct communication and outreach within a watershed can raise awareness and change desired behavior. Based on exposure to *Stop Aquatic Hitchhikers!*, 97 percent of respondents indicated they would take actions in the future to prevent the spread of AIS.

- Minnesota Sea Grant serves on a number of national and regional AIS panels and committees, and provides leadership nationally on a broad number of issues, including ballast water management.

Future Needs

- Increase information about invasive species available through various communication channels such as the DNR website, publications, and media outlets.

- Maintain spending on paid public awareness radio/TV spots and newspaper ads to reinforce the high awareness of invasive species by watercraft users in Minnesota.

- Develop a brand standards document for the DNR's AIS program to deliver consistent messaging, and create a common look and feel across all publications, and clarify legal actions and recommendations necessary to stop the spread of AIS.

- Work cooperatively with specific industry groups such as the aquaculture industry, live bait dealers, water garden and horticulture industry, aquarium trade, and lake service providers, to develop targeted public awareness efforts.

- Expand joint public awareness activities with lake communities through grants and other means.

- Continue to work collaboratively with Minnesota Sea Grant, Wildlife Forever, and other stakeholders to pursue research and outreach funding through National Sea Grant, the Great Lakes Restoration Initiative, USFWS, foundations, and other sources.

Enforcement

Goals

- **Analyze the DNR's aquatic invasive species (AIS) laws with input from stakeholders:**
  - Continue to work with the public and private entities on legislative issues in order to provide enforcement with the tools necessary to assist in controlling the spread of AIS.

- **Continue to emphasize AIS as priority work and a core responsibility:**
  - Monitor and provide advanced training to all conservation officers to ensure they have the knowledge they need to effectively enforce AIS laws.
  - Continue inspections by conservation officers to reduce the risk of spreading AIS by water-related equipment.
  - Assist Level 1 and Level 2 inspectors with decontamination efforts at public access sites.
  - Quickly respond to reports of new infestations.
  - Train local law enforcement to enforce invasive species laws.
  - Continue saturation details statewide to target high-priority areas.
  - Continue to analyze data, develop protocols, and secure needed equipment to safely and effectively administer AIS checkpoints.

- **Work with internal and external stakeholders to identify the types of activities that are likely to spread invasive species in Minnesota waters:**
  - Provide information to the public, and work with lake associations and other user groups to help raise awareness about controlling the spread of invasive species. Continue attending statewide public input meetings to maintain and increase dialog with concerned citizens and user groups.

- **Investigate non-traditional structures/watercraft being moved into Minnesota waters from infested water, and other pathways for spreading AIS, such as food markets, bait dealers, aquatic plant dealers, etc.:**
  - Train and educate commercial entities to increase compliance with invasive species regulations.

Highlights

- During 2013, DNR conservation officers provided 2,165 hours of invasive species enforcement and education, resulting in over 19,530 contacts.
- The Enforcement Division launched a new AIS canine unit consisting of three specially trained zebra mussel detecting dogs. These canines assisted officers and inspectors during routine or focused AIS enforcement efforts. The dogs improved the efficiency of conservation officers with faster and more thorough inspections of water-related equipment.
- Nine conservation officers dedicated a significant portion of their work toward invasive species enforcement again this year. Hourly goals were increased to manage the added workload.
- Water resource enforcement officers and regional conservation officers staffed AIS booths at major sport and outdoor shows and events in 2013
- Enforcement worked with Ecological and Water Resources staff to create strategies and plans for statewide AIS work focus.
- In May 2013, eight barges were delivered by truck from Wisconsin to a construction staging area for the St. Croix bridge project. The delivery contractor was informed about Minnesota's AIS regulations and instructed to remove all invasive species from the barges. A Department of Transportation employee inspected the barges, found zebra mussels attached, and notified the DNR. The Enforcement Division conducted an investigation which resulted in enforcement action being taken.

Statewide Open Water Season Enforcement Results

In 2011, conservation officers performed 5,463 law compliance checks resulting in:

- 121 citations.
- 427 written warnings.
- 431 verbal warnings.
- Resulting in an 18% violation rate.

In 2012, conservation officers performed 17,700 law compliance checks resulting in:

- 998 citations.
- 1,550 written warnings.
- Verbal warnings were not documented.
- Resulting in a 14.4% violation rate.

Statewide AIS Check Stations Enforcement Results

In 2013, conservation officers performed 7,974 law compliance checks resulting in:

- 405 citations.
- 688 written warnings.
- Verbal warnings were not documented.
- Resulting in a 13.7% violation rate.

In 2012, conservation officers performed nine AIS check stations resulting in:

- 44 hours of operation.
- 139 inspections of various water related equipment.
- The average delay was 3.9 minutes for no violation.
- The average delay was 10.7 minutes with a violation.
- The violation rate for check stations was 31.3%.

In 2013, conservation officers performed 18 AIS check stations resulting in:

- 79 hours of operation.
- 322 inspections of various water-related equipment.
- The average delay was 3.3 minutes for no violation.
- The average delay was 10.8 minutes with a violation.
- The violation rate for check stations was 20.19%.

The data for this year, although still preliminary, includes everything except citations and warnings that have not been sent in for entry into the department's records. No major changes to the numbers are anticipated. Due to fewer available AIS funds, enforcement hours were reduced during this past fiscal year.

DNR Conservation Officer Larry Hanson and K-9 partner, 'Digger', search for zebra mussels.

Partnerships

The enforcement of Minnesota's invasive species regulations is essential to the ultimate goal of preventing their spread into and throughout Minnesota. Conservation officers continue to work with lake associations, local governments, user groups, and other DNR divisions to assist in sharing information about how to control the spread of invasive species.

Enforcement activities – whether educational opportunities or issuing citations and warnings – are focused on compliance to help control the spread of AIS. Enforcement is a primary motivator to help change the behavior of those who may transport invasive species, whether intentionally or unintentionally.

Future Needs

The Division of Enforcement continues to focus its efforts on enforcement and education, both proven to be critical tactics in reducing the spread of invasive species. Historically, conservation officers have had little or no experience enforcing AIS laws, so updates and training will need to be maintained by the division.

We 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 issues to provide enforcement with the tools necessary to prevent the spread of AIS. We also will continue to emphasize this as priority work, and a core responsibility.

Enforcement will continue to plan, implement, execute, and evaluate this type of natural resource enforcement to provide the most effective measures available now and into the future. This will be accomplished by our continued efforts in AIS enforcement, education, partnerships, and training. The division also will continue to work with the legislature to secure laws and funding for AIS work.

Regulations

The state statutes related to aquatic invasive species (AIS) are found in Minnesota Statutes, Chapter 84D. The administrative rules related to invasive species are found in Minnesota Rules, Chapter 6216. Current versions of both statutes and rules are available at www.revisor.leg.state.mn.us. Summaries of annual changes in the regulations can be found in past DNR annual reports on invasive species.

It is the DNR's responsibility to designate infested waters (see Minnesota Statutes 84D.03). Water bodies are designated infested if they contain specific invasive species such as Eurasian watermilfoil, faucet snails, flowering rush, New Zealand mudsnails, ruffe, round goby, spiny waterfleas, white perch, or zebra mussels. The current list of infested waters is posted on the DNR website at www.mndnr.gov/ais.

The DNR also is required to adopt rules (per Minnesota Statutes 84D.12) that place nonnative aquatic plant and wild animal species into various regulatory classifications and prescribe how invasive species permits will be issued (per Minnesota Rules 6216.0265). The DNR is authorized to adopt other rules regarding infested waters and invasive species of aquatic plants and wild animals.

Goals

- Continue to support efforts to integrate and improve the comprehensiveness, enforceability, and responsiveness of federal laws regarding noxious weeds, injurious wildlife, and other designations related to invasive species. Specifically seek more restrictive ballast discharge regulations including "lakers" and designations of injurious wildlife.

- Continue to adopt state rules that designate or redesignate additional prohibited invasive species, regulated invasive species, and unregulated nonnative species.

- Continue to designate infested waters using Commissioner's Orders.

