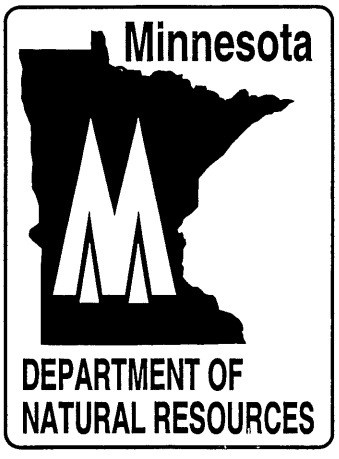
# Harmful Exotic Species of Aquatic Plants and Wild Animals in Minnesota

## Annual Report 2001

*for the year ended December 31*



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# 2001 Annual Report Highlights

## Monitoring Populations of Harmful Exotic Species

- Eurasian watermilfoil was discovered in 12 additional Minnesota waters. There are now 133 waters known to have Eurasian watermilfoil.

- Flowering rush was discovered in two new locations in the state. One is located in Hart Lake (Itasca County). The second was found in an unnamed lake in Dakota County.

- One new exotic fish species, the tubenose goby, was reported in the wild during 2001 in the Duluth/Superior harbor area.

- No range expansions were discovered in Minnesota for ruffe, round goby, zebra mussel, or spiny waterflea. And no reports of bighead or silver carp were received from the Mississippi River.

## Species Management

- The DNR Exotic Species and Aquatic Plant Management programs worked with cooperators to manage Eurasian watermilfoil on 31 lakes and the DNR initiated control efforts on other "high-intensity management" lakes.

- Approximately two million purple loosestrife-eating beetles were released at more than 250 sites. Beetles have now been released on 654 sites, one-third of the known purple loosestrife infestations in Minnesota. A survey of sites where biological-control beetles had previously been released found that the insects were causing significant damage to purple loosestrife on 39% (121 of 307) of the sites.

- The DNR Exotic Species Program staff removed flowers from flowering rush in Forest Lake, the only known population in Minnesota which produces fertile seeds. And the program coordinated and assisted with control of flowering rush at a public swim beach in Twin Lakes, Itasca County.

- The DNR removed two mute swans from the wild.

## Research and Cooperation

- For the second year, Exotic Species staff assisted the U.S. Army Corps of Engineers in studying the effectiveness of using endothall herbicide to control curly-leaf pondweed in spring when water temperatures are low.

- DNR funded research at Minnesota State University - Mankato on carbohydrate allocation in curly-leaf pondweed. The information can be used to help maximize the effectiveness of curly-leaf management.

- Two cooperative studies involving the DNR, Minnesota Sea Grant, and the University of Minnesota were continued to better understand which exotic aquatic plants are being sold in the state and how to determine whether specific plants can survive Minnesota winters.

- Over 160 lakeshore residents participated in a volunteer monitoring program during fall 2001, checking their docks, rafts, boats, and other objects for zebra mussels. The monitoring program was sponsored by DNR and Minnesota Sea Grant.

## Limiting the Spread and Preventing New Introductions

- Minnesota Sea Grant lead the development of a video "From Net to Sale" to teach bait dealers and others in the aquaculture industry how to prevent the spread of species such as Eurasian watermilfoil and zebra mussels.

- Watercraft inspectors contacted 38,696 boaters about harmful exotics species and how to clean boats and trailers. About 12% of the inspections were at uninfested waters.

- Five weekend-long exotic species awareness events were conducted in the areas of Alexandria, Red Lake, Kandiyohi County, Becker County, and the counties of Stearns, Sherburne, and Wright.

- Four road checks were held by DNR conservation officers. Aquatic vegetation was found in, or on, an average of 16% of all watercraft/trailers inspected. Warnings and citations were issued to all violators.

# Summary

This report describes the progress made during 2000 by the Exotic Species Program of the Minnesota Department of Natural Resources (DNR) and its cooperators within Minnesota. The Exotic Species Program is responsible for the monitoring and management of harmful exotic species of aquatic plants and wild animals. These are species that may harm communities of native plants and animals, limit water recreation, and increase operating costs for industry.

Funding for the Exotic Species Program is derived primarily from a $5 surcharge on the registration of watercraft. The surcharge generates approximately $1,200,000 annually and funds most of the activities described in this report. The program receives additional funding from a variety of other sources and those activities are also described. Activities documented in this report occurred in state fiscal years 2001 (FY01) and 2002 (FY02) which began on 1 July and ended on 30 June. A breakdown of FY01 expenditures by major category, as well as expenditures planned in FY02, is shown in Table 1.

**Table 1. Water Recreation Account spending by the Exotic Species Program in fiscal years 1998-2001 and projected spending in 2002. Minnesota state government fiscal years begin on 1 July and end on 30 June.**

| Fiscal Year | Expenditures ($$$ in thousands) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Administration & Overhead | General Program Activities | Public Awareness Efforts | Managing Exotic Populations | Inspections & Enforcement Efforts | Research | Total |
| 1998 | 156 | 136 | 57 | 235 | 379 | 85 | 1,048 |
| 1999 | 135 | 126 | 114 | 287 | 358 | 127 | 1,147 |
| 2000 | 162 | 102 | 94 | 257 | 410 | 94 | 1,119 |
| 2001 | 173 | 84 | 110 | 258 | 432 | 113 | 1,170 |
| 2002 | 169 | 90 | 90 | 286 | 448 | 98 | 1,181 |

The three primary goals of the Exotic Species Program are:

- Prevent introductions of new harmful exotic species into Minnesota;
- Prevent the spread of harmful exotic species within Minnesota; and
- Reduce the impacts caused by harmful exotic species to Minnesota's ecology, society, and economy.

To accomplish these goals the DNR and its cooperators undertake a wide variety of, and continually increasing, scope of activities (program summary is shown on page 5). This report details the program's progress during 2001 in meeting its goals and

provides updates on management efforts for various key species, e.g. Eurasian watermilfoil, purple loosestrife, zebra mussels, flowering rush, and curly-leaf pondweed, ruffe, and mute swan. Detailed information on emerging exotic species issues is also provided.

The Exotic Species Program's efforts in 2001 to prevent the introduction of new harmful exotic species to Minnesota were focused on species and pathways related to aquatic plants and exotic earth worms. A cooperative study by Minnesota Sea Grant, DNR, and University of Minnesota was continued to identify aquatic plants that are available for sale to Minnesota residents and the vendors who supply them, what contaminants are included, and to improve methods to identify which species will be "winter-hardy".

Reports received by the DNR and inventory efforts conducted in 2001 documented the introduction of new aquatic exotic species in Minnesota and the spread of species that are already present in the state. The tubenose goby, a European fish, was discovered in the Duluth/Superior harbor. Eurasian watermilfoil was confirmed to have spread to twelve waters bringing the total to 133. This total includes Rice County, an area of the state where the plant had not previously been identified. Two new populations of flowering rush were discovered in 2001. They were Hart Lake in Itasca County and an unnamed lake in Dakota County. In contrast, during 2001 no change was documented in the distribution within Minnesota of a number of other harmful exotic species. No evidence was found that zebra mussels, spiny water flea, ruffe, or round goby have expanded their range in Minnesota.

The Exotic Species Program continued efforts to keep Minnesotans well informed about exotic species and the problems they can cause, and to promote the adoption of "clean boats" behavior. A well-informed public is an important strategy in DNR efforts to prevent the spread of harmful exotic species. In 2001, DNR continued to use paid radio ads to reinforce the "clean boats" message and undertook a variety of cooperative efforts with the University of Minnesota Sea Grant Program. Information on harmful exotic species provided on DNR's website (dnr.state.mn.us/ecological_ services/ exotics/) was expanded. In addition, the program worked with local communities in greater Minnesota to promote an exotic species prevention message. Weekend-long exotic species awareness events were conducted in: Kandiyohi County; Alexandria; Becker County; Red Lake; and a joint effort in Stearns, Sherburne and Wright Counties during the summer of 2001. Because of the expansion of zebra mussels into the lower St. Croix River and Lake Zumbro additional public awareness efforts were focused in those areas during 2001.

| **Exotic Species of Aquatic Plants and Wild Animals in Minnesota** | **Elements of DNR's Exotic Species Program** | | | | | | |
|---|---|---|---|---|---|---|---|
| | A = Public information and education<br>B = Watercraft inspections to prevent spread<br>C = Population surveys and monitoring<br>D = Control to reduce nuisance<br>E = Control to reduce populations/escapes<br>F = Research on biology and management<br>G = Regulations | | | | | | |
| | **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| **Aquatic Plants** | | | | | | | |
| Flowering rush (*Butomus umbellatus*) | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Purple loosestrife (*Lythrum salicaria*) | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Eurasian watermilfoil (*Myriophyllum spicatum*) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Other Non-native aquatic plants | ✓ | | ✓ | | | | ✓ |
| Curly leaf pondweed (*Potamogeton crispus*) | ✓ | ✓ | **F** | **APM** | | ✓ | ✓ |
| **Animals** | | | | | | | |
| Common carp (*Cyprinus carpio*) | | | **F** | | **F/W** | **W** | ✓ |
| Ruffe (*Gymnocephalus cernuus*) | ✓ | ✓ | **F/O** | | **NIF** | ✓ | ✓ |
| Round goby (*Neogobius melanstromus*) | ✓ | ✓ | **F/O** | | **NIF** | | ✓ |
| Spiny waterflea (*Bythotrephes cederstroemii*) | ✓ | ✓ | **F** | | | | ✓ |
| Zebra mussel (*Dreissena polymorpha*) | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| Rusty crayfish (*Orconetes nusticus*) | ✓ | | | | | | ✓ |
| Mute swan (*Cygnus olor*) | | | ✓ | | ✓ | | ✓ |

APM - Individuals or groups apply for aquatic plant management permits
F - DNR Division of Fisheries monitors this species
F/O - DNR Division of Fisheries and other agencies monitor this species
F/W - DNR Division of Fisheries and/or Division of Wildlife occasionally manage this species at priority sites
NIF - Inland waters will be addressed as outlined in a Nonindiginous Fish Plan
W - DNR Division of Wildlife is involved with research on this species.

**Figure 1. Elements of Minnesota DNR's Exotic Species Program.**

The Exotic Species Program stations watercraft inspectors at public water access points to make the boating public aware of exotic species and provide advice on how to clean watercraft. The Minnesota Legislature mandates (M.S. 84D.02, Subd. 4) that the DNR annually accomplish 20,000 hours of water access inspection activity. The DNR's goal, based on input from constituent groups, is to focus about 90% of the required access inspection effort on "infested waters". In 2001, 20,047 hours of inspection activity was logged and over 38,696 trailered watercraft were inspected (about 88% of this activity occurred on infested waters). Special inspection efforts continued to be focused on events, e.g., fish tournaments and the waterfowl hunting season, that bring many watercraft users to infested waters.

Conservation Officers play a key role in bringing harmful exotic species to the public's attention and enforcing exotic species laws. Conservation Officers use road checks of trailered boats as one tool to accomplish these goals. Road checks also can be used to evaluate the success of prevention efforts. Trailered boats represent an important vector that move exotic species between water bodies and the DNR's goal is to increase the percentage of "clean boats" on the state's roads. Conservation Officers conducted four major road checks in 2001 where 429 boats were inspected to assess compliance with laws that prohibit the transportation of aquatic vegetation and zebra mussels on public roads. Aquatic vegetation was found in, or on, about 16% of the trailered watercraft inspected; the lowest rate observed in the last five years. Nevertheless, results between road checks and between years are often quite variable. Watercraft inspectors also check boats entering and leaving the accesses where they are doing inspections. Their results show a different pattern; on average 24% of boats pulling out of a lake or river had vegetation attached - before cleaning - while vegetation was present on only 3 - 5% of the boats pulling into the access area.

The Exotic Species Program attempts, alone or in cooperation with various groups, to reduce the impacts caused by harmful exotic species to Minnesota's ecology, society, and economy. A wide variety of management actions were conducted in 2001 with this goal in mind. DNR conducted or assisted with Eurasian watermilfoil control efforts on 49 lakes, purple loosestrife control efforts on over 310 sites (60 sites were sprayed with herbicide while biocontrol insects were released at more than 250 sites), and continued to coordinate flowering rush management activities on a number of lakes. Local partners are extremely important for the success of these efforts. For example, on a majority of the lakes where Eurasian watermilfoil is managed, a local partner takes the lead while the Exotic Species Program provides technical and financial assistance. Likewise, a broad group of partners assist with the rearing of the leaf-eating beetles that are being introduced to control purple loosestrife infestations. In 2001, groups cooperating with the Exotic Species Program raised and released approximately two million leaf-eating beetles. The Exotic Species Program will continue to cooperate with various groups to accomplish its public awareness, containment, management, and research goals.