- Per the strategies in the *Minnesota State Management Plan for Invasive Species*, "Review state regulations to optimize legal authority for prevention of the import and introduction of invasive species;" and "Establish new and maintain / revise / improve existing regulations that address pathways of spread in the state …"

State Statute Changes

The Minnesota Legislature passed legislation that made several modifications and added new authorities and requirements to state statutes related to AIS in 2013. Minnesota Statutes, Chapter 84D, was amended as described in the sections below (modifications are shown in strikeout and underline).

Definitions

- Decontamination was added to the definition of "service provider," expanding permitting requirements to individuals who and entities that perform decontamination services. The DNR offers specific decontamination training and maintains a list of permittees that provide these services. Individuals or entities that rent or lease water-related equipment were also added to the definition of service provider and language (into or) was added to clarify the definition.

- The one occurrence of the term "zebra mussels" in section 84D was deleted and the definition repealed. The term "prohibited invasive species" will continue to be used to describe zebra mussels and other prohibited invasive species.

84D.01 DEFINITIONS.
Subd. 15a. Service provider.
"Service provider" means an individual who or entity that;
(a) Decontaminates, installs, or removes water-related equipment or structures into or from waters of the state for hire or as a service provided as a benefit of membership in a yacht club, boat club, marina, or similar organization; or
(b) Rents or leases water-related equipment that will be used in, placed into, or removed from waters of the state. [Effective 8-1-2013]
~~Subd. 22. Zebra mussel. [Repealed, 2013]~~
~~"Zebra mussel" means a species of the genus Dreissena. [Effective 8-1-2013]~~

Infested Waters; Restricted Activities

- Removed language requiring a person to remove all aquatic plants from nets and other equipment "when the nets and equipment are removed from waters of the state" and added language requiring a person with a commercial license to remove all aquatic vegetation from equipment "before placing the equipment into" waters of the state.

84D.03 INFESTED WATERS; RESTRICTED ACTIVITIES.
Subd. 4. Commercial fishing and turtle, frog, and crayfish harvesting restrictions in infested and noninfested waters
(c) A commercial licensee must remove all aquatic macrophytes from nets and other equipment ~~when the nets and equipment are removed from~~ before placing the equipment into waters of the state. [Effective 8-1-2013]

Aquatic Plants

- The transport exemption for harvest and control activities was eliminated and now requires a permit for transportation.

84D.09. AQUATIC MACROPHYTES.
Subd. 1. Transportation prohibited.
Unless specifically authorized under a license or permit issued by the commissioner, a person may not transport aquatic macrophytes, except as provided in this section. [Effective 8-1-2013]
Subd. 2. Exceptions.
~~(2) For disposal as part of a harvest or control activity when specifically authorized under an aquatic plant management permit pursuant to section 103G.615, under permit pursuant to section 84D.11, or as specified by the commissioner;~~

~~(7) When transporting commercial aquatic plant harvesting or control equipment to a suitable location for purposes of cleaning any remaining aquatic macrophytes; [Effective 8-1-2013]~~

Transportation of Water-Related Equipment

- Because the definition of zebra mussels was repealed (see "Definitions," on page 26), the term "zebra mussels" was removed from subdivision 1.New language allows individuals transporting water from a non-infested water body for the purposes of firefighting or other emergencies to be exempt from requirements to drain the equipment and to have drain plugs open during transport.

- New language will also exempt water trucks and other equipment specifically designed to transport water from draining and drain plug requirements; however, such water-hauling vehicles cannot discharge the water into other waters or within 100 feet of any surface water body.

84D.10 WATERCRAFT AND WATER-RELATED EQUIPMENT REQUIREMENTS AND PROHIBITIONS.
Subd. 1. Launching prohibited.
A person may not place or attempt to place into waters of the state water-related equipment, including aquatic plant harvesting or control equipment that has aquatic macrophytes, ~~zebra mussels~~, or prohibited invasive species attached except as provided in this section. [Effective 8-1-2013]
Subd. 4. Persons transporting water-related equipment.
(g) A person who transports water that is appropriated from noninfested surface water bodies and that is transported by a commercial vehicle, excluding watercraft, or commercial trailer, which vehicle or trailer is specifically designed and used for water hauling, is exempt from paragraphs (a) and (b), provided that the person does not discharge the transported water to other surface waters or within 100 feet of a surface water body.

(h) A person transporting water from noninfested surface water bodies for firefighting or emergencies that threaten human safety or property is exempt from paragraphs (a) and (b). [Effective 8-1-2013]

Inspection Authority

- The addition of the words "individual or" will allow centralized inspection stations to service multiple water accesses on a single water body.

84D.105 INSPECTION OF WATER-RELATED EQUIPMENT.
Subd. 2. Inspector authority.
(f) The commissioner may require mandatory inspections of water-related equipment before a person places or removes water-related equipment into or out of a water body. Inspection stations may be located at or near public water accesses or in locations that allow for servicing individual or multiple water bodies.The commissioner shall ensure that inspection stations:… [Effective 8-1-2013]

Service Provider Permit

- New language was added to exempt individuals working for, and supervised by, an individual holding a service provider permit from certain training requirements, as long as the equipment remains on the permitees property and the equipment is used only in one water body.

84D.108 SERVICE PROVIDER PERMIT.
Subd. 2. Permit requirements.
(c) Persons working for a permittee must satisfactorily complete aquatic invasive species-related training provided by the commissioner, except as provided under paragraph (d).
(d) A person working for and supervised by a permittee is not required to complete the training under paragraph (c) if the water-related equipment or other water-related structures remain on the riparian property owned or controlled by the permittee and are only removed from and placed into the same water of the state. [Effective 7-1-2013]

Other Permits

- New language requires those entities that transport water, and that are not covered by an exception, to obtain a permit, or an authorization under another license or permit, to transport water in containers or equipment specifically designed and used for hauling water.

- Language was added to allow for the transport of aquatic macrophytes to specific locations for research, education, and decontamination of equipment, provided that this activity is authorized by a permit.

- New language would allow for special permits, including general permits, to be issued.

84D.11 PERMITS.
Subd. 2b. Transport of water.
The commissioner may issue a permit under this section or an authorization under other licenses or permits pursuant to sections 97C.801, 97C.811, and 103G.271 to allow the transport of water in containers or water-related equipment specifically designed and used for hauling water.
Subd. 2c. Transport of aquatic macrophytes.
The commissioner may issue a permit to allow the transport of aquatic macrophytes to locations specified in the permit for purposes of research, education, and decontaminating equipment.
Subd. 2d. Special permits.
The commissioner may issue special permits for the activities in this section. A special permit may be issued in the form of a general permit to a governmental subdivision or to the general public to conduct one or more activities under a single permit. [Effective 8-1-2013]

Enforcement

- New language now includes "other licensed peace officers" in a provision stating that conservation officers' authority to issue civil citations is in addition to other remedies available under law.

- A new subdivision will require persons who violate the provisions of Chapter 84D with water-related equipment to complete a course related to AIS prevention.

84D.13 ENFORCEMENT; PENALTIES.
Subd. 2. Cumulative remedy.
The authority of conservation officers and other licensed peace officers to issue civil citations is in addition to other remedies available under law, except that the state may not seek penalties under any other provision of law for the incident subject to the citation. [Effective 8-1-2013]
Subd. 9. Training for offenders.
A person who is convicted of or subject to a final order for a violation of this chapter involving water-related equipment must successfully complete a training course as provided in section 86B.13. [Effective 7-1-2015]

Future Needs

- Use species evaluations and current literature to propose appropriate regulatory designations that will protect Minnesota's environment from the introduction of invasive species.

- Work with staff members at the Minnesota Pollution Control Agency (MPCA) who regulate wastewater to inform licensees about laws regarding transport of water from infested waters, and also contact marinas statewide regarding invasive species laws.

- Partner with the MPCA regarding the establishment of state and federal ballast water regulations protective of Minnesota's and the nation's waters.

Watercraft Inspections

Goals

The Watercraft Inspection Program helps to prevent the spread of invasive species within Minnesota by:

- Conducting watercraft inspections at public water accesses across the state and requiring watercraft users to decontaminate their watercraft if aquatic invasive species (AIS) or water are found.
- Increasing public awareness about invasive species and reducing the potential for boaters to transport invasive species between water bodies.
- Increasing education efforts with citizen groups.
- Distributing information at local events around the state.

Highlights

Watercraft Inspections

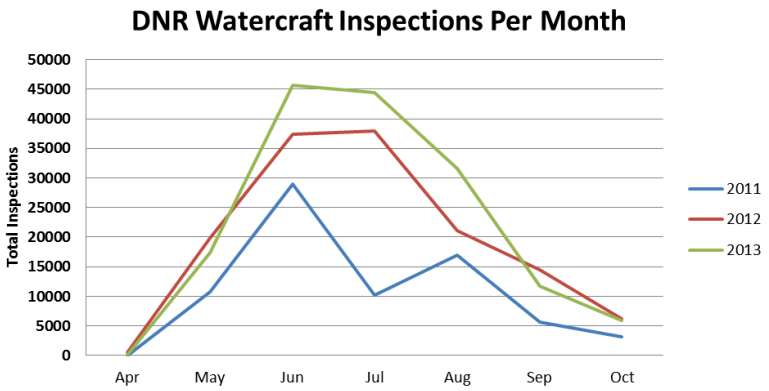
In 2013, both the DNR and tribal or local units of government (LGUs) had authorized watercraft inspectors stationed at public water accesses across Minnesota.

- Approximately 129 DNR watercraft inspectors worked the majority of the open water season.
- An additional 16 DNR inspectors worked one month inspecting boats and providing information to the public on AIS and how to inspect boats and trailers.
- Through delegation agreements, tribal and LGUs had an additional 298 watercraft inspectors working throughout the state.

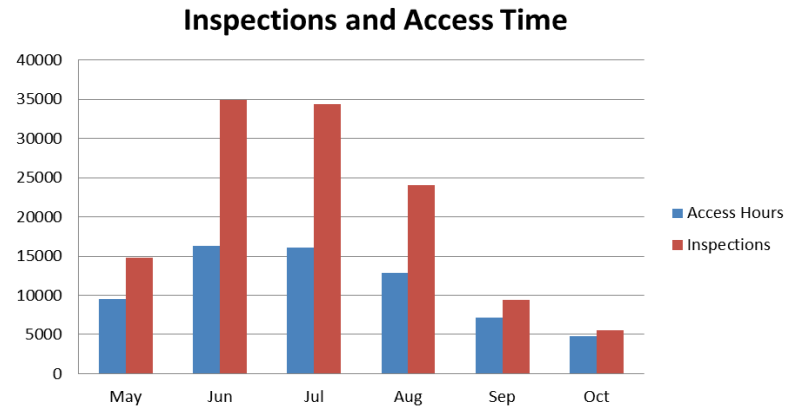
Inspections began in late April and continued though the end of October. Within this 25-week period, DNR watercraft inspectors logged 66,780 inspection hours. A total of 122,901 watercraft/trailers were inspected by DNR staff and another 64,177 were inspected by tribal or LGU watercraft inspectors.

DNR Inspections	**2013**	**2012**	**2011**
Total inspections	123,000	102,600	76,000
Total inspection hours	66,800	65,880	44,500
Inspections per hour	1.84	1.56	1.70
Inspections by DNR Region *(included in total above)*			
Northwest - 1	28,500	24,600	15,600
Northeast - 2	17,900	11,500	12,900
Central - 3	72,600	64,800	38,600
Southern - 4	4,000	1,700	8,500

Number of watercraft inspections conducted and total number of inspection hours completed by authorized DNR watercraft inspectors in 2011, 2012, and 2013. Totals are rounded values.



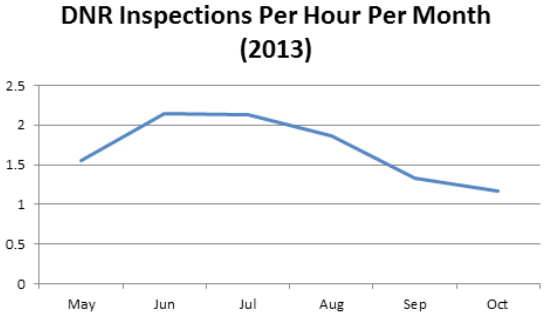
DNR watercraft inspections per month during the 2011-2013 field seasons.



DNR inspections completed per month, compared to the number of hours worked at accesses statewide.

How are the Hours Distributed?

DNR watercraft inspection hours are distributed using a tiered system that focuses time on high-use infested water bodies, high-use, non-infested water bodies, and water bodies that previous inspection data show are a destination for watercraft arriving from zebra mussel infested waters. Using a tiered system to allocate watercraft inspection hours helped make the overall inspection effort more efficient by reducing the amount of time spent at very low-use, non-infested water bodies.



DNR inspections per hour by month at public water accesses during the season.This figure does not include drive time.

In addition to the hours of watercraft inspection that are directed by the goals of the Invasive Species Program, the DNR also offered approximately 10,000 hours of watercraft inspection through grants to local groups – as well as grants to tribal and LGUs to hire their own authorized inspectors. See the Partnerships section on page 34 for more information.

Transportation of Invasive Species

One challenge the Watercraft Inspection Program currently faces is the detection of zebra mussels, spiny waterfleas, and other invasive species on or in watercraft. As more water bodies have become infested with zebra mussels and spiny waterfleas, the concern about transporting infested water has become even greater. Minnesota's "pull the plug" law continues to help the DNR educate boaters about the importance of draining all water before transporting their watercraft.

In 2013, DNR, tribal, and LGU inspectors intercepted numerous watercraft arriving at accesses in violation of state laws. The Watercraft Inspection Program tracks the number of watercraft users who arrive at the access with their drain plugs out, as required by law. In 2013, approximately 7% (7,598 occurrences) of the watercraft inspected had the drain plug in when they arrived at the access. Watercraft users arriving at the access with their drain plugs in – a violation of the drain plug law – were asked to remove plugs and drain any water away from the access before launching.

- DNR, tribal, and LGU watercraft inspections found that 1,247 watercraft users statewide had vegetation attached to their watercraft when entering water accesses, with the highest number occurring in Region 3.

DNR watercraft inspectors search for aquatic plants, zebra mussels, and other prohibited invasive species.

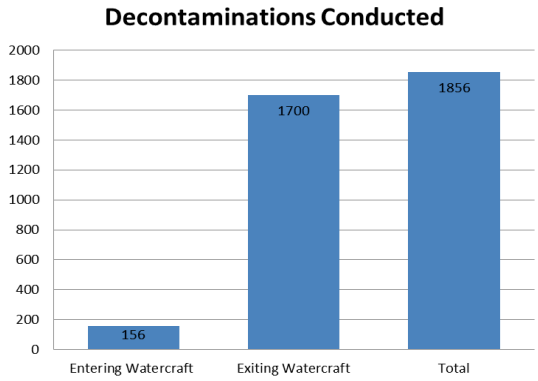
- Zebra mussels were found during 134 incoming watercraft inspections in 2013; 11 of these arrived at water bodies not infested with zebra mussels. The watercraft owners were instructed not to launch until all zebra mussels had been removed.

- The highest number occurred in Region 3, with 115 watercraft arriving with zebra mussels attached; there were also 16 in Region 1 and three in Region 2. One watercraft was found with zebra mussels attached during a road check.

All watercraft attempting to enter a water body with attached vegetation or zebra mussels were required to have their watercraft decontaminated. This was accomplished either by hand removal, draining, or a high-pressure, hot water treatment.

Decontamination Units

In 2013, the Watercraft Inspection Program hired approximately 43 Level 2 watercraft inspectors trained to decontaminate watercraft with high-heat, high-pressure wash units. The staff used 23 portable wash units around the state to perform 1,856 decontaminations of varying types. The decontamination units were situated at watercraft accesses on zebra mussel-infested water bodies that historically had high use.