Targeted research, to improve existing management approaches, can aid in reducing the impacts caused by harmful exotic species. The Exotic Species Program assisted

with and/or funded a variety of research efforts during 2001 focused on improving the management of Eurasian watermilfoil, purple loosestrife, flowering rush, reed canary grass, and curly-leaf pondweed. Funding recommended by the Legislative Commission on Minnesota Resources (LCMR) and appropriated by the Legislature continued to support a large, on-going, effort to develop biological-control methods for Eurasian watermilfoil and expand biological controls for purple loosestrife. Cooperators play an important role in these research efforts, including conducting basic research, helping implement field tests, and analyzing study results. During 2001, staff and in some cases students from the University of Minnesota, Cornell University (NY), and the Army Corps of Engineers Aquatic Plant Research conducted research that may improve exotic species management in Minnesota.

# Introduction

## Administration of state exotic species control programs

The control and prevention programs for harmful exotic species in the State of Minnesota are administered by the Department of Natural Resources (DNR) and the Minnesota Department of Agriculture (MDA). The DNR's Exotic Species Program within the Division of Ecological Services is responsible for programs covering exotic aquatic plant and wild animal species. DNR's Division of Forestry, working in cooperation with the Department of Agriculture, is charged with surveying and controlling forest pests, including exotic organisms such as gypsy moth and evergreen spruce bark beetle. A separate annual report is prepared by the Forest Pest Program to report on those issues. The Department of Agriculture is responsible for the state's noxious weed and seed laws which apply primarily to terrestrial plants that harm agricultural crops, pastures, and roadsides. Information about control, prevention, and regulatory programs for harmful terrestrial exotic plants and plant pests may be obtained from the Department of Agriculture.

## Requirement to prepare annual report

Each year, by January 15, the DNR is required to prepare a report for the Legislature which summarizes the status of management efforts for harmful exotic species (aquatic plants and wild animals) under its jurisdiction (see M.S. 84D.02, Subd. 3 in Appendix A). According to statute, this report must include:

- detailed information on expenditures for administration, education, management, inspections, and research;
- an analysis of the effectiveness of management activities conducted in the state, including chemical control, harvesting, educational efforts, and inspections;
- information on the participation of other state agencies, local government units, and interest groups in control efforts;
- information on management efforts in other states;
- information on the progress made in the management of each species; and
- an assessment of future management needs.

Additional sections on prevention, regulations, enforcement, emerging issues and distribution of species have been added to this report to provide a thorough account of Exotic Species Program activities. Background information on select harmful exotic species which are present in Minnesota, but are not currently actively managed are also included.

# Overview of Minnesota Exotic Species Program

## History of DNR's Exotic Species Program

Although harmful exotic species have been present in Minnesota for decades (e.g., common carp and sea lamprey), a specially identified program to prevent their spread and mitigate their negative impacts is relatively new to state government. In 1987, the Minnesota Department of Natural Resources (DNR) was designated the lead agency for control of purple loosestrife, an invasive plant of particular concern for the state's wetlands. In 1989, DNR was officially assigned an additional coordinating role for Eurasian watermilfoil (EWM) control (see M.S. 84D.02, Subd. 2 in Appendix A).

During its 1991 session, and in response to the "Report and Recommendations of the Interagency Exotic Species Task Force" (Minnesota Interagency Task Force 1991), the Legislature called for the DNR to develop and coordinate a statewide program to prevent the spread of *ecologically harmful exotic wild animals and aquatic plants*. Many species, in addition to purple loosestrife and Eurasian watermilfoil, fall under the DNR's statewide responsibility. They include harmful exotic species that are currently found in Minnesota, such as zebra mussel and ruffe, as well as harmful species that have the potential to move into Minnesota.

## Responsibilities Assigned to the DNR

The purpose of DNR's Exotic Species Program is to prevent the introduction and curb the spread of harmful exotic species. These species are aquatic plants and wild animals that can naturalize in the state and either:

- displace, or otherwise threaten, native species in their natural communities; or
- threaten natural resources or their use in the state.

The DNR is assigned the responsibility for preparing a long-term plan for the statewide management of harmful exotic species (see M.S. 84D.02, subd. 3 in Appendix A). Management plans for individual species are also prepared by the DNR. Preparing a statewide plan and species specific plans is beneficial for coordinating efforts within the state, and establishing priorities for prevention, management, and research activities.

The DNR is assigned responsibility for designating *infested waters* (see M.S. 84D.03 in Appendix A). Water bodies are designated *infested* if they contain certain harmful exotic species such as Eurasian watermilfoil, zebra mussels, ruffe, round goby, white perch, and spiny water flea. The current *infested waters* lists are included (Appendix B).

The DNR is also required to adopt rules (see M.S. 84D.12 in Appendix A) which place exotic species into various regulatory classifications and prescribe how exotic species permits will be issued (see M.R. 6216.0265 in Appendix B). The DNR is authorized to adopt other rules regarding harmful exotic species and infested waters.

Another important role of the program is prevention activities, such as identifying potentially harmful species in other areas of North America and the world, predicting pathways of spread, and developing and implementing solutions that reduce introduction and spread.

## Program staff

Most activities of the Exotic Species Program are conducted or directed by staff from DNR's Division of Ecological Services. Current staff, their principal areas of activity, and their phone numbers, are listed below:

| | | |
|---|---|---|
| Exotic Species Program Coordinator | Jay Rendall | 651-297-1464 |
| Purple Loosestrife Coordinator | Luke Skinner | 651-297-3763 |
| Eurasian Watermilfoil Coordinator | Chip Welling | 651-297-8021 |
| General Exotic Species Issues | Wendy Crowell | 651-282-2508 |
| | Brainerd office | 218-828-6132 |
| | Nick Proulx | 651-284-3589 |
| Watercraft Inspections | Tiffanie Knapp (2001) | 651-284-3586 |
| | Jason Abraham (2002) | 651-284-3586 |
| | Heidi Wolf | 651-297-4891 |
| Zebra Mussels\Exotic Aquatic Invertebrates | Gary Montz | 651-297-4888 |
| Budget Management | Dave Wright | 651-297-4886 |
| General Information | | 651-296-2835 |

Responsibility for overall coordination of the DNR's Exotic Species Program is assigned to the Program Coordinator (Jay Rendall). Development of exotic species policy, rulemaking, legislation, participation in regional and federal entities are other key responsibilities of the Coordinator's position.

## Other staff support

Staff from the Division of Fisheries, Division of Wildlife, Division of Enforcement, Division of Trails and Waterways, Bureau of Information, Education, and Licensing and Minnesota Conservation Corps also contribute significantly to the implementation and coordination of exotic species activities.

Divisions of Ecological Services, Fisheries, and Wildlife Pesticide Enforcement specialists from Ecological Services and Aquatic Plant Management specialists in the Division of Fisheries assist with the management of various exotic plants including purple loosestrife, Eurasian watermilfoil, and flowering rush. In addition to these staff, other individuals from the Divisions of Fisheries and Wildlife contribute by providing biological expertise, assisting with control efforts, conducting inventory and public awareness activities, and providing additional avenues for public input.

Division of Enforcement Conservation officers are responsible for enforcing the state regulations regarding harmful exotic species. A regional Enforcement Supervisor now acts as exotic species enforcement coordinator within the Division of Enforcement to assist in scheduling, conducting, and reporting on enforcement activities related to

harmful exotic species. A chapter describing enforcement activities is included in this report (see Enforcement).

Minnesota Conservation Corps (MCC) In 2001, 35 corps members spent 20,047 hours inspecting boats at public water accesses on lakes and rivers in Minnesota primarily at those infested with exotic species. Corps members also assist conservation officers at road checks, work at the State Fair, and in a variety of education efforts. A summary of their efforts is included in this report (see Watercraft Inspections).

Bureau of Information, Education, and Licensing Staff from the Bureau of Information, Education, and Licensing provide support for the DNR's Exotic Species public awareness activities (see Education\Public Awareness).

## Funding

Funding for the DNR's exotic species activities is derived primarily from a surcharge on watercraft licenses. The surcharge for a three year license period is $5 and generates approximately $1,200,000 annually. Additional appropriations, primarily for specific research efforts, have come from the Environment and Natural Resources Trust Fund and Minnesota Future Resources Fund (Table 3).

In 2001, the program sought and received grants from several sources. Federal funding was authorized from the U. S. Fish and Wildlife Service (USFWS) in the amount of $85,000, to implement an interstate management plan that addresses prevention and management of aquatic nuisance species on the St. Croix River during 2002. The program received a small grant of $7,124 from the USFWS International Division to conduct a risk assessment regarding exotic earthworms.

The program also received grants in 2002 to fund research regarding biological control of Eurasian buckthorn species. The grants, which will be spent in 2002 and 2003 via a contract with CABI Bioscience in Switzerland, included: U.S. Environmental Protection Agency - $75,000; Bailey's Nursery Foundation - $2,000; Minnesota Nursery and Landscape Association - $1,500; and donations from concerned citizens - $400. Other state funding commitments to further the buckthorn research included $20,000 from DNR Ecological Services (2001); $5,000 from DNR Trails and Waterways(2002); and $5,000 from the Minnesota Department of Agriculture (2002).

## Federal and Regional Coordination

The DNR Exotic Species Program staff often participate in regional or federal activities regarding harmful exotic species. Jay Rendall, Exotic Species Program Coordinator, is the current Minnesota representative to the Great Lakes Panel on aquatic nuisance species (Doug Jensen from Minnesota Sea Grant is the alternate). Participation on this regional panel, helps keep Minnesota informed of regional and federal efforts regarding harmful exotic species, and provides a voice for Minnesota interests. The Mississippi Interstate Cooperative Resources Association (MICRA) has an aquatic nuisance species committee. Jay Rendall represents the state on that committee and was the committee chairperson in 2001. The DNR Exotic Species Program Coordinator also

participates on the following committees: Council of Great Lakes Governor's Ballast Water Task Force, Citizen Advisory Committee for the Dispersal Barrier Demonstration Project in Chicago, and the Recreational Activities Committee of the National Aquatic Nuisance Species Task Force.

Luke Skinner, Purple Loosestrife Coordinator, has been involved in regional and national efforts to use biological agents to manage purple loosestrife, leafy spurge, and garlic mustard. He is a member of the National Biological Control Planning Committee established to develop national guidelines for implementation of biological controls for purple loosestrife.

Gary Montz, Research Scientist, and Jay Rendall have participated in the development and implementation of the St. Croix River Zebra Mussel Response Plan and the drafting of an interstate management plan for the prevention and control of nonindigenous aquatic nuisance species in the St. Croix River.

## References Cited

Minnesota Interagency Task Force 1991. Report and recommendations of the Minnesota Interagency Exotic Species Task Force. Final edit. Submitted to the Natural Resources Committees of the Minnesota House and Senate by the Minnesota Department of Natural Resources, Division of Fish and Wildlife, 500 Lafayette Road, St. Paul, MN 55155.

# Emerging Issues

## Introduction

A new species of fish, the tubenose goby, was discovered in the state's border waters and other species are likely to invade Minnesota in the future. While it is impossible to predict with certainty when, where, or how new introductions will occur, they could represent a significant threat to the state's ecosystems and related recreation and commerce activities. This chapter highlights a number of these threats, the response by Minnesota and others, and future work that needs to be done.

## Emerging Issues Highlights - 2001

- In September 2001, an exotic fish, the tubenose goby (*Proterorhinus marmoratus*) was discovered in Duluth/Superior harbor on Lake Superior by U.S. Geological Survey (USGS) and Wisconsin Department of Natural Resources (WIDNR) fisheries biologists.

- Water lettuce (*Pistia stratiotes*), a tropical floating aquatic plant that can form dense floating mats and displace native plants, was not found in Lake Winona where it had been discovered in 2000.

- A variety of exotic species of earthworms continue to be a severe threat to forest ecosystems in the state. They are present in many locations in Minnesota and more impacts of these infestations are being documented through ongoing research. Where a European species of earthworm (*Lumbricus terrestris*) has invaded, it appears that the abundance and diversity of native plant species and tree seedlings decline dramatically.

- Black carp (*Mylopharyngodon piceus*) are already present in, or are proposed for use in, aquaculture ponds in at least three southern states (Arkansas, Mississippi, Missouri). Their escape would pose a significant risk to the mollusk and fisheries resources throughout the Mississippi River and its tributaries.

- Bighead carp (*Hypophthalmichthys nobilis*) and silver carp (*Hypophthalmichthys molitrix*) in the Mississippi River Basin downstream from Minnesota continue to be a concern and are likely to move upstream and threaten fisheries in the Minnesota.

- The DNR sought and received a small grant to conduct a risk assessment on exotic earthworms and determine what actions should be taken in the state to prevent and limit their harmful impacts.

- Eurasian collared-doves (*Streptopelia decaocto*) were documented in four additional counties of Minnesota including one in the northern border of the state and they are likely to continue spreading throughout the state.

## Exotic Deer

For several years, exotic deer were occasionally reported in the wild and the DNR has responded to those escapes. In 2001, the number of exotic deer that have escaped or have been reported in the wild has increased considerably. Between one and six sika and fallow deer have escaped and been reported in the wild on eight separate occasions. The exotic deer in the wild were observed in the following counties: Aitkin, Crow Wing, Douglas, Meeker, and Ottertail.

## Tubenose Goby

In April and September 2001, tubenose gobies (*Proterorhinus marmoratus*) were discovered in Duluth/Superior harbor on Lake Superior. The discoveries were made by U.S. Geological Survey (USGS) and Wisconsin Department of Natural Resources (WIDNR) fisheries biologists. The fish was likely transported from the St. Clair River area of the Great Lakes in ballast water. The first fish was caught by USGS in a bottom trawl between the Bong Bridge and Erie Pier on the Minnesota side of the river. It was aged at one year old by USGS and was 2 3/8" long (personal communication Lori Evrard, U.S. Geological Survey, Lake Superior Biological Station). The WIDNR captured the second fish in standard survey work in the Duluth/Superior harbor on the lower St. Louis River located on Western Lake Superior (WIDNR 2001). The second specimen captured was about 1 3/4" long and less than a year old. It is unknown at this time whether this fish is the result of natural reproduction within the harbor or was an individual released in ballast water. These discoveries represent the first occurrence of the tubenose goby found outside of the St. Clair River/Western Lake Erie area.

The tubenose goby is a Eurasian fish species that is native to the Black and Caspian seas. In 1990, it was first discovered in the Michigan waters of the St. Clair River between Lakes Huron and Erie and has since been found in Northwestern Lake Erie. Michigan biologists state that the tubenose goby although more abundant in the first few years after their original discovery are considered a rare species there today. This is in great contrast to the round goby (*Neogobius melanostomus*), another Eurasian fish discovered in the Great Lakes around the same time period.

Tubenose gobies lay eggs on aquatic vegetation. If tubenose goby populations increase in the Duluth harbor, it is possible they could be inadvertently transported to other waters via aquatic vegetation attached to boats and boating equipment.

## Mississippi River Basin

### Water lettuce

During the fall of 2000, a water lettuce (*Pistia stratiotes*) infestation was verified by the Exotic Species Program staff and all visible individuals (~275) were collected and destroyed. Current literature and one expert on water lettuce, suggested that water lettuce should not be able to persist in a Minnesota climate. In particular, the growing season is too short for water lettuce to produce viable seeds. The Exotic Species Program followed up during August 2001 by monitoring of Lake Winona and no water

lettuce plants were found. Exotic Species Program staff believe it is likely the water lettuce had been intentionally introduced in Lake Winona, that educational efforts in 2000 discouraged similar introductions in 2001, and as the literature suggested, water lettuce cannot survive winters in Minnesota.

**Black carp**

Black carp (*Mylopharyngodon piceus*) do not currently occur in the Mississippi River or tributaries, but they pose a significant threat to native mollusks and other fisheries in the basin. After a year of evaluation which began in 2000, the U.S. Fish and Wildlife Service is in the final stages of a process to determine if they will list black carp as an injurious wildlife species. Minnesota DNR supported black carp designation as an injurious wildlife species by submitting a letter to the USFWS during 2000 in response to a notice in the *Federal Register*. The USFWS decision may be finalized in early 2002.

At the state level, during 2001 several additional states have designated black carp as a prohibited species. The State of Mississippi Department of Agriculture and Commerce, which recently approved the importation of black carp for snail control in catfish ponds, has now required that the black carp in that state must be triploid (sterile). In Arkansas, diploid (fertile) black carp exist in captivity for the purpose of breeding triploid black carp. Black carp were present in captivity in Missouri, in aquaculture ponds and during 2001, Missouri state officials were successful in eliminating black carp from one large aquaculture operation. The Missouri Department of Conservation will provide triploid carp to the aquaculture operations that desire them for snail control in catfish ponds. Black carp are also reported to be in ponds in Louisiana. The potential escape of black carp from these states, into the Mississippi River basin, continues to be a concern of Minnesota and basin-wide.

**Bighead carp**

The bighead carp (*Hypophthalmichthys nobilis*) was initially introduced into several southern Mississippi River basin states in the 1960s. Its distribution in the basin has expanded and, in recent years, populations of this fish in states such as Indiana, Iowa, and Missouri have dramatically increased. Based on reports of increasing populations of bighead carp in the Mississippi River in Missouri, Iowa, and other states of the upper Mississippi basin, it is likely that this exotic will soon invade the Mississippi River and its tributaries in southern Minnesota. There was no significant news about this species in 2001, yet it remains a species to be concerned about in Minnesota waters connected to the Mississippi River, especially for paddlefish and zooplankton populations.

**Silver carp**

The silver carp (*Hypophthalmichthys molitrix*) is present in large numbers in the Mississippi River and is likely to move into Minnesota waters of the Mississippi River soon. The fish was found in open waters of southern states in the Mississippi River basin about 1980, likely the result of escapes from fish hatcheries and other aquaculture facilities. In large numbers the fish has potential to cause considerable damage to native species because it feeds on plankton required by larval fish and

native mussels. No significant news about this species was available in 2001, although it continues to be a concern to boaters in other states because the fish commonly jump up to five feet into the air and into boats. It remains a species to be concerned about in Minnesota waters connected to the Mississippi River.

## Illinois Waterways

The Illinois waterways in the Chicago area are an unrestricted pathway through which harmful exotic species can move from Lake Michigan into the Mississippi River basin, and therefore into the St. Croix River, the Minnesota River, and its other tributaries in this state. This artificial connection between the Great Lakes watershed and Mississippi River watershed was the route that allowed zebra mussels to enter the Mississippi River. It now appears to be the pathway that will introduce round gobies into the Mississippi River basin and in the future could be the pathway for ruffe, a water flea (*Cercopagis*), and other exotic species to enter the Mississippi basin from Lake Michigan.

The National Invasive Species Act of 1996 called for the U.S. Army Corps of Engineers (USACOE) to install a demonstration dispersal barrier to prevent the spread of aquatic nuisance species through the Chicago Sanitary and Ship Canal portion of the Illinois waterways. There have been numerous completion dates promised by the Corps. Despite continued efforts in 2000 an 2001 to make the project a priority with the Corps, as of December 2001 the barrier still isn't operational. Round gobies are now confirmed to be past the proposed barrier site and have been documented just upstream of the Des Plaines River, a tributary that leads to the Mississippi River (see Round Goby).

## Exotic Earthworms

Several species of exotic earthworms continue to be a severe threat to forest ecosystems in the state. They are present in many locations in Minnesota and more impacts of these infestations are being documented through ongoing research (see 2000 annual report for more background information).

Past studies have shown that where exotic species of earthworms from Europe (e.g., *Lumbricus terestris* and *L. irubellus*) have invaded, they are eliminating the duff layer in hardwood forests of Minnesota and it appears that the abundance and diversity of native plant species and tree seedlings decline dramatically within a few years of the worm's presence. Earthworm invasions pose a significant threat to many forest understory plant species including rare and endangered species and spring ephemerals. Populations of ground nesting birds, amphibians, and other species in the ground layer may also be harmed following earthworm invasions.

As with other harmful exotic species, there are many human related pathways of introduction. European earthworms came to North America in soil of potted plants, in soil used for ship's ballast, and have been imported for angling bait. Worm experts have suggested that wild populations of exotic earthworms can get started from unused worms released on land by anglers and there is a good correlation of infested areas

with places where people fish. Other pathways of spread may include soil on tire treads of off-road vehicles, landscaping activities (e.g., moving topsoil, sod, spaded trees) and composting.

Research about exotic earthworm distribution and impacts in the state is ongoing. At the University of Minnesota, Cindy Hale, Andy Holdsworth, and Dr. Lee Frelich are undertaking "A survey of earthworms and native plant communities in hardwood forests in Minnesota." Their research, initially funded by the Minnesota Nongame Wildlife Small Grants Program, has expanded greatly as a result of funding from the National Science Foundation and a major private donation to the U of M Center for Hardwood Ecology. It is hoped that this survey will provide baseline information to aid potential policy, management, and restorations plans. Their research includes four areas of focus: 1) Regional survey of earthworms and plant diversity, 2) herbaceous recovery after deer and earthworm exclusion, 3) the role of tree and earthworm community composition in forest floor loss, and 4) litter decomposition in areas with low versus high earthworm biomass.

In 2001, the DNR Exotic Species Program sought and received a small grant from the USFWS to conduct a risk assessment on exotic earthworms. To assist in conducting the risk assessment, the DNR Exotic Species Program assembled an exotic earthworm team. The team will help assess the problem and assist in determining how importation and release of exotic earthworms could be regulated in the future, inform the public about concerns and precautions to avoid introducing exotic earthworms, and what if any control or management options are available to limit the distribution and impacts of exotic earthworms. The team includes scientists from the University of Minnesota, and regulatory program and other staff from DNR and the MDA, as well as individuals with exotic earthworm expertise and concerns from the Chippewa National Forest, Leech Lake Reservation, and Native Plant Society. The team held a meeting in December and Nick Proulx from the DNR Exotic Species Program began the risk assessment.

## Eurasian Collared-dove

The Eurasian collared-dove (*Streptopelia decaocto*) was first described as a new exotic bird species present in the state in the 1999 annual report. They were seen in Big Stone, Brown, Carver, Dakota, Freeborn, Lyon, Kandiyohi, Martin, Pipestone, and Yellow Medicine counties in 1999 or 2000. They were observed in the following additional counties in 2001: Houston (nest with two eggs was observed), Renville, Rock, and Roseau (the first reported sighting in a northern county). A less reliable report of doves in Nobles County was included in a birding report. They are likely to be in other Minnesota counties.

Note: See the 2000 annual report and references in this chapter for additional information.

## Threespine and Fourspine Sticklebacks

One of the newer exotic fish species to be found in Minnesota waters is the threespine stickleback (*Gasterosteus aculeatus*) (see 2000 annual repport for distribution information). Stephenson and Momot (2000) suggest, based on their research in Ontario, that the threespine populations may reduce the abundance of native stickleback populations and may be less subject to predation (except by bullheads) than native ninespine.

The fourspine stickleback (*Apeltes quadracus*) is currently found in Lake Superior near Thunder Bay, but is not known to have spread to other areas of the lake. Potential future spread of this species could also reduce native stickleback populations. In Ontario, the rapid increase of fourspine particularly in nearshore areas suggests it is displacing native sticklebacks, such as the brook and ninespine, at a rapid rate (Stephenson and Momot 2000).

## Reed canary-grass

Reed canary-grass (*Phalaris arundinacea* L.) was first included in the annual report for 2000 as an 'emerging issue' (Exotic Species Program 2001:19). There are several active research groups in the upper Midwest that are increasing our knowledge of the ecology of this invasive species. In 2001, Dr. Susan Galatowitsch and one of her students, Ms. Emily Green, of the University of Minnesota-Saint Paul published a paper on the effects of reed canary-grass and another invasive plant on plant communities of restored wetlands (Green and Galatowitsch 2001). In addition, the efforts of Ms. Carrie Reinhardt and Dr. Galatowitsch, which were briefly described by the Exotic Species Program (2001), continued in 2001.

Another research group lead by Dr, Joy Zedler at the University of Wisconsin-Madison also is investigating the effects of invasion by reed canary-grass on communities of native plants (Zedler et al 2001). Other topics under investigation by Dr. Zedler's group include: seed germination and establishment in relation to light (Lindig-Cisneros and Zedler 2001); effects of light, nutrients, and flooding on establishment of rhizome fragments; use of the native grass Spartina pectinata as an alternative plant in storm water basins; effects of hydroperiod and sedimentation on the plant.

Doug Norris, Wetlands Coordinator in the Division of Ecological Services, DNR, is investigating the potential to obtain funding to evaluate the relationship between the abundance of reed canary-grass in wetlands and use by wildlife. Some research in this area has been initiated by Dr. Eileen Kirsch of the U.S. Geological Survey Center in La Crosse, WI.

## Future Needs

- Monitor information regarding exotic species in other states or provinces that may be of concern in Minnesota.
- Survey Lake Winona during the 2002 growing season for water lettuce and other non-native species
- Disseminate information regarding risks of exotic earthworms and precautions for those involved with pathways of spread.
- Support establishment of a Mississippi River Basin Aquatic Nuisance Species Panel by the Federal ANS Task Force. Also, participate in the panel once it is established.

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# Regulations

## 2001 Highlights

- The DNR gave notice of proposed rulemaking through the *State Register* and sent letters to many potentially affected entities. The proposed rule would designate aquatic plants on the federal noxious weed list as prohibited exotic species in Minnesota and yellow iris as a regulated exotic species (see Appendix C for draft rule language).

- Additional waters identified with populations of Eurasian watermilfoil and zebra mussels were designated as infested waters through emergency rule making.

## Background

State

Most harmful exotic species were unregulated in Minnesota until the mid-1980s. In 1987, the first law prohibiting the sale of purple loosestrife was passed. As additional harmful exotic species have been introduced into Minnesota and the Great Lakes region, state statutes were modified several times to address the changing threats to the state's resources and the need for technical amendments to previous laws. Four categories are used to regulate exotic species: prohibited, regulated, unregulated, and unlisted (see Table 2). Descriptions of regulatory changes made each year are included in past annual reports. The current state statutes and rules are located in Appendices A and B, respectively.

Federal

Federal Public Law 101-646, titled the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, includes a mandate that the U.S. Coast Guard regulate ballast water discharge into the Great Lakes. Since many harmful species present in waters near Duluth are the result of ballast water discharges, this legislation was an important first step to protect Minnesota waters from future introductions of harmful species.