Partnerships

The DNR partnered with other groups through grants and delegation agreements in 2013. The DNR offers two types of watercraft inspection grants:

1. Grants for hours of DNR Watercraft Inspection Program staff time at public water accesses.

2. Grant funds to tribal and LGUs to hire authorized watercraft inspectors.

The DNR provided 10,000 hours of staff time to citizen groups in 2013. Typically, citizen groups are seeking additional hours of inspection on lakes where they live or recreate. To address this need, watercraft inspection grants are offered annually, providing a one-to-one match for hours financed by citizen groups. Organizations that receive inspection hours are allowed to use them on non-infested waters, however, applications for water bodies that are infested or are near infested waters are given a higher grant rating. This offers local entities an opportunity to intercept watercraft coming to local water bodies that could be carrying AIS.

There were 22 grants to tribal or LGUs to help fund local watercraft inspection efforts in 2013. Grantees are required to have their watercraft inspectors trained and authorized through a delegation agreement with the DNR. LGUs that did not receive grants also were able to complete delegation agreements and hire authorized watercraft inspectors to support local watercraft inspection programs. A total of 25 tribal or LGUs completed delegation agreements in 2013 and these LGUs hired an additional 298 watercraft inspectors around the state.

These tribal or LGU employees used DNR survey questions and reported their survey findings to the DNR Watercraft Inspection Program. A total of 64,177 surveys were completed by tribal or LGUs in 2013.

The Watercraft Inspection Program also helped citizen groups increase the number of hours at watercraft accesses by conducting AIS volunteer training sessions to teach citizens how to educate watercraft users at waters where they live or recreate. In 2013, the Watercraft Inspection Program conducted 15 AIS volunteer training sessions that resulted in 411 trained AIS volunteers around the state. Watercraft inspectors also worked at the Minnesota State Fair and other local events, speaking to the public about invasive species.

Future Needs

In 2014, the Watercraft Inspection Program plans to complete 60,000 hour of watercraft inspection, with at least 2,400 days of Level 2 watercraft inspection at public accesses around the state. We also plan to implement a continuous improvement process to increase our efficiency.

We will review 2013 data and use it to refine our survey process – and adjust the hours and days spent at watercraft accesses – to try to increase our inspections per hour. We will continue to train citizen groups to conduct AIS education at local watercraft accesses and try to expand the number of partnerships with tribal and LGUs in an effort to increase watercraft inspection hours around the state.

We also plan to explore options for increasing the availability of decontamination units operated by the state, LGUs, and private entities.

Management of Invasive Aquatic Plants

Goals

The goals of the Invasive Aquatic Plants Management Program are to work with citizens to:

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

Highlights

Inventory

Eurasian watermilfoil, *Myriophyllum spicatum*, was newly discovered in seven lakes during 2013. Milfoil is now known to occur in 280 water bodies in Minnesota.

Flowering rush, *Butomus umbellatus*, was newly discovered in three lakes during 2013: Horseshoe Lake (Le Sueur County), Bald Eagle Lake (Ramsey County), and Sprague Lake (Rice County). This invasive aquatic plant is now known to occur in 30 water bodies in Minnesota.

Eurasian watermilfoil. Photo: Alison Fox, University of Florida, Bugwood.com.

Brittle naiad, *Najas minor*, was found in an unnamed wetland in Hennepin County. This invasive aquatic plant is now known to occur in four water bodies in Minnesota.

Management

Throughout 2013, the DNR continued to implement improvements developed in 2011 to manage invasive aquatic plants in Minnesota. These improvements include issuing permits and expanding the grant program. Considering the management of different invasive aquatic plants, the number of permits issued to allow the control of curly-leaf pondweed or Eurasian watermilfoil were greater than the number issued for flowering

rush or purple loosestrife (Table 1). In 2013, the number of both permits and grants provided to control curly-leaf pondweed or Eurasian watermilfoil, or both, continued to increase in comparison with previous years (Table 2).

Curly-Leaf Pondweed and Eurasian Watermilfoil

In 2013, nearly twice as many permits were issued to manage curly-leaf pondweed than Eurasian watermilfoil. The number of permits varied around the state, with the greatest number issued in the north and south districts of the Central Region (Table 3).

Table 1: Number of Invasive Aquatic Plant Management permits issued in 2013 to allow control of various aquatic plants.

Invasive Aquatic Plants	Number of Permits
Curly-leaf pondweed	144
Eurasian watermilfoil	85
Curly-leaf pondweed and Eurasian watermilfoil	13
Subtotal	**242**
Flowering rush	6
Purple loosestrife	2
Total	**250**

Table 2: Number of Invasive Aquatic Plant Management permits and grants issued by the DNR to control curly-leaf pondweed, Eurasian watermilfoil, or both.

Curly-leaf pondweed and/or Eurasian watermilfoil	2013	2012	2011
Number of permits	242	197	149
Number of grants	158	147	54
Grant funding paid as reimbursements	$580,000	$840,000	$530,000

Table 3: Number of permits issued in 2013 in DNR regions.

2011-2013 Regional Summary – Control of curly-leaf pondweed, Eurasian watermilfoil, or both	
Northwest - 1	19
Northeast - 2	38
Central - 3 (North District)	82
Central - 3 (South District)	74
Southern - 4	29
Total	**242**

Lake-Wide Herbicide Treatment of Curly-Leaf Pondweed

From 2000 through 2011, the DNR and our partners evaluated the potential for lake-wide treatment with herbicide of curly-leaf pondweed to produce ecological benefits. These benefits included increased water clarity and native submersed plants. Overall, there did not appear to be a consistent trend of increasing water clarity following lake-wide treatments in eutrophic or hyper-eutrophic lakes.

While most native aquatic plants were not harmed by lake-wide treatments of curly-leaf pondweed, they also did not reliably increase in eutrophic or hyper-eutrophic lakes. These results were documented by researchers at the University of Minnesota (Johnson et al. 2012 and Jones et al. 2012).

For these reasons, the DNR has been shifting its focus from lake-wide to partial-lake treatment of curly-leaf pondweed. Partial-lake treatments are less time-consuming and expensive than lake-wide treatments; consequently, we can do more of the former.

Treatment of Other Aquatic Invasive Plants

Purple Loosestrife

During the summer of 2013, apparent increases in purple loosestrife were noticed in some parts of the Twin Cities metro area. In previous years, low levels of loosestrife likely were due to beetles introduced from Europe to control the plant. Although we cannot be sure, we suspect that weather conditions may have allowed the plant to get ahead of the beetles this year. Spring 2013 was unusually cool and late; and we had quite a bit of rain early in the summer.

Purple loosestrife – Frontenac, MN.

Insects for biological control of purple loosestrife were first released in Minnesota in 1992. From 1997 to 2012, the DNR worked with various partners to raise and release biological control beetles. Beetle rearing is no longer necessary as populations have been established statewide. Now, beetles are collected in the wild from a few highly productive sites and moved to a limited number of sites where little or no biological control exists. In 2013, an estimated 67,000 leaf-eating beetles were collected and released on 15 sites. Long term impacts that beetles are having on purple loosestrife stands continues to be monitored by DNR staff at selected sites statewide.

Small populations of purple loosestrife can be controlled by "spot-treatment" with herbicide. Recently established populations of loosestrife, which have limited seed banks, are given the highest priority for treatment. Sites located in the upper reaches of watersheds with small loosestrife infestations are treated before those located in watersheds with large amounts of loosestrife. DNR staff visited 29 purple loosestrife stands for herbicide control work in 2013.

Water Hyacinth, Water Lettuce, and Parrot-Feather

During the summer of 2013, staff of the U.S. Fish and Wildlife Service and the Wisconsin Department of Natural Resources searched for hyacinth, water lettuce, and parrot-feather in Pool 5 of the Mississippi River. They focused on a number of locations where these nonnative aquatic plants were observed in 2012, but did not discover any of these plants. Perhaps this variation in the abundance of these nonnative plants is related to differences in weather between 2012 and 2013. Spring came much earlier in 2012.

Phragmites

In the fall of 2013, Invasive Species staff visited the shoreline of a lake in the Twin Cities metro area where a nonnative and invasive subspecies of common reed or phragmites was a concern. Currently, *Phragmites australis* (subsp. *australis*) is not legally classified as an invasive species by the DNR (see Minnesota Statute 84D.04). Nevertheless, it is listed as an invasive species on the DNR website (www.dnr.state.mn.us/invasives/aquaticplants/phragmites/). The Minnesota Department of Agriculture has designated it as a restricted noxious weed (www.mda.state.mn.us/plants/badplants/noxiouslist). This designation prohibits the importation, sale, and transportation of the plant except as allowed by Minnesota Statues 18.82. The statewide distribution in Minnesota's waters has not been assessed, and the effects of invasion by the nonnative phragmites are not well understood.

Research

The Minnesota Aquatic Invasive Species Research Center at the University of Minnesota continued to study the effects of lake-wide treatment of curly-leaf pondweed with herbicide in combination with additional management (see reference on previous page to Johnson et al. 2012 and Jones et al. 2012). Other efforts included removing common carp and applying alum to reduce the availability of phosphorus – both of which may increase water clarity.

The U.S. Army Engineer Research and Development Center (ERDC) continued studies of the effects of bay-wide treatment of Eurasian watermilfoil with herbicide on Lake Minnetonka. These studies document differences between "enclosed bays" and "open bays" in terms of the effectiveness of control and the duration of reductions in the targeted invasive plants. There may be evidence of an increase in abundance of hybrid watermilfoil in the bays following treatments, which may have implications for future control (Thum et al. 2012, LaRue et al. 2013). In addition, the ERDC published an article on control of flowering rush by treatment with herbicide (Poovey et al. 2013).

In 2013, the Pelican River Watershed District continued to support evaluations by researchers from Mississippi State University of the potential to reduce flowering rush by repeated treatments with contact herbicides (Madsen et al. 2013). Results of monitoring to date suggest that long-term and lake-wide control of flowering rush may be achieved by treatment with diquat herbicide. The Pelican River Watershed District also provided significant support to the research described in the article on control of flowing rush published by the ERDC (Poovey et al. 2013).

SePRO Corporation worked with the DNR and a number of lake groups to arrange field evaluations of the potential efficacy of Clearcast herbicide, active ingredient *imazamox*, on curly-leaf pondweed in Minnesota lakes.

The DNR worked with Contour Innovations and a number of lake groups to continue evaluating the potential usefulness of monitoring submersed plants with SONAR equipment. Contour Innovations was an enthusiastic partner and provided processing of the data.

Partnerships

Stakeholder engagement: DNR staff had many conversations with citizens by email, phone, and in person throughout the year. In addition, we seek to engage with stakeholders to hear their perspectives on invasive aquatic plants to help guide evolution of Minnesota's approach to management. During the fall of 2013, the DNR distributed a questionnaire intended for people who obtained permits and grants from the agency to manage invasive aquatic plants. We received responses from people on approximately 90 lakes.

Future needs

To effectively and proactively manage invasive aquatic plants into the future we plan to continue the following activities:

- Engage stakeholders and refine the issuance of 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.
- Improve our understanding of the ecology and management of invasive aquatic plants.
- Assess potential utility of hydroacoustic sampling of submersed plants.

We also plan to assemble results of management by partners of curly-leaf pondweed in clear lakes (average Secchi depth greater than 2 m), and the effectiveness of *imazamox* herbicide. We plan to review the results of bay-wide or lake-wide treatments of Eurasian watermilfoil and the possible differences in susceptibility to herbicides of Eurasian watermilfoil and hybrids with native watermilfoil.

In addition, we will review results of lake-wide control of flowering rush by partners, and the effectiveness of biocontrol in different years of purple loosestrife.

Management of Invasive Aquatic Animals — Zebra Mussels

Goals

The goals of the Invasive Species Program for zebra mussel efforts are to:

- Prevent the spread of this invasive invertebrate to uninfested, unconnected lakes and rivers in the state.

- Support, assist, and/or conduct research on zebra mussel ecology, biology, life history, and other aspects to help management and prevention of spread.

Highlights

Activities in the Regions

Region 1

- Invasive species specialists assisted the U.S. Geological Survey with proper permitting for an open water treatment trial of *Zequanox* on Lake Darling (Douglas County). *Zequanox* is a control material formulated from dead common soil bacteria that is being tested for potential use in controlling zebra mussels.

Region 2

- Invasive species specialists conducted surveys to document the extent of the zebra mussel infestation in the Whitefish Chain of lakes that includes 14 water bodies. Shoreline searches and multiple veliger samples from throughout the chain of lakes helped document and establish the scope of the infestation and provide information to managers and the lake association. In addition, limited diving was carried out to monitor adult populations. Veliger samples also were collected from ten lakes downstream and in Lake Winnibigoshish.

- Specialists continued to help monitor zebra mussel populations in Mille Lacs Lake as part of an ongoing, long-term monitoring study, by collecting veliger samples and diving to monitor adult zebra mussel densities. Similar efforts also were undertaken to establish baseline zebra mussel population levels in Pelican Lake (Crow Wing County) to begin long-term monitoring on this lake.

Region 3

- Invasive species specialists conducted shoreline searches on two lakes after reports of possible zebra mussel infestations. Results of the search were negative.

Region 4

- After receiving a report from a lakeshore resident on Madison Lake (Blue Earth County), specialists conducted a search for zebra mussels. The resident had loaned a boat to a neighbor, who used it in infested waters in Iowa and then relaunched the watercraft without decontaminating it first. No zebra mussels were found.

New infestations of zebra mussels

Zebra mussel infestations were discovered in every region except Region 4 (see table on page 11). The number of new infested waters was high this year due to the discovery of zebra mussel in the Whitefish Chain, which is a connection of 14 separate water bodies.

Research

- A study was conducted to collect water samples through the ice on Mille Lacs, Minnetonka, and Le Homme Dieu lakes to determine if veligers are present in winter months in Minnesota waters. Multiple samples were collected in January, February, and March 2013 from each lake. No veligers were found in any sample.

- Preliminary work was started to examine the amount of water left in a typical watercraft after following the required draining regulations, and to determin if veligers were in the residual water. This research will expand and continue in 2014.

Partnerships

- Prevention efforts against zebra mussels can only succeed by establishing partnerships with lake associations, lake-user groups, tribal organizations, local governmental agencies, and others throughout the state. Highlights of the efforts are included in various chapters of this report.

- Volunteers across Minnesota examine docks, lifts, boats, recreational equipment, shorelines, and other objects to monitor for zebra mussels as part of the *Volunteer Zebra Mussel Monitoring Program*. Reports are sent to the DNR via the mail or online forms. This effort is extremely vital, as DNR staff does not have time to examine the vast numbers of lakes and other waters in the state, while lakeshore residents are able to discover the early presence of this invasive. Over 100 individuals participate, ranging from individual lake residents, to homeowner groups coordinated by lake associations. Visit www.dnr.state.mn.us/volunteering/zebramussel_monitoring/ to learn more about the program.

Adult zebra mussels vary in size from 1/4 to 1-1/2 inches long.

- DNR staff sat on the selection and interview committee for a new zebra mussel research position with the Minnesota AIS Research Center (MAISRC) at the University of Minnesota. This process culminated in the hire of Dr. Michael McCartney to head research efforts on zebra and quagga mussels for the Center. This position provides important collaborative potential for research questions which the Invasive Species Program may not have the staff or time to investigate.

Future Needs

Over the next year, we will be focusing our attention on drafting summaries of multi-year surveys of zebra mussel data from ongoing monitoring in Mille Lacs Lake. We also plan to continue to expand research on residual water and veliger transport in recreational watercraft, increasing the scope to include more types of watercraft. In addition, we will start discussions with the MAISRC on potential short-term research topics, such as reproduction levels in early summer in infested waters, density of veligers and/or adults needed to successfully create reproducing populations, and other topics to help understand life history of zebra mussels to guide management and prevention efforts.

Management of Aquatic Invasive Animals – Asian Carp

Goals

- Prevent or limit range expansion at strategic locations.
- Monitor Minnesota waters for changes in population sizes, range expansion, and reproduction.
- Accelerate research on control strategies.

Silver carp leap from the water when frightened or disturbed. Photo credit: Chris Young, AP.