The National Invasive Species Act of 1996 (NISA), reauthorizing Federal Public Law 101-646, was passed by the U.S. Congress and signed into law. The act is intended to enhance prevention of aquatic nuisance species introduction and spread at the national level.

On February 3, 1999, President Clinton signed an executive order that further mobilized the federal government to defend against alien invasive species (e.g., harmful exotic species). The Departments of the Interior, Agriculture, and Commerce were given the lead to encourage federal agencies to work together to prevent the introduction of non-native species and control those already here. Under the executive order, a new Invasive Species Council was formed to, amongst other activities, provide national leadership regarding invasive species, and see that the federal agency activities

concerning invasive species are coordinated, complementary, cost-efficient, and effective, relying to the extent feasible and appropriate on existing organizations addressing invasive species, such as the Aquatic Nuisance Species Task Force, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds, and the Committee on Environment and Natural Resources.

**Table 2. Explanation of regulations associated with Minnesota's exotic species classifications.**

| | Regulations | | | |
|---|---|---|---|---|
| **Regulatory Classification** | **Transportation** | **Importation, sale, possession, propagation** | **Introduction** | **Responses to escapes** |
| Prohibited | Prohibited - except for disposal as part of control activities or when transporting to DNR to report the presence of a species. | Prohibited - except under permit for disposal - control, research, or reduction. | Prohibited | For escaped animals, the individual must notify DNR within 48 hours and is responsible for cost of capture. |
| Regulated | Not prohibited | Not prohibited | Prohibited - unless excepted by rule, or under DNR permit (per M.S. 84D.07). | For escaped animals, the individual must notify DNR within 48 hours and is responsible for costs of capture if permit conditions were violated. |
| Unlisted | Not prohibited | Not prohibited | Prohibited - unless reviewed and permit issued (per 84D.06) or after review the DNR designates the species as unregulated. | For escaped animals, the individual must notify DNR within 48 hours. |
| Unregulated | Not prohibited - (These species are not subject to regulation under Minn. Stat. 84D. Although may be regulated through other laws). | Not prohibited | Allowed | No requirements. |

## Progress in Regulations - 2001

During 2001, progress was made in the following areas that were identified as future needs in the 2000 report.

Improve Federal Laws

The DNR provided comments on several federal regulatory issues (e.g., ballast water standards) and regional policy positions to encourage the adoption of better federal policies and regulations. The DNR provided comments to the Great Lakes Panel on priorities for Congressional reauthorization of the National Invasive Species Act of 1996. DNR participated in three conference calls sponsored by the Northeast-Midwest

Institute related to priorities for NISA reauthorization regarding rapid response, recreational activities, and the dispersal barrier in the Illinois waterways. As an invited speaker, Jay Rendall gave a presentation on "Invasive Species Regulations: Past, Present, and Future" for Invasive Species Symposium at the Ecological Society of America annual meeting in Madison, WI.

Minnesota Rules

The DNR adopted emergency rules on January 17, 2001 that designated part of the St. Croix River as infested waters. Also on August 20, 2001 DNR designated six additional infested waters that contain Eurasian water milfoil (The current rules regarding harmful exotic species, including the infested waters list, are in Appendix B).

The DNR proposed to add species to the state prohibited exotic species and regulated exotic species lists in Minnesota Rules 6216.0250 and 6216.0260. The DNR provided notice of proposed rulemaking through the *State Register* and sent letters to many potentially affected entities. One proposed amendment would add the aquatic plants on the federal noxious weed list to the state prohibited exotic species list. The Minnesota Department of Agriculture has already added the non-aquatic plants on the federal noxious weed list to the state prohibited noxious weed list through rulemaking. This amendment would complement that action.

Four of the species on the federal list were previously designated as state prohibited exotic species during past rulemaking. They are *Hydrilla verticillata*, *Hygrophila polysperma, Lagarosiphon major, and Salvinia molesta*. The proposed amendment that designates all the aquatic plants on the federal list by reference is preferred over individually designating each species because it will allow future additions to the federal list to automatically be included in the state list.

The current federal noxious weed list includes these aquatic plants species:

| Scientific name and authority | Common names |
|---|---|
| *Azolla pinnata* R. Brown | mosquito fern, water velvet |
| Eichornia azurea (Swartz) Kunth | anchored waterhyacinth, rooted waterhyacinth |
| Hydrilla verticillata (Linnaeus f.) Royle | hydrilla |
| *Hygrophila polysperma* T. Anderson | Miramar weed |
| *Ipomoea aquatica* Forsskal | water-spinach, swamp morning-glory |
| *Lagarosiphon major* (Ridley) Moss | |
| *Limnophila sessiliflora* (Vahl) Blume | ambulia |
| *Melaleuca quenquinervia* (Cav.) Blake | broadleaf paper bark tree |
| *Monochoria hastata* (Linnaeus) Solms-Laubach | |
| *Monochoria vaginalis* (Burman f.) C. Presl | |

| Scientific name and authority | Common names |
|---|---|
| *Ottelia alismoides* (L.) Pers. | |
| *Sagittaria sagittifolia* Linnaeus | arrowhead |
| *Salvinia auriculata* Aublet | giant salvinia |
| *Salvinia biloba* Raddi | giant salvinia |
| *Salvinia herzogii* de la Sota | giant salvinia |
| *Salvinia molesta* D.S. Mitchell | giant salvinia |
| *Sparganium erectum* Linnaeus | exotic bur-reed |

The second proposed rulemaking amendment would designate yellow iris (*Iris psuedacorus)* as a regulated exotic species. Yellow iris is a herbaceous perennial found throughout the United States and Canada (Ramey et al. 2001). It grows in and near water including wetlands, lakeshores, and river banks. Yellow iris is a common ornamental plant used in gardens (Ramey 2001) and watergardens, and is often promoted for naturalizing on lakeshores. The likelihood that yellow iris might be released or escape into a free-living state is high. Perleberg (per. com. 13 June 2001) reported that it has naturalized in several lakeshore locations around the state and in other northern latitude states and Canadian provinces. Yellow iris can grow much like Typha (cattail) species; a monoculture of densely packed plants with extensive rhizomes (Ramey 2001). These traits allow the yellow iris to out compete many native wetland plants. In Minnesota, the yellow iris does not seem to be as invasive as other harmful exotic species (Perleberg per.com. 2001) although it has established some large infestations along lakeshores. The proposed classification will aid public understanding that the plant cannot be placed into a free-living state (into protected waters), but will allow the continued sale and use of the plant in water gardens and terrestrial settings.

Obtain Information Necessary to Evaluate Exotic Species

Two new projects were continued at the University of Minnesota in 2001 to help assess the potential for harmful exotic aquatic plant species to be shipped to Minnesota and whether they may survive and cause adverse impacts. These are described in the chapter on Aquatic Plant Research and Prevention.

## Effectiveness of Regulations

The DNR believes that regulations are an important component of an effective strategy to help prevent the spread of harmful exotic species. Three surveys of boaters, including a 1998 survey from the Brainerd area (MDNR 1999), indicate that boaters support this view. A new survey conducted in 2000-2001 shows that over 89% of boaters surveyed thought regulations, fines, and enforcement checks would be very effective or somewhat effective at getting boaters to take action to prevent spread (Armson 2001).

## Future needs for regulations

Federal

- 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 harmful exotic species. Specifically, seek reauthorization of the National Invasive Species Act (NISA) and a more comprehensive federal law, or designations of injurious wildlife, prohibiting transport and possession of harmful exotic species such as black carp, round goby, and ruffe.

State

- Continue to adopt rules, under the authority in Minnesota Statutes 84D.12, that designate additional prohibited, regulated, and unregulated exotic species; and designate infested waters as they are identified.

- Continue to obtain information to improve our ability to evaluate the likelihood of introduction, the likelihood of naturalization, and the magnitude of potential adverse impacts of exotics species of aquatic plants and wild animals.

- Address risk associated with Internet and mail sales of aquatic plants. Preliminary results from a study of these sales indicate contamination of mail shipments with prohibited species and an assortment of other organisms.

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# Expenditures

## Appropriations and activities

Base funding for the Exotic Species Program is derived from a $5 surcharge on the registration of watercraft. Surcharge receipts are deposited in the Water Recreation Account and appropriated by the Legislature. The surcharge generates approximately $1,200,000 annually and additional program funding comes from other state and federal sources. Significant support for exotic species research efforts has been appropriated from the Environment and Natural Resources Trust Fund and the Minnesota Resources Fund (as recommended by the Legislative Commission on Minnesota Resources). Federal funds support implementation of the St. Croix Interstate Management Plan for aquatic nuisance species including public awareness efforts and monitoring activities. State funding for Department of Natural Resources' efforts to control exotic species was first appropriated in 1988 and has gradually increased. A summary of appropriations to the program for fiscal years 1992 through 2002 (FY92-FY02) is provided in Table 3 along with projections for FY03. This report covers activities in calendar year 2001, which includes half of two state fiscal years, (FY01 and FY02) that begin on July 1 and end on June 30. To provide a comprehensive review of expenditures that occurred during 2001, we report both expenditures that were incurred in FY01 and those planned in FY02 (Table 4). The following assumptions and definitions were used to report on expenditures.

**Administration**

Administration expenditures include the administrative charges assessed by the Division and the Department as well as day-to-day office expenses: clerical staff time, telephones, postage, office rent, etc. Staff time spent on administrative activities (training or professional development activities, assistance with other division or department projects, and personal leave including holiday, sick, and vacation time) is also included under administrative expenses.

**Program Planning/Direction**

Program planning/direction includes expenditures and activities which primarily benefit the entire Exotic Species Program, not one of the particular program components listed below. They include:

*State program coordination*: preparation of state plans and reports, hearings, strategic planning efforts, as well as the general oversight and planning of program activities. Expenditures primarily represent staff time spent on these activities.

*Coordination with regional and federal activities*: staff time and out-of-state travel to represent the state at meetings of the Great Lakes Panel on Aquatic Nuisance Species, the Mississippi Interstate Cooperative Resources Association's ANS Committee, the Council of Great Lakes Governors' Ballast Water Initiative, and other efforts of regional entities related to harmful exotic species; provide review and input on federal legislative or rulemaking development (e.g., ballast water regulations and National Invasive

Species Act reauthorization); and participate in meetings, workshops, hearings conducted by other midwestern states and provinces on harmful exotic species issues.

*Equipment and Services*: purchases and repair of boats, trailers, computers, and similar items, computer support services, and analytical chemistry services purchased from the Minnesota Department of Agriculture.

**Public Awareness**

Expenditures in this category include staff time, in-state travel expenses, fleet charges, mailings, supplies, printing and advertising costs, and radio and TV time to increase public awareness of exotic species. The cost of developing and producing pamphlets, public service announcements, videos, and similar material is included, as is the cost of developing and maintaining exotic species information on the DNR's website.

**Control, Management, and Inventory**

Expenditures in this category include staff time, in-state travel expenses, fleet charges, commercial applicator contracts, and supplies to survey the distribution of exotic species in Minnesota and to prepare for, conduct, supervise, and evaluate control activities. Funds provided to local units of government and organizations to offset the cost of Eurasian watermilfoil management efforts are also included.

**Inspections/Containment**

Expenditures in this category include the costs that Conservation Officers incur enforcing exotic 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, and other efforts to prevent the introduction of additional exotic species into Minnesota.

**Research**

Expenditures in this category include staff time, in-state travel expenses, fleet charges, supplies, and contracts with the University of Minnesota and other research organizations to develop new or improve existing control methods.

**Not Spent**

Funds in this category represent work that was authorized in FY01 but for which the final bill has not yet been received. Examples include funds committed to help local units of government manage Eurasian watermilfoil and/or research projects conducted by other agencies/organizations.

**Fiscal Year 2001 (FY01)**

Expenditures on exotic species activities during FY01 (July 1 2000 - June 30, 2001) totaled $1,256,000 and are shown in Table 4. Expenditures from the "Water Recreation Account", the primary source of funding, are listed along with spending from other accounts. The Exotics Species Program manages "Other Exotics Accounts" that also support program activities. An example are revenues from the sale of public awareness material, which are deposited in a Publications Account and can be used to fund future

public awareness efforts. No funds were spent from these accounts in FY01. Expenditures from "Other Department Accounts" primarily reflect staff in the Division of Ecological Services who are not hired as exotic species specialists, but who occasionally work on exotic species issues as part of their department positions. In FY01, exotic species work activities were coded to the Game & Fish Fund (about $8,500) and the General Fund (about $41,000). This summary may not reflect the contribution of all DNR staff who provide assistance to the Exotic Species Program. Exotic species research projects funded by the legislature, as recommended by the Legislative Commission on Minnesota Resources (Table 3), are also not shown.

The $1,196,000 of Water Recreation Account expenditures by the Exotic Species Program during FY01 (Table 4) exceeded the $1,181,000 appropriated (Table 3). Additional funds were available because all the funding received in the previous year (FY00) was not spent; approximately $40,000 was rolled forward. In addition, the program made approximately $26,000 of funding commitments during FY01 for which it had not been billed at the time this report was written.