Highlights

New Detections of Adult Asian Carp

The DNR relies on several methods to detect and monitor the expansion of Asian carp into Minnesota. In 2013, our efforts listed below yielded ten new detections of adult Asian carp:

1. Traditional fisheries monitoring programs;
2. Targeted sampling;
3. Contracted commercial fishing;
4. Monitoring the commercial catch; and
5. Reporting sightings.

Species	Number Caught	Date	Location	Type of Gear
Silver Carp	1	Feb 18	Mississippi River – Pool 6	commercial
Grass Carp	4	Feb 18	Mississippi River – Pool 6	commercial
Grass Carp	1	Mar 15	Mississippi River – Pool 5	commercial
Grass Carp	1	May 6	Mississippi River – Near Sartell, MN	bow angler
Grass Carp	1	Jun 17	Mississippi River – Pool 2	contracted commercial
Silver Carp	1	Aug 9	Mississippi River – Pool 5A	reported sighting
Silver Carp	1	Nov 17	Mississippi River – Pool 7	Commercial – reported to WI DNR

Upper St. Anthony Falls Lock

The DNR believes that the best way to keep Asian carp out of the upper Mississippi River watershed is to close the Upper St. Anthony Falls Lock, which is administered by the United States Army Corps of Engineers (USACE). Lock closure requires an act of Congress. Lock closure provisions are included in both the Senate and House version of the Water Resources Reform and Development Act of 2013 (WRRDA). The bill is in conference committee, which began meeting on November 20, 2013.

Lock and Dam 1 Electric Barrier

At the beginning of 2013, the DNR explored alternative barrier technologies to prevent upstream movement of Asian carp. The agency took this approach because it was unknown whether a St. Anthony Falls Lock closure provision would make progress at the federal level – either as its own bill or as part of a larger bill. In addition, it was highly unpredictable if such a provision would pass.

In May 2013, the DNR contracted with Smith-Root, an electrical barrier engineering firm, to design a barrier utilizing new technology for Lock and Dam 1. This technology, referred to as "sweeping" electrical, uses electricity to move fish away from the lock chamber. Smith-Root submitted a 95% complete design to the DNR and USACE in December 2013, and is scheduled to complete its design and finalize plans by May 2014. If USACE approves the final design, the 408 permit will be issued in fall 2014. Passage of the WRRDA bill would affect the continuation of this project.

Asian Carp Prevention Projects in Southwest Minnesota

In 2011, the Iowa DNR captured two bighead carp with a bag seine in East Okoboji Lake in Iowa. The following year, a commercial fishing seine haul captured both bighead and silver carp from Iowa's Big Spirit and East Okoboji lakes. If Asian carp are able to navigate upstream from Big Spirit Lake, they have the potential to reach the following lakes in southwest Minnesota:

- Loon Lake (738 acres)
- Pearl Lake (117 acres)
- Rush Lake (293 acres)
- Clear Lake (415 acres)

All of these lakes, except Rush Lake, are moderately developed lakes in the Windom area. To help prevent the migration of Asian carp into southwest Minnesota through these waters, the Iowa DNR, with $261,000 from the Minnesota DNR, installed an electric barrier at the outlet of Iowa Great Lakes, located on Lower Gar Lake. This barrier became operational in May 2013.

Electric carp barrier on Lower Gar Lake. Photo: Iowa Great Lakes Association.

In fiscal year 2013, the DNR received funding from the Outdoor Heritage Fund to place additional barriers in southwest Minnesota. The Windom area fisheries office identified six sites for new projects to prevent the spread of Asian carp into high value lakes or between watersheds. With populations of Asian carp already present lower in the watershed, these projects are a high priority.

- Site 1A is a watershed breach: The DNR is negotiating to acquire a flowage easement so that two Ewington Township (Jackson County) culverts can be removed. With these culverts removed, the township gravel road would act as a physical berm to separate the watersheds.

- Site 1C: The DNR will install an electric barrier by removing two small culverts and installing a 12 foot by 6 foot culvert. The project, also in Ewington Township, is currently out for bid.

- Site 2: The DNR worked with the Jackson County Soil & Water Conservation District and a private landowner to build up an earthen dike berm at this location. The project has been completed.

- Site 3: The DNR plans to work with the Jackson County Highway Department and Mn/DOT to install a grate system at the upstream of a culvert in a road right-of-way. There is currently a bid out for materials.

- Site 4: Herlein-Boote Wildlife Management Area (WMA) – The DNRs fisheries and wildlife sections are working to install a larger capacity outlet for the WMA.

- Site 6 located at the outlet of Illinois Lake in Jackson County – The DNR will install an electric barrier on a WMA. The project is currently out for bid.

Coon Rapids Dam

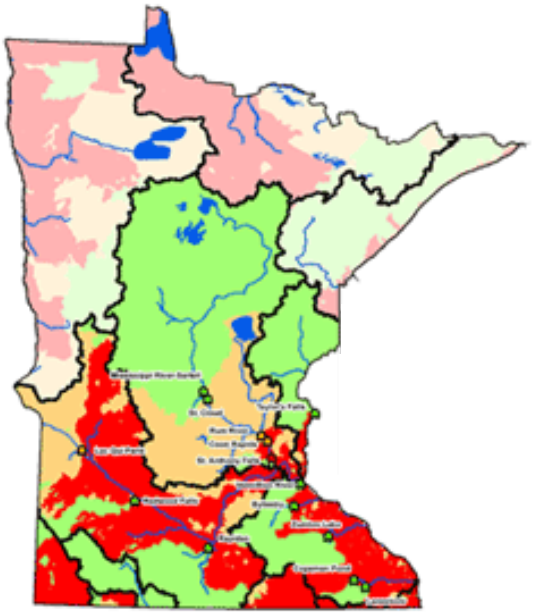
In 2011, the Minnesota Legislature approved $16 million to fund improvements to the Coon Rapids Dam, including features to make it a more effective barrier against Asian carp movement upstream. Five steel, hydraulically-operated crest gates and a new concrete stilling basin on the Anoka County side of the dam were installed in 2013. The remainder of the project on the Hennepin County side of the dam is scheduled to be completed by the end of 2014.

Construction can take place on only half of the dam in one construction season due to the scale of the project and the need to keep half of the spillway open to pass river flows. Three Rivers Park District, which currently owns the dam, will continue to own and operate the dam.

Asian Carp Risk Assessment Project

DNR Fisheries began a GIS-based Asian carp risk assessment project in September 2012. Project objectives were to:

- Visualize potential pathways of Asian carp upstream migration;
- Assess aquatic barriers for the ability to limit migration;
- Identify potential watershed breaches (i.e. pathways across major watershed boundaries such as ditches, culverts, etc.);
- Identify waters "at-risk" for infestation;
- Quantify resources affected;
- Consider migration/infestation scenarios; and
- Identify strategic sites for Asian carp barriers.



Relative Risk of Carp Upstream Movement. For map details visit www.mndnr.gov/asian-carp.

The project applied GIS analysis to information from several barrier databases and data collected from field level professionals. In November 2013, a preliminary risked-based spatial map was released depicting where Asian carp may spread by their own swimming capabilities.

The project also produced the following outcomes:

- Assignment of relative risk of Asian carp passage at stream barriers,
- GIS tools for quantifying resources and evaluating scenarios, and
- Identification of watershed breaches.

Future work will include verifying and refining data, prioritizing locations for stream barrier construction or enhancement, and prioritizing watershed breaches for projects to prevent fish passage.

Partnerships

The University of Minnesota created the Minnesota Aquatic Invasive Species Research Center (MAISRC) with funding from several sources. The center works closely with the DNR to address invasive aquatic nuisance species through research on prevention, control, detection, and eradication. The center is the lead on the state's Asian carp environmental DNA (eDNA) testing.

Recent analyses of water samples from the Mississippi and St. Croix rivers returned negative results for bighead and silver carp DNA. The joint effort by scientists from the U.S. Geological Survey and the DNR concluded that while the capture of invasive fish by commercial fisheries show these species are present in Minnesota, their numbers are likely still relatively low.

MAISRC also analyzed the eDNA technique currently used to assess concerns associated with the process. Results indicated that the technique presently employed by USACE appears to have limited use as a management monitoring tool in our region. While it produced a modest 68% detection rate for silver carp eDNA in Iowa – where silver carp are abundant – and it did not produce known false positives, it was unable to detect bighead carp in Iowa where this species is abundant. Nevertheless, the promise of eDNA is great, which merits continued research.

In addition, MAISRC submitted a proposal to the Legislative-Citizen Commission on Minnesota Resources to examine methods, velocity, and lock chamber deterrents to slow the northward movement of Asian carp. This is the best proposal thus far to potentially limit or slow the spread into the St. Croix and/or Minnesota rivers. The proposal has received preliminary approval. USACE and the DNR are partners in this project.

Future Needs

The first edition of the *Minnesota Asian Carp Action Plan,* finalized in November 2011, was developed by an informal task force that included state and federal agencies, local governments, and other interests. The plan lays out a step-wise approach to assess the threat posed by Asian carp, and focuses on actions to slow their spread and minimize their impact.

Although the plan is less than two years old, the large amount of research, monitoring, project implementation, and evaluation that has occurred, necessitates updating the plan to accurately reflect current knowledge. Thus, the DNR is co-chairing a work group with MAISRC and the National Park Service to update the plan. The 12-member work group includes representatives from government agencies, non-government organizations (NGOs), scientists, and citizens.

Revisions are underway – with a public forum planned for early 2014 – and a release of the updated plan in spring 2014. Some of the actions will require locating additional funding sources outside the DNR. We are conducting a preliminary hydrologic assessment of potential barrier sites on the Minnesota river.

Terrestrial Invasive Species Program

Goals

- The goal of the program is to improve or enhance the ability of DNR staff to effectively manage terrestrial invasive species on DNR-managed lands through prevention, management and inventory, outreach and communication, and research.

- Terrestrial invasive species such as Oriental bittersweet, wild parsnip, buckthorn, garlic mustard, earthworms, emerald ash borer, and gypsy moth can have negative impacts on Minnesota's ecology and economy and on human health.

- Prevention and management of terrestrial (land-based) invasive species are important conservation actions needed to protect and/or restore habitats for wildlife species, especially those species in greatest conservation need.

A young visitor at the Minnesota State Fair steps up to a boot brush kiosk and learns how to prevent the spread of invasive species by removing mud and seeds from his footwear.

Highlights

Prevention

- Worked with DNR staff to ensure that they had the equipment needed to prevent invasive species spread and follow the DNR's Invasive Species Operational Order 113.

- Through outreach and education with the public, worked to prevent the introduction of terrestrial invasive species to state-managed lands.

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. Funds are dispersed to DNR divisions and regions. Funding for this program has decreased over time.
- Fiscal Year 2014: Forty-nine proposals totaling $490,798 were received; $165,000 was awarded for 19 projects.

Funding History for Terrestrial Invasive Species Program

Fiscal year 2006-07

$365,000 • 31 projects • 27,375 acres[1]

Fiscal year 2008

$435,660 • 32 projects • 26,523 acres

Fiscal year 2009

$610,807 • 47 projects • 40,000 est. acres

Fiscal year 2010

$606,777 • 42 projects • 27,955 acres[2]

Fiscal year 2011

$438,000 • 33 projects • 18,258 acres

Fiscal year 2012

$178,340 • 26 projects • 24,989 acres[3]

Fiscal year 2013

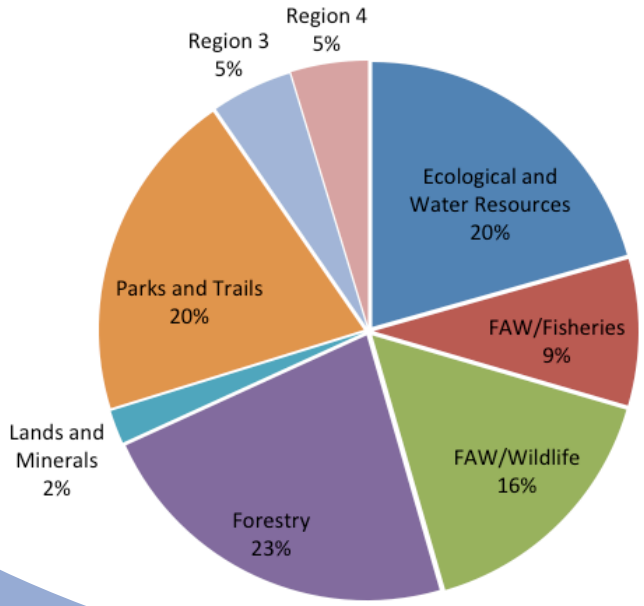
$160,000 • 22 projects • 7,547 acres

Fiscal year 2014

$165,000 • 19 projects • acres underway

[1] All fiscal years include both inventoried and managed acres
[2] + 40,000 acres from aerial survey
[3] +13,500 acres from aerial survey

Terrestrial Invasive Species Program - Fiscal Year 2013 Funding Distribution



Total $162,075* • 22 projects
• 5,304 acres inventoried • 2,243 acres managed

Species targeted: Canada thistle, common and glossy buckthorn, common tansy, garlic mustard, Japanese knotweed, leafy spurge, nonnative bush honeysuckles, nonnative thistles, reed canary grass, spotted knapweed, sweet clover, and wild parsnip.

* Includes FY 2012 carry-over funds.

Outreach and Communication

- In 2013, the outreach program "*PlayCleanGo*: Stop Invasive Species in Your Tracks" increased its social media presence with the launch of *PlayCleanGo* Facebook, Twitter, Pinterest, YouTube, and GovDelivery accounts.
- More than 2,900 people 'liked' the *PlayCleanGo* Facebook page as of November 2013.
- The first annual *PlayCleanGo* Day was held June 8, 2013 at six Minnesota State Parks. Volunteers shared information materials with visitors and demonstrated steps visitors could take to prevent the spread of invasive species.
- Sixty-seven boot brush kiosks with the *PlayCleanGo* message were purchased and installed at trail heads at State Parks, Scientific and Natural Areas, State Forests, and Wildlife Management Areas throughout the state. Two additional boot brush kiosks were installed at the Minnesota State Fair on the DNR grounds for educational purposes.

Research

Common Buckthorn (Rhamnus cathartica)

After 11 years of searching for a biological control insect that is host specific and damaging to buckthorn, we conclude that we do not have any promising agents at this time. The results of this research were submitted to a scientific journal in 2013 so that the information gained can be shared with others. The information also has been shared through presentations.

Garlic Mustard (Alliaria petiolata)

Host-specificity testing of native plant species was completed for the potential garlic mustard biological control insect *Ceutorhynchus scrobicollis* and a petition for release in the United States was submitted in September 2011 to USDA APHIS Technical Advisory Group (TAG). TAG responded in June 2013 and requested additional threatened and endangered mustard species to undergo host-specificity testing. A test species list will be developed and additional testing will be done.

The article "The Garlic Mustard *(Alliaria petiolata)* Case, What Makes a Good Biological Control Target" was published with DNR staff as co-authors (Becker et al. 2013).

In 2013, $140,000 was awarded to the DNR for three years of research on the biological control of garlic mustard. Funding for this effort is from the Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources.

Partnerships

The *PlayCleanGo* program is built around bringing in partners to help spread the word by using consistent messaging. As of November 2013, *PlayCleanGo* had 27 partner organizations (www.playcleango.org/partners).

The Minnesota Invasive Species Advisory Council (MISAC) continues to provide a mechanism for interagency and inter-organization communication and collaboration on invasive species issues (www.mda.state.mn.us/misac). The DNR was a co-chair in 2013.

MISAC produced a 2013 wall calendar highlighting 12 nonnative invasive species that are current and potential threats in Minnesota.

The DNR is a member of the Noxious Weeds Advisory Committee convened by the Minnesota Department of Agriculture (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 or not the species should be placed on a noxious weed list.

Future Needs

Within the DNR, there is a need to expand the amount of awareness, data, tools, and resources to reduce impacts caused by invasive plants on state-managed lands. Funding available for terrestrial invasive species work has decreased while the need remains great.