FY01 expenditures by major category were similar to spending levels in recent years (Table 1). Some year-to-year variation in expenditures is expected and reflects changes in program needs and/or the level of assistance provided by various partners. For example, expenditures in the Program Planning/Direction category were higher in FY99 because the Exotic Species Program invested a significant amount of time meeting with constituent groups and holding public hearings to develop new rules. Both the Administration & Overhead and the Inspection & Enforcement categories had higher spending levels in FY01. Increased Inspection & Enforcement spending largely represents the higher costs of hiring, training, and deploying watercraft inspectors who contact boaters at public accesses around Minnesota. The Exotic Species Program is expanding the number of access inspections conducted in out-state areas (both on infested and non-infested waters) and this decision has increased travel costs. In addition, prevention activities that had previously been listed under Program Planning & Direction have been moved to the Inspection & Enforcement category. The following chapters describe in detail the activities that were conducted using FY01 funds.

**Fiscal Year 2002 (FY02)**

Since this report is due in the middle of FY02, planned expenditures for this year are also reported. Expenditures in most categories are expected to remain relatively constant between FY01 and FY02. The Exotic Species Program believes that the current distribution of funding among major program categories represents an appropriate allocation; significant investments are being made in each of the four primary focus areas (public awareness, control & management, inspections & enforcement, and targeted research to improve management and prevention) as well as to efforts to maintain a coordinated statewide and regional response to the threats posed by exotic species. These anticipated spending levels would change if a significant event (e.g., the discovery of a new harmful exotic species in Minnesota, the availability of a new management method) altered exotic species management needs and options.

The following chapters also describe in detail the activities that have been and will be conducted using FY02 funds.

## Table 3. Appropriations (in thousands) for DNR Exotic Species Programs, fiscal years 1992 - 2003.

| Funding Source | FY92 | FY93 | FY94 | FY95 | FY96 | FY97 | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Water Recreation Account (WRA)** | 416 ($2 watercraft surcharge) | 657 ($3 watercraft surcharge) | 1,011 ($5 watercraft surcharge) | 1,112 | 1,136 | 1,087 | 1,092 | 1,106 | 1,132 | 1,181 | 1,171 | 1,165 |
| **Legislative Commission on Minnesota Resources recommendations:** | | | | | | | | | | | | |
| 1) Purple Loosestrife | | | 75[2] | 75[2] | 75[2] | 75[2] | 37.5[2] ($37,500 match from WRA funds) | 37.5[2] ($37,500 match from WRA funds) | 37.5[2] ($37,500 match from WRA funds) | 37.5[2] ($37,500 match from WRA funds) | 25 ($25,000 match from WRA funds) | 20 ($25,000 match from WRA funds) |
| 2) Eurasian watermilfoil | | | | 125[2] (requires $100,000 non-state match) | 125[2] | 75[2] | 37.5[2] ($37,500 match from WRA funds) | 37.5[2] ($37,500 match from WRA funds) | 37.5[2] ($37,500 match from WRA funds) | 37.5[2] ($37,500 match from WRA funds) | 25 ($25,000 match from WRA funds) | 20 ($25,000 match from WRA funds) |
| 3) Ballast Water Control | | | | | | | 125[1] | 125[1] | | | | |
| Total | 416 | 817 | 1,211 | 1,312 | 1,286 | 1,237 | 1,292 | 1,306 | 1,207 | 1,256 | 1,221 | 1,205 |

[1] From the Minnesota Future Resources Fund
[2] From the Minnesota Environment and Natural Resources Trust Fund

**Table 4.** Exotic species related expenditures in fiscal year 2001 (FY01) and projected expenditures in FY02 (in thousands of dollars).

| | Water Recreation Account | | Other Exotic Accounts | | Other Dept. Accounts | | Totals | |
|---|---|---|---|---|---|---|---|---|
| | FY01 | FY02 | FY01 | FY02 | FY01 | FY02 | FY01 | FY02 |
| **Administrative/Operations** | | | | | | | 173 | 169 |
| Rent, Phones, Postage, Misc. | 23 | 27 | | | | | | |
| Staff Time | 48 | 50 | | | | | | |
| Staff Personal leave (Vacation, Holiday, Sick) | 50 | 50 | | | | | | |
| Clerical | 11 | 15 | | | | | | |
| Div/Dept Administrative Support | 41 | 27 | | | | | | |
| **Program Planning/Direction** | | | | | | | 109 | 105 |
| State program coordination | 62 | 60 | | | 11 | 12 | | |
| Support regional / federal activities | 20 | 20 | | | | | | |
| Equipment and services | 2 | 10 | | | 14 | 3 | | |
| **Public Awareness** | | | | | | | 110 | 150 |
| Communications plan, workshops, presentations, radio spots, billboards, TV, website development | 110 | 90 | | 60 | | | | |
| **Control, Management, and Inventory** | | | | | | | 293 | 306 |
| General | 2 | 10 | | | 35 | | | |
| Eurasian watermilfoil | 143 | 154 | | 20 | | | | |
| Purple loosestrife | 105 | 110 | | | | | | |
| Zebra mussel | 6 | 5 | | | | | | |
| Curly-leaf pondweed | <1 | 5 | | | | | | |
| Flowering Rush | 1 | 1 | | | | | | |
| Nongame Fish | <1 | 1 | | | | | | |
| **Inspections/Enforcement** | | | | | | | 432 | 448 |
| MCC - access inspections | 369 | 370 | | | | | | |
| Enforcement - road and access checks | 60 | 63 | | | | | | |
| Development rules/laws/other prevention efforts | 3 | 15 | | | | | | |
| **Research** | | | | | | | 113 | 98 |
| General | 12 | 12 | | | | | | |
| Eurasian watermilfoil | 49 | 28 | | | | | | |
| Purple loosestrife | 30 | 28 | | | | | | |
| Zebra mussel | -- | -- | | | | | | |
| Curly-leaf pondweed | 16 | 30 | | | | | | |
| Flowering Rush | 2 | | | | | | | |
| Nongame Fish | 2 | | | | | | | |
| **Not Spent** | 26 | | | | | | 26 | |
| **Total** | 1,196 | 1,181 | 0 | 80 | 60 | 15 | 1,256 | 1,276 |

* and Minnesota Future Resources Fund

# Education / Public Awareness Activities

## 2001 Highlights

- Over 92% of Minnesota boaters surveyed indicated they are very likely to take action to prevent spread of harmful exotic species, an increase of over 20%, compared to a similar survey in 1994.

- The DNR continued to place radio spots encouraging boaters to help prevent the spread of harmful exotics. The spots were placed as public service announcements and paid advertising during spring and summer.

- New public awareness materials about harmful exotics were developed and/or distributed: zebra mussel prevention cards, an invasive species portion of a interactive CD titled "Restore Your Shore", a booklet titled "Minnesota invasive non-native, terrestrial plants - an identification guide for resource managers", and a "Plants Out of Place" video.

- Minnesota Sea Grant and DNR conducted cooperative educational activities about harmful exotics including: a workshop for bait dealers, a poster for bait shops, and a video for the bait and aquaculture industry titled "From Net to Sale".

## Background

Since 1992, the DNR's Exotic Species Program has made substantial efforts to maintain high public awareness and understanding about harmful exotic species. Communication efforts are built around the theme of "Clean boats, Clean waters". This theme captures the desired outcome (clean waters) and a key strategy (clean boats) to achieve that result. An annual communications plan is developed by the Exotic Species Program to identify activities and priorities.

Public awareness efforts in Minnesota are designed to:

- make the public and certain businesses aware of the negative environmental impacts caused by some exotics;

- help these groups identify and report findings of specific exotic species;

- outline actions that boaters, anglers, seaplane pilots, waterfowl hunters, water gardeners, riparian landowners, bait dealers, and others must do to reduce the spread of these exotics; and

- summarize research and control approaches.

## Progress in public awareness - 2001

Key components of the Exotic Species Program's 2001 communication efforts included:

- exotic species signs at public water accesses;
- information about harmful exotic species in the fishing and boating regulations;
- radio advertisements during Fishing Opener, Memorial Day, Fourth of July, and Labor Day weekends;
- a series of press releases and media contacts throughout the year to keep current information before the public;
- staffing and displays at various sport shows and the Minnesota State Fair;
- preparing and distributing radio public service announcements to all Minnesota stations; and
- attending meetings of lake associations and other groups concerned about exotic species.
- training for bait harvesters.

**Radio** - Radio was used in 2001 to reach boaters and anglers in several ways. Paid advertising was used on larger Twin Cities stations (WCCO-AM, KQRS-FM, KFAN-AM, WKLX-FM, KSTP-AM, and KTCZ-FM) during the week preceding the fishing opener, Memorial Day, and 4th of July. These stations were selected for their listener profile which matched the desired demographics of boat owners. In late summer, a special effort using radio spots was made in the Duluth market (KQDS, WDSM/KRBR, and KDAL) and southeastern Minnesota (KWEB/KRCH, KRDC, KDLM-AM) where the presence and threat of zebra mussels continues to grow.

In addition, public service announcements were produced and distributed to all Minnesota radio stations (a total of 165). A cover memo and related materials, which encouraged station program managers to play these announcements as often as possible, were distributed with the tapes.

**Television, video, and informational materials** - DNR and Sea Grant staff contributed to the development of a documentary "Plants Out of Place" that aired on Minnesota cable TV channels and across the country. It shows numerous invasive plant problems across the nation and discusses their management. The video is available from the DNR Exotic Species Program.

**Shows and fairs** - DNR Exotic Species Program staff participated in the Northwest Sport Show and the Minnesota State Fair to distribute literature and information. At the State Fair, a barrel encrusted with zebra mussels was exhibited and drew considerable attention.

**Public water accesses** - DNR Watercraft inspectors made 38,696 personal contacts with boaters at public accesses (see Watercraft Inspections Section) providing them with information and tips on ways to reduce the spread of exotic species. Signs are also posted at public water accesses. The DNR attempts to place "Help Prevent the Spread" and "Stop and Remove" signs at all public water accesses. Additionally, "Exotic Species Alert "signs are placed at accesses to infested waters.

**Presentations** - Presentations were given to a variety of audiences, including: university classes, high schools, Minnesota Turf and Grounds Foundation Conference, Midwest Aquatic Plant Management Society (Minneapolis), annual meetings and training of the Minnesota Agricultural Inspectors, and several lake associations.

## Effectiveness of public awareness efforts

### Background

The DNR and Minnesota Sea Grant have conducted several surveys to help assess the effectiveness of public awareness efforts conducted in Minnesota. In 1994, Minnesota Sea Grant conducted a survey of boaters in Minnesota, Wisconsin, and Ohio to evaluate and compare regional differences in educational and awareness programs.

A report (Minnesota Sea Grant 1994) summarizing the survey results said,

> *"More effort has been expanded and a greater variety of techniques have been used in getting the exotic species message out in Minnesota than in the other two states surveyed. Survey results indicate Minnesota boaters are more knowledgeable about exotic species issues and have already changed their behavior to a greater extent (to prevent the spread of exotics) than boaters in the other two states. This suggests that educational programs are effective."*

In 1996, the DNR funded a follow-up survey of boaters in the Minneapolis/St. Paul metro area (MDNR 1996). Also in 1998, a survey of boaters in the Brainerd area was conducted (MDNR 1999). Both these surveys indicate that awareness about exotics has continued to increase. Watercraft inspectors (see Watercraft Inspections) also continue to find high levels of public awareness of exotics throughout Minnesota. Information from past surveys and a new multi-state Sea Grant funded survey mailed out in fall of 2000 will continue to be used to guide development of annual public awareness efforts and maximize their effectiveness.

**Effectiveness and Boater Survey Results in 2001**

A 2000-01 mail survey coordinated by Minnesota Sea Grant, with cooperation from the DNR Exotic Species Program and conducted through the University of Minnesota Research Center, was sent to 4,000 boaters in five states: Minnesota, Vermont, Ohio, Kansas, and California. Preliminary results show that public education, watercraft inspections, and enforcement efforts, especially in Minnesota are effective methods to inform boaters about harmful aquatic exotic species. The survey results show that messages are translating into action. Over 92% of Minnesota boaters surveyed in 2000-2001 said they were very likely to take action (Armson 2001), an increase over a similar Sea Grant survey in 1994 when 70% of Minnesota boaters said they were very likely to take action. The survey also showed considerable differences in the likelihood of boater's action in other states: 82% in Vermont; 46% in Ohio; 40% in California; and 30% in Kansas. These differences are proportional to the level of boater public awareness efforts and the variety of methods used in those states. Comparatively, Minnesota has invested more in public awareness regarding harmful exotic species and results show that this investment is resulting in significant increases in public awareness and preventative actions taken.

Public awareness of specific exotic species is highest for Eurasian watermilfoil and zebra mussels — over 93% of boaters surveyed in Minnesota have heard or read about these species (Armson 2001). The percent of boaters that have heard or read about ruffe, round goby, and spiny water fleas is much lower — between 26% and 33%. One explanation of this difference is that radio and TV spots used by the DNR have focused on primarily on Eurasian watermilfoil and zebra mussels. Additionally, ruffe, round goby, and spiny water fleas are only found in the Duluth area of the state and are encountered less by state boaters.