Invasive Species Program Staff

Staff is located in Central Office, St. Paul unless otherwise noted. Telephone numbers and email addresses are available at mndnr.gov/ais, – click on an Expert.

Bruce Anspach
Watercraft Inspection Program Assistant
Northwest Region, Park Rapids

Michael Bolinski
Watercraft Inspection Program Supervisor
Northwest Region, Fergus Falls

Nick Brown
Invasive Species Specialist
Southern Region, Hutchinson

Marjorie Casey
Communications

Wendy Crowell
Grants Coordinator

Adam Doll
Watercraft Inspection Program Supervisor
Central Region, St. Paul

Joe Eisterhold
Invasive Species Specialist
Northwest Region, Park Rapids

Evan Freeman
Watercraft Inspection Program Supervisor
Central Region, St. Cloud

Nick Frohnauer
Invasive Fish/River Habitat Coordinator

Allison Gamble
Invasive Species Specialist
Southern Region, New Ulm

Keri Hull
Watercraft Inspection Program Supervisor
Northeast Region, Brainerd

Christine Jurek
Invasive Species Specialist
Central Region, St. Cloud

Keegan Lund
Invasive Species Specialist
Central Region, St. Paul

Jessica Mellin
Watercraft Inspection Program Assistant
Central Region, Shakopee

Courtney Millaway
Invasive Species Specialist
Central Region, St. Cloud

Gary Montz
Research Scientist

Anna Ness
Watercraft Inspection Program Assistant
Northwest Region, Fergus Falls

Cory Palmer
Conservation Officer - Enforcement
New Ulm

Ann Pierce
Program Supervisor

Jay Rendall
Prevention Coordinator
651-259-5131 (through June 2013)

Richard Rezanka
Invasive Species Specialist
Northeast Region, Grand Rapids

April Rust
Training Coordinator

Dan Swanson
Invasive Species Specialist
Northeast Region, Brainerd

Justin Swart
Watercraft Inspection Program Assistant
Northeast Region, Brainerd

Laura Van Riper
Terrestrial Invasive Species Management Coordinator

Chip Welling
Invasive Aquatic Plants Management Coordinator

Heidi Wolf
Watercraft Inspection Program Coordinator

Maureen Ziskovsky
Watercraft Inspection Program Assistant
Central Region, St. Paul

Other Contacts for Invasive Species Prevention and Control Programs

STATE AGENCIES

Minnesota Department of Agriculture (MDA) – Invasive Species Programs
The MDA is responsible for the prevention and early detection of new and emerging terrestrial plant pests and management of noxious weeds. The MDA's Pest Detection and Response Unit addresses species such as emerald ash borer, potato cyst nematode, and Asian long-horned beetle. The Pest Mitigation and Biocontrol Unit coordinates all aspects of survey, treatment, and regulatory work pertaining to gypsy moth. The Seed Inspection and Noxious Weed Unit oversees the Minnesota Noxious Weed Law, coordinates weed biological control efforts, and assists land managers with general weed management and early detection efforts.

Plant Protection Division		
Pest Protection and Response Unit	Vacant	651-201-6448
Pest Mitigation and Biocontrol Unit	Lucia Hunt	651-201-6329
Pest Mitigation and Biocontrol Unit-Biocontrol	Monika Chandler	651-201-6537
Seed Inspection and Noxious Weed Unit		
Noxious Weed Law/General Management	Anthony Cortilet	651-201-6538

Minnesota Department of Natural Resources (DNR) - Forest Pest Program
The DNR's Division of Forestry, working in cooperation with the MDA, is charged with surveying and controlling forest pests including invasive organisms such as gypsy moth and several bark beetles. An annual report is prepared by the DNR Forest Health Protection Team on those issues.

Forestry Division Contacts		
Metro/Southern Forest Health Specialist	Vacant	651-259-5821
Northeast Forest Health Specialist	Mike Albers	218-327-4115
Northwest Forest Health Specialist	Jana Albers	218-327-4234
Forest Health Program Coordinator	Val Cervenka	651-259-5296
Invasive Species Coordinator	Susan Burks	651-259-5251

University of Minnesota Sea Grant - Aquatic Invasive Species Information Center
The Aquatic Invasive Species Information Center at the University of Minnesota Sea Grant Program provides research, outreach, and education in collaboration with the DNR's Invasive Species Program. The center has served as an important resource on aquatic nuisance species and provides information to the public to prevent and slow the spread of aquatic invaders.

AIS Info Center Coordinator - Duluth	Doug Jensen	218-726-8712

INTERAGENCY AND INVASIVE SPECIES GROUPS

There are several invasive species committees and work groups that facilitate coordination between agencies.

Weed Integrated Pest Management Committee, MDA Integrated Pest Management Coordinator, Jeanne Ciborowski 651-201-6217, Agricultural Development and Financial Assistance Division

Gypsy Moth Program Advisory Committee
MDA Pest Mitigation and Biocontrol Unit, Lucia Hunt 651-201-6329 Plant Protection Division

St. Croix River Zebra Mussel Task Force
Primary members include: Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources, Great Lakes Indian Fish and Wildlife Commission, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and National Park Service.

Minnesota Invasive Species Advisory Council
MDA Pest Detection and Response Unit, Teresa McDill, Co-chair, 651-201-6448 Plant Protection Division

DNR Invasive Species Program, Laura Van Riper, Co-chair 651-259-5090

APPENDIX C

References Cited

Invasive Aquatic Plants

Johnson, J.A., A.R. Jones, and R.M. Newman 2012. Evaluation of lakewide, early season herbicide treatments for controlling invasive curly-leaf pondweed (*Potamogeton crispus*) in Minnesota lakes. Lake and Reservoir Management 28:346-363.

Jones, A. R. J.A. Johnson, and R.M. Newman 2012. Effects of repeated early season, herbicide treatments of curly-leaf pondweed on native macrophyte assemblages in Minnesota lakes. Lake and Reservoir Management 28:364-374.

LaRue, E.A., M.P. Zuellig, M.D. Netherland, M.A. Heilman, and R.A. Thum. 2013. Hybrid watermilfoil lineages are more invasive and less sensitive to a commonly used herbicide than their exotic parent (Eurasian watermilfoil). Evolutionary Applications 6:462-471.

Madsen, J.D., B. Sartain, G. Turnage, and M. Marko. 2013. Herbicide trials for management of flowering rush in Detroit Lakes, Minnesota for 2012. Geosystems Research Institute Report 5059. Geosystems Research Institute, Mississippi State University, Mississippi State, MS 39762 (dated April 20).

Poovey, A.G., C.R. Mudge, K.D. Getsinger, and H. Sedivy. 2013. Control of submersed flowering rush with contact and systemic aquatic herbicides under experimental conditions. Journal of Aquatic Plant Management 51:53-61.

Thum, R.A., M.A. Heilman, P.J. Hausler, L.E. Huberty, D.J. Wcisel, M.P. Zuelling, S.T. Berger, and M.D. Netherland. 2012. Field and laboratory documentation of reduced fluridone sensitivity of a hybrid watermilfoil biotype (*M. spicatum x M. sibiricum*). Journal of Aquatic Plant Management. Journal of Aquatic Plant Management 50:141-146.

Terrestrial Invasive Species

Becker, R.L., E.J.S. Katovich, H.L. Hinz, E. Gerber, D.W. Ragsdale, R.C. Venette, D.N. McDougall, R. Reardon, L.C. Van Riper, L.C. Skinner, and D.A. Landis. 2013. The Garlic Mustard (*Alliaria petiolata*) Case, What Makes a Good Biological Control Target. The Intersection of Science, Perspectives, Policy and Regulation. pp. 332-339. *In* Proceedings of the XIII International Symposium on Biological Control of Weeds (ISBCW). Sept. 11-16, 2011. Waikoloa, Hawaii. Wu, Yun; Johnson, Tracy; Sing, Sharlene; Raghu, S.; Wheeler, Greg; Pratt, Paul; Warner, Keith; Center, Ted; Goolsby, John; and Reardon, Richard, Editors. USDA Forest Service, FHTET-2012-07. January 2013. 536 p. http://www.invasive.org/publications/xiiisymposium/.