The 2000-01 boater survey also provided information about the effectiveness of various methods used to communicate messages about harmful exotic species. Among the highest rated sources of information on aquatic harmful exotic species were: newspaper articles (88%), DNR fishing and boating regulation booklets (87%), signs at water accesses (83%), television (81%), and radio (62%) news, and magazine and newsletter articles (73%). Many of these methods are used by the DNR. Media coverage prompted by DNR and Sea Grant press releases and interviews continues to be among the most frequently noted sources of information about aquatic harmful exotic species.

**Angler Survey**

Minnesota Sea Grant conducted a separate survey of Minnesota anglers (Pers. Comm.: Doug Jensen, Minnesota Sea Grant). The survey found that nearly 97% of Minnesotans believe it is important to prevent the spread of aquatic nuisance species. Yet, while awareness is very high, Minnesota anglers still represent a significant risk for spread of harmful exotic species - 29% of surveyed anglers dump unwanted live bait into the lake or river after fishing and 25% of anglers who put bait buckets in the water, re-use those minnows on other waters.

## Participation of Others in Public Awareness Activities

**National "Stop Aquatic Hitchhikers!" Campaign**
The national Aquatic Nuisance Species (ANS) Task Force, the U.S. Fish and Wildlife Service and the U.S. Coast Guard are the primary sponsors of a new "Stop Aquatic Hitchhikers!" campaign. The national campaign was under development in 2001 and is planned for full implementation in 2002. The campaign will include a variety of products and methods such as public service announcements, stickers, posters, magazine and newspaper articles, television and radio programs to make the public aware of this issue. Most material and announcements will include a website address (http://www.protectyourwaters.net/) to direct individuals to visit and learn about how they can become part of the solution in stopping the transport and spread of harmful aquatic hitchhikers.

**Minnesota Partners**
Other agencies and organizations in Minnesota have been cooperatively involved with public awareness activities in the state for several years and continued to conduct public awareness efforts throughout the state.

Educational "traveling trunks" designed for hands-on learning about harmful exotic species are used by and available from several organizations in the state in addition to the DNR: University of Minnesota Sea Grant and the Bell Museum of Natural History, the National Park Service, and teachers (for additional information, see www.seagrant.umn.edu/education/ttea.html).

The University of Minnesota Sea Grant Extension Program's Exotic Species Information Center provides research, outreach, and education in collaboration with the DNR. Since 1991, the Center has served as an important resource on harmful aquatic nuisance species (ANS) for the public and water-related businesses. Center staff regularly communicate with DNR Exotic Species Program staff to help identify program priorities and unmet needs, coordinate activities, leverage funds and resources, and share information and publications.

**2001 Highlights of Minnesota Sea Grant's Education Activities in Minnesota:**

- Sea Grant and DNR continue to promote the award-winning educational videotape, "Stop Exotics, Clean Your Boat", which shows boaters, anglers, sailors, and personal watercraft users how to prevent the spread of Aquatic Nuisance Species. Sponsored in part by the DNR, U.S. Coast Guard, U.S. Fish and Wildlife Service and others, the video features John Ratzenberger (a.k.a. Cliff Clavin from the TV show Cheers). This 11-minute humorous video is designed for use at visitor and learning centers, retail outlets, and boater workshops in Minnesota and nationwide. Video content is based on national voluntary recreational guidelines approved in 2000. Sea Grant staff used the video in six education workshops conducted across the state.

PBS and public access cable television stations continue to broadcast it as an educational program.

- Sea Grant continued to collaborate with DNR, U.S. Fish and Wildlife Service, California and Ohio Sea Grant, and Vermont Department of Environmental Conservation on a national effort to evaluate regional differences in boater awareness and behavior (see Effectiveness and Survey 2001 above).

- Sea Grant collaborated with the National Oceanic Atmospheric Administration and the National Sea Grant College Program Office to create a color-poster on key ANS species of national concern. The poster features sea lamprey, green crab, zebra mussels, purple loosestrife, and nutria, and is designed primarily for use in the classroom. Sea Grant is leading efforts to distribute the poster to teachers and students in Minnesota in 2002.

- For the second consecutive year, Sea Grant and DNR staff co-hosted an Infested Waters Training Workshop for businesses that harvest bait from Eurasian watermilfoil infested waters. Sea Grant staff provided an overview of the ANS-HACCP: Aquatic Nuisance Species and Critical Control Point Training Curriculum, which is intended for use by the industry and DNR hatcheries to help ensure that operations and products are ANS-free.

- In collaboration with the DNR, the Great Lakes Sea Grant Network, and the bait-fish industry, Sea Grant produced a videotape "From Net to Sale." The videotape provides curriculum that will be released in January 2002.

- Posters were developed for bait shops throughout the Great Lakes region to alert clerks and anglers about ANS. The posters (tailored for each state) will aid efforts to remove suspicious-looking fish, crayfish, or plants from bait tanks. Posters will be distributed in Minnesota during 2002.

- Center staff provided presentations about harmful aquatic nuisance species at 22 conferences, workshops, meetings, and festivals in Minnesota. For example, presentations were made at a MinnAqua educator training session in Duluth (February), a Shoreland Roundtable meeting in Excelsior (April), and at the Minnesota State Fair (August), and a zebra mussel session was chaired at the Minnesota Lakes and Rivers Conference in Brainerd (May). Since 1994, Sea Grant staff have given presentations at the annual DNR training meetings for watercraft inspectors (July).

- Center staff also hosted a downlink site in Duluth for a U.S. Fish and Wildlife Service teleconference, Invasive Species: America's Least Wanted, from Shepardstown, West Virginia. Sea Grant and DNR collaborated with

US Forest Service, St. Louis River Citizen Action Committee, and other organizations to integrate ANS messages into their publications and other materials.

The DNR Purple Loosestrife Program and University of Minnesota Extension Service staff teamed again with Sea Grant staff to develop purple loosestrife biocontrol efforts into a community youth stewardship project in the Duluth area. Originally funded to develop a 4-H youth project, this project expanded its original scope when the St. Louis River Citizen Action Committee, U.S. Fish and Wildlife Service, and local environmental and recreational organizations added their support. An estimated 440,000 biocontrol beetles (Galerucella) were released in infested wetlands in the Duluth area by two dozen families from 4-H clubs, a Cub Scout troop, and two groups from a youth treatment facility. A pre-event Beetlemania media event advisory by Sea Grant resulted in media coverage reaching an estimated 1/2 million viewers, listeners, and readers. The stewardship project is expected to be expanded in 2002. The purple loosestrife biocontrol project will be offered as an official 4-H project in 2002.

Center staff participate on and attend meetings of regional and national task forces including the Great Lakes Panel on ANS Information/Education Committee (chair), Great Lakes Sea Grant Network Nonindigenous Species Outreach Committee (chair), St. Croix Zebra Mussel Task Force, and the national ANS Task Force's - Recreational Activities Committee (National Sea Grant representative), Ruffe Control Committee, and Community, Education and Outreach Committee.

## Future needs for public awareness in Minnesota

- Maintain spending on paid public awareness radio/TV spots to reinforce high awareness of exotic species by watercraft users.
- Continue to make public awareness of zebra mussels in southeast Minnesota near the Mississippi, Zumbro, and St. Croix rivers a priority.
- Work cooperatively with specific industry groups to develop targeted public awareness efforts such as the aquaculture industry, live bait dealers, water garden and horticulture industry, and aquarium trade.
- Use the Minnesota Invasive Species Advisory Committee and other multi-entity groups to enhance interagency communication on the status and progress of exotic species management efforts.
- Expand public awareness activities that are cooperative ventures with lake communities outside the Metro Area.
- Increase the information about harmful exotic species available through the DNR web site.
- Sea Grant staff will continue to work collaboratively with the DNR and pursue research and outreach funding through National Sea Grant and other sources.

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# Watercraft Inspections

## 2001 Highlights

- During the 2001 boating season, 38,696 boater contacts were made by DNR watercraft inspectors to educate the public about harmful aquatic exotic species.

- Five weekend-long awareness events were conducted in greater Minnesota. Each event focused publicity and awareness on aquatic exotic species in order to maximize the attention and interest of the local citizens. Three of the events were held in cooperation with local citizen groups. The Kandiyohi Association of Lakes, Becker County COLA and the Shoreland Volunteers (in Wright, Stearns and Sherburne counties) volunteered time to increase awareness on their area accesses.

- Kandiyohi Association of Lakes worked cooperatively with the DNR to hire an additional inspector for Kandiyohi County.

## Background

The potential for boaters to accidentally move aquatic exotic species from one lake to another is a clear threat to Minnesota's aquatic ecosystems. For this reason, the 1991 Minnesota Legislature mandated that DNR conservation officers conduct inspections of trailered boats on Minnesota highways. The purpose of these inspections was to look for Eurasian watermilfoil, issue citations to violators, and to inform the public about the potential spread of harmful aquatic exotic species.

In 1992, the DNR, the Minnesota Lakes Association and angling groups proposed and supported legislation (adopted as M.S. 18.317, Subd. 3a, and recodified as 84D.02 subd. 4, see Appendix A) requiring 10,000 hours of inspections of watercraft leaving "infested" water bodies containing harmful aquatic exotic species such as Eurasian watermilfoil, spiny water flea, and zebra mussels. Subsequently, a watercraft inspection program was established by the DNR in 1992 to accomplish this mandate. In 1993, legislation was passed increasing the number of inspection hours to 20,000 starting with the 1994 boating season. In 1999 this statute was amended to allow inspections on both infested and uninfested waterbodies to fulfill the 20,000 hour requirement.

Watercraft Inspectors, employed through the DNR's Minnesota Conservation Corps, conduct inspections at public water access sites. The goal of their effort is to promote actions by boaters that will reduce the risk of transporting harmful aquatic exotic species throughout the state. Their objectives are to increase public awareness of the threats posed by exotic species, inform boaters of the laws regarding exotic species transportation, and to show individuals how to inspect and remove exotics and aquatic vegetation from their boating equipment before

leaving an access. Inspection activities are targeted at high use accesses and during high use periods.

## Progress in Watercraft Inspections - 2001

In 2001, inspections began in late April and continued through the end of October. Within this 26-week period, 20,047 inspection hours were logged and 38,696 watercraft/trailer units were inspected (Figure 2).

In 2001, the accomplishments and responsibilities of MCC watercraft inspectors included the following:

- Assisted the Division of Enforcement with four road checks;
- Answered questions at the Exotic Species display during each day of the 2001 Minnesota State Fair;
- Conducted inspections at 22 different fishing tournaments throughout the state;
- Conducted inspections for waterfowl hunters during the "opener" and throughout the month of October;
- Distributed Exotic Alert Tags on 5,750 vehicles with trailers at access points on infested waters;
- Cleared aquatic plant fragments from public water accesses as encouraged in M.S. 84D.02, subd. 3, (8)
- (Appendix A). Removed vegetation fragments from the access sites helps to reduce the amount of Eurasian Watermilfoil and other aquatic plants adhering to watercraft and trailer units exiting infested waters;
- Collected loosestrife beetles and distributed them at locations throughout the state;
- Answered questions at an informational booth for Cannon Valley Trails Day; and
- Conducted five weekend-long awareness events (in Alexandria; Becker County; Kandiyohi County; Stearns, Sherburne, and Wright counties and Red Lake).

A total of 35 inspectors worked through the summer of 2001 providing information to the public on watercraft inspections and exotic species. Inspection efforts were distributed across the state in rough proportion to the number of public water

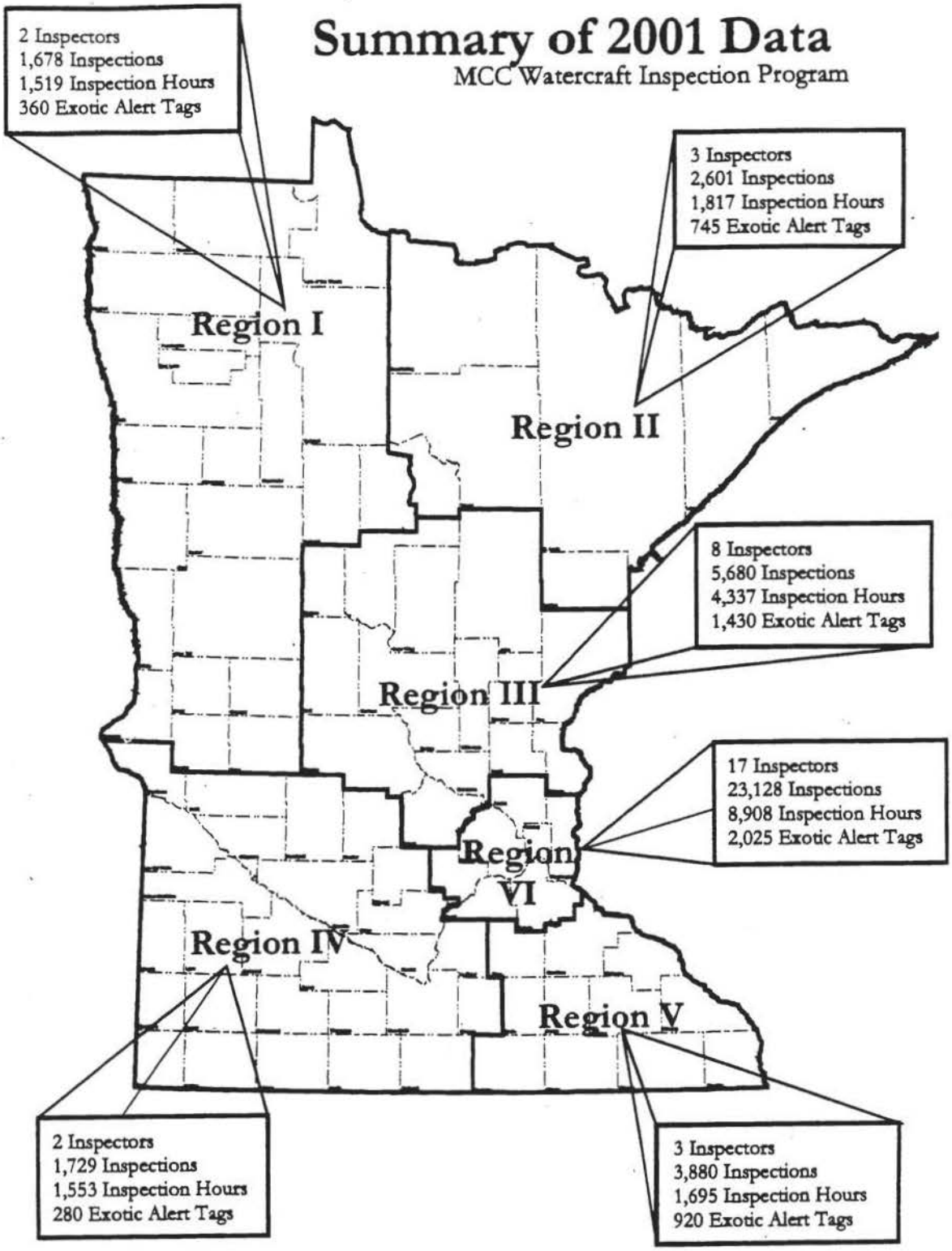


**Figure 2. 2001 MCC Watercraft Inspections at Public Water Accesses.**

**Table 5. Number of watercraft inspections conducted by MCC Watercraft Inspectors in 1998, 1999, 2000, and 2001.**

| Area | Number of Watercraft Inspected | | | |
|---|---|---|---|---|
| | 1998 | 1999 | 2000 | 2001 |
| Region I - Northwest | 201 | 1,584 | 2,392 | 1,678 |
| Region II - Duluth/Superior | 1,332 | 1,729 | 2,940 | 2,601 |
| Region III - Central | 4,476 | 7,360 | 5,395 | 5,680 |
| Region IV - Southwest | 0 | 138 | 541 | 1,729 |
| Region V - Mississippi River | 3,953 | 5,748 | 8,566 | 3,880 |
| Region VI - Metro | 28,457 | 24,885 | 31,674 | 23,128 |
| State-wide Total | 38,419 | 41,444 | 51,508 | 38,696 |

accesses (PWA) on infested water bodies, with some inclusion of high use accesses on uninfested waterbodies. The actual distribution of time reflects both the number of PWAs and the level of public use at those accesses. Last year the program was broadened to include many uninfested waterbodies in an effort to reach more boaters in non-metro locations. This year the program worked with Kandiyohi Association of Lakes to cooperatively hire an inspector in that area. In addition the program worked side by side with lake association members around the state educating boaters during awareness events. This sort of cooperative effort should enable lake association groups to do exotics awareness work on their own.

In addition it is important to note that the percent of time the program is spending in each region has shifted considerably from 1998 to 2001 (Fig. 3). A higher percentage of time in 2001 was spent in regions I, II, III and IV, reducing the percentage in regions V and VI. Region V decreased primarily due to a shortage of staff in the Winona area. An increase in infestations in the greater Minnesota area in the past years, coupled with a consistent level of inspection efforts necessitated no decrease in hours spent in Region VI, and to some extent Region V, to shift efforts to other regions. The necessity of having inspectors on infested waterbodies in greater Minnesota has enabled the program to spend time on surrounding uninfested waterbodies as well.

## Inspections at Uninfested Waters

The watercraft inspection program has primarily focused on water bodies with infestations of harmful exotic species. The purpose of spending time on infested water bodies is to reduce the transportation of exotics out of those lakes or rivers. While it is important to contact boaters leaving water bodies infested with harmful exotic species, we feel that it is also important to inform boaters on other popular recreation lakes in Minnesota. To allow more flexibility in the program, the statute was amended to include watercraft inspections on uninfested waterbodies in the Department's 20,000 hour mandate (M.S. 84D.02, Subd. 4). During 2001, inspections on uninfested waters represented about 12% of the total inspections

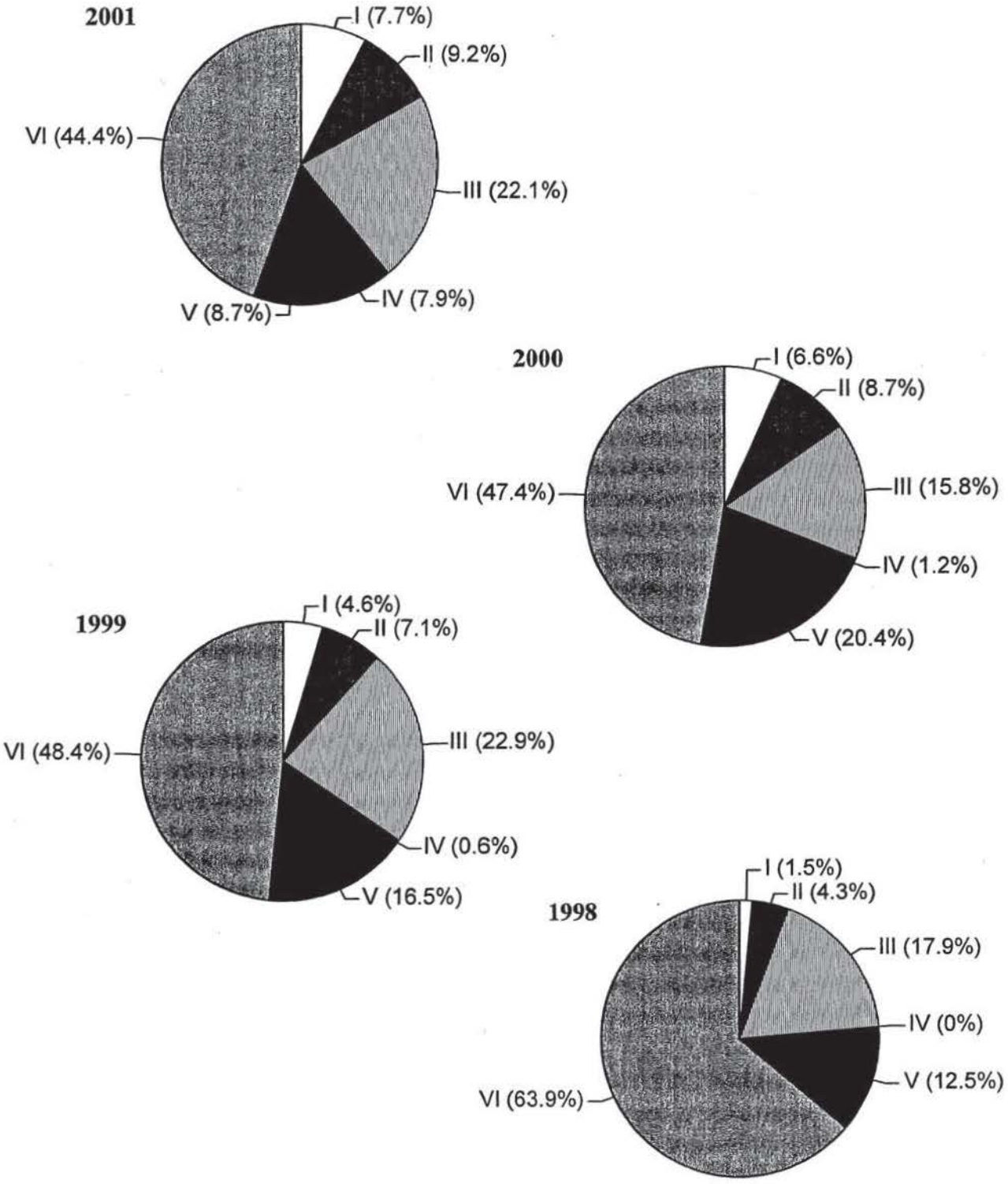


**Figure 3. Percent of the state's total MCC watercraft inspection hours spent in each region in 1998, 1999, 2000, and 2001.**

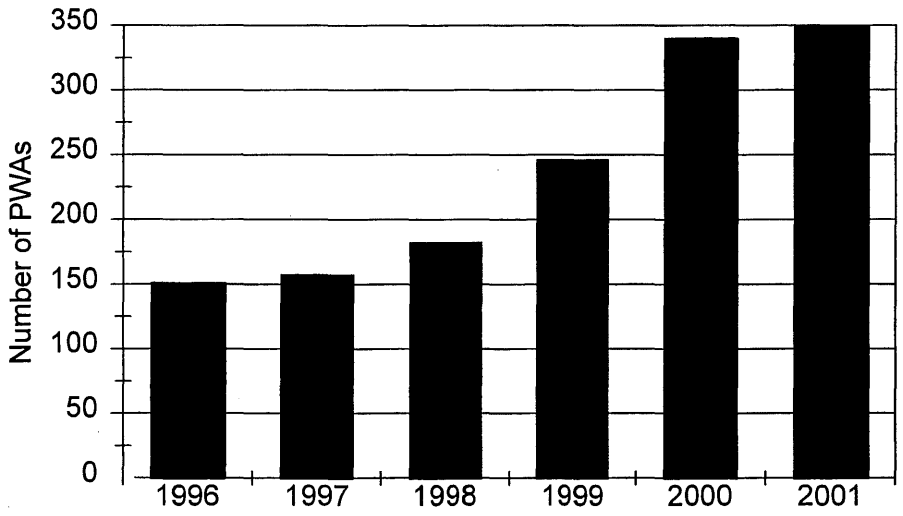


**Figure 4. Total number of public water accesses with MCC watercraft inspections, 1996 through 2001.**

(4,508 inspections) and 19% of the inspection hours (3,569 hours). Part of the reason that this was higher than last year was because we had lake associations interested in participating in awareness events around the state on uninfested waters. This interest made it worth our time to assist them and get them started on exotics education in their areas.

To determine which uninfested waters to visit we used three criteria; 1) lakes or areas with a high level of boater activity, 2) lakes identified on program surveys as frequent destinations for boaters leaving infested water bodies, and 3) lakes with lake associations that desired to hold "Exotic Awareness Events".

The number of accesses where inspections are conducted has increased as new infested waters are identified (Figure 4). In 1999, which was the first year we moved to uninfested waterbodies, the number increased significantly. In 2000, many of the new accesses were on waterbodies with curly-leaf pondweed, a harmful exotic species that is widespread in the state. In 2001, the outstate access list was reviewed based on information collected from area fisheries staff which helped us to better define high use accesses.

## Effectiveness

The goal of the watercraft inspection program is to promote actions by boaters that will reduce the risk of transporting harmful aquatic exotic species. The objectives are to increase awareness of aquatic exotic species issues and laws, and to reduce the number of boats and trailers leaving an access with vegetation or harmful exotic species on their watercraft.

Surveys conducted by watercraft inspectors provide important information on the public's awareness of exotic species laws and help identify high risk areas, i.e., accesses where many watercraft pick up plant fragments. According to survey information collected by watercraft inspectors, awareness of exotic species laws remains very high among Minnesota boaters. The percent of watercraft users who responded "yes" when asked if they were aware of the exotic species laws for the state was 96.4% (Figure 5). Boaters from other states using Minnesota waterbodies had a slightly lower response at 89.7%. The range of percentages for each Minnesota county varied from 91.1% (in Itasca) to 100% (in multiple counties). Of those who said they were not familiar with the laws, 3.7% (27 out of 739) had vegetation on their watercraft when they entered the access. In contrast, 2.0% (354 out of 17,847) of the people who said that they were familiar with the laws entered with vegetation.

Decals are given to boaters (see *Decal Program for Trailered Watercraft* at the end of this section) which signifies that they have talked with a watercraft inspector. Of those with no decal, 6.6% said they were not familiar with the exotics laws. In contrast, of those with a year 2001 decal, 0.1% said they were not familiar with the laws. This suggests that the watercraft inspection program is successful at educating boaters about the exotics laws.

The Exotic Species Program continues to use a variety of media to keep exotic species awareness high (see Education/Public Awareness Activities).

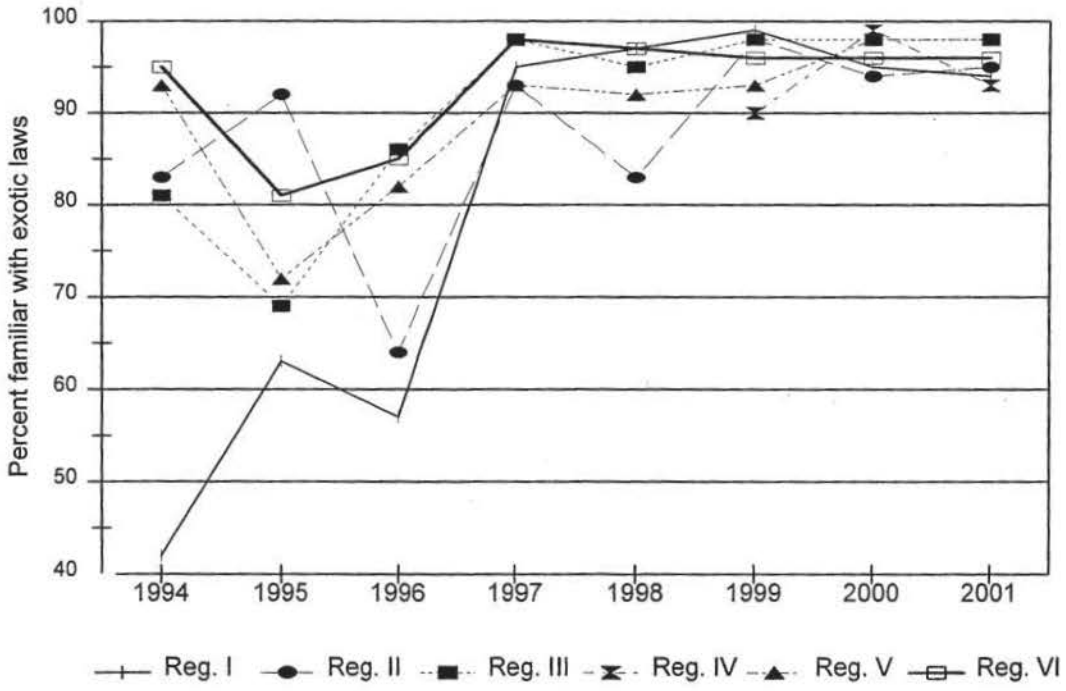


**Figure 5. Surveyed boaters' awareness of exotic species laws by DNR Region in Minnesota from 1994 through 2001.**

## Transportation of Vegetation

The percentage of boats/trailers carrying vegetation as they were trailered out of a lake or river varied widely by county. These variations may be caused by several variables including the amount and type of vegetation in the water body, its proximity to the public water access, and amount of the recreational boating traffic. An average of 14.8% of the watercraft checked by watercraft inspectors were found with vegetation (2,649 watercraft) as they trailered out of the water. This rate demonstrates the clear risk that boaters will transport aquatic vegetation (and exotics) from lake to lake if boats are not properly cleaned. The percentage of boats and trailers carrying vegetation as they enter public accesses on infested waters was 1.7%. This is a good indication that the majority of boaters using infested waters are inspecting and cleaning their boats and trailers.

During the DNR's exotic species road checks in 2001, the violation rate for transportation of vegetation was 16%, much higher than the percentage of boats entering public waters with vegetation. This might be accounted for if the areas where the road checks were held is considered. All of the four road checks occurred in counties (2 in Hennepin, 1 in Anoka, and 1 in Kanabec) where the number of boats exiting with vegetation was high in comparison to other counties in the state (Figure 6). In fact, Anoka County had 38% of its exiting boats carrying vegetation. This rate demonstrates the need for increased outreach and education in certain areas. Enforcement of exotic species laws continues in an effort to reduce the transportation of vegetation and harmful exotics (see Enforcement section).

## Transportation of Other Exotic Species

Zebra mussels were found on one boat going into Lake Zumbro. Zebra mussels are being "caught" off the bottom by anglers who often discard them in the bottom of their boats. Fourteen boats leaving the St. Louis River were cleaned of spiny water fleas.

## St. Croix River

Watercraft inspectors continued to conduct inspections at several public water accesses along the St. Croix River (see: Management of Zebra Mussels). Increased public awareness and education in this area is necessary due to zebra mussels being found in the St. Croix last season. In almost 1,300 hours, more than 5,000 watercraft were inspected and boaters were educated on specific steps to take to prevent the spread of zebra mussels.

## Decal Program for Trailered Watercraft

During the 1994 boating season, several boaters expressed frustration over being approached by inspectors several times each week throughout the summer. To respond to boaters' concerns and to reduce the duplication of education efforts, a decal was developed and distributed to boaters whose watercraft had been inspected for exotic species (see decal below). Boaters are instructed to voluntarily affix the decal to the wind post of their trailer. This allows inspectors to

identify the boaters who inspectors have already spoken with during the summer. Boaters with a decal are given a brief reminder to drain water and remove vegetation from their boats. The decals have been used for seven years now and have been well received by the public. The 25,000 decals distributed during the 2001 boating season also remind boaters to inspect their boat when inspectors are not present.

## Future needs and recommendations for watercraft inspections

- Conduct a minimum of 20,000 hours of inspections during the 2002 boating season.
- Continue to reduce the percentage of watercraft traveling on Minnesota roads carrying vegetation and other exotic species.
- Continue to refine the time spent on noninfested lakes to maximize the productivity of that time.
- Increase cooperation with citizen groups that would like to help increase awareness in their areas.

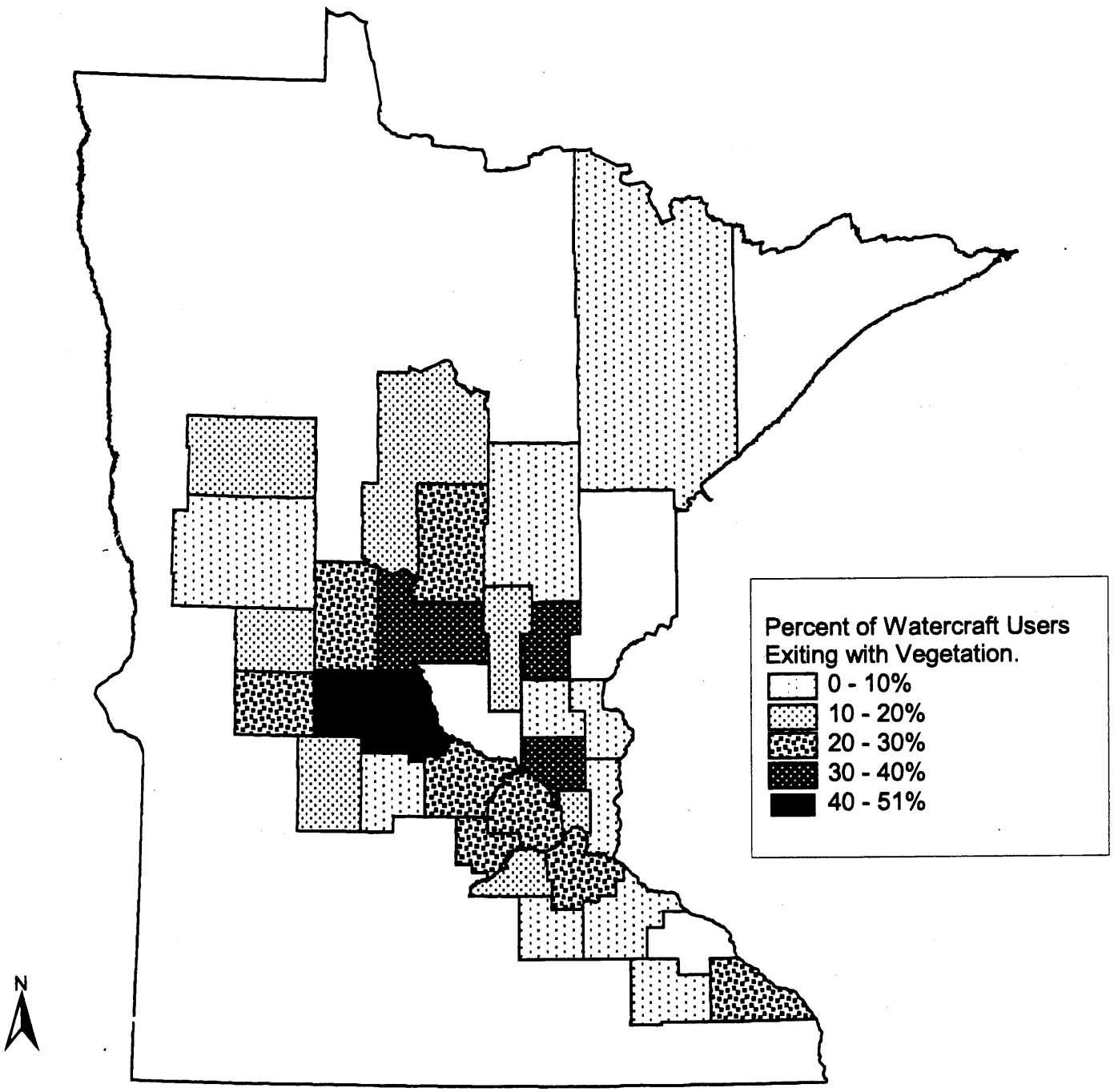


**Figure 6. Percentage of exiting watercraft users inspected with attached vegetation prior to cleaning watercraft (in counties where more than 90 boats were inspected upon leaving an access).**

# Enforcement

## 2001 Highlights

- Four road checks for trailered boats were held and aquatic vegetation was found in, or on, an average of 16% of all watercraft/trailers inspected. Along with day-to-day enforcement action, road checks and access checks continue to be used to increase public awareness of exotic species laws and to gather information on violation rates of the law prohibiting transportation of aquatic vegetation.

- Conservation Officers spent 1,623 hours enforcing the exotic species laws and rules.

- One civil citation and 25 written warnings were issued to individuals for violations at road checks.

- Overall on a Statewide basis there were 19 civil citations and 26 written warnings issued to individuals for violations of exotic species laws and rules.

- The DNR Exotic Species Program trained State Patrol and other staff from the highway truck scales about exotic species such as zebra mussels, state laws, and how to respond if they see zebra mussels or other species on boats being transported through the scales.

## Background

In 1991, the Minnesota Legislature directed the DNR Commissioner to establish a two year program designed to check trailered boats for the presence of Eurasian watermilfoil (milfoil). These requirements became effective August 1, 1991. Road checks were initially designed to inspect boats and trailers for the presence of milfoil fragments and to educate and inform boaters about milfoil. As additional harmful exotic species have become established in Minnesota, road checks and boat inspections were expanded to detect illegal transportation of these organisms, including zebra mussels and ruffe.

The Department of Natural Resources (DNR) supported changes in statute passed during the 1996 Legislative Session that prohibited the transport of all aquatic vegetation (rather than Eurasian watermilfoil exclusively). This change in law made enforcement simpler. Instead of having to identify Eurasian watermilfoil, which can be difficult, officers and watercraft users only had to ensure that all vegetation was removed before transporting boats and equipment. The law change also reduced the chances of zebra mussels, that can attach to aquatic plants, being inadvertently spread. Passage of the 1996 law prohibiting transport

of aquatic plant has allowed an increase in exotic species-related enforcement efforts by conservation officers.

In 1999, the Division of Enforcement began to implement an Exotic Species Enforcement Plan to prioritize exotic species enforcement needs in each district. Under the plan, conservation officers' activities were expanded to include time spent at boat accesses doing more exotic species-related checks of boats, trailers, live wells, etc. Exotic species activities were included as a specific component of the 2001 Work Plan developed by the Division of Enforcement. This annual plan describes in detail each Enforcement District's responsibilities in meeting various enforcement requirements, including exotics, and ensures that appropriate work activities and levels are targeted.

## Progress in Enforcement - 2001

### Road Checks

In 2001, four major road checks were conducted, three in the metro area and one in greater Minnesota (Table 6). The Anoka and Orono (Hennepin Co.) roadchecks had the lowest percentage of watercraft carrying vegetation at 8.6% and 10.7% (Table 6). Most of the vegetation was found on trailer frames, motors and anchor ropes. The Anoka road check on Highway 10 had the highest volume of traffic. The Mora (Kanabec County) road check had the lowest volume of traffic. In total, 429 watercraft were inspected as part of the road check enforcement effort. Sixty-eight watercraft (15.9%) were found to have vegetation in, or on, the trailer/watercraft. Sixty-seven of the 68 violations resulted in verbal or written warnings, or citations being issued. A new road check was planned for at the St. Croix MnDOT truck scale site on I-94 just east of the Minnesota/Wisconsin border. The scale closed for maintenance and did not open in time to conduct a road check in 2001.

An important component of the Department's goal to prevent the spread of exotic species in Minnesota is to lower the percentage of boats transporting vegetation in the state. Road checks of trailered boats are a method to evaluate the success of that effort. In 2001, the highest violation rates observed were in Mora (40%) with the August Orono roadcheck following closely at 37.5%. This rate of vegetation transport in Orono is high in comparison to other road checks in the area in recent years. This may be attributed to the fact that many of the boats were being removed from the lake and taken to storage areas, as it was late in the boating season. The Department intends to continue using road checks both for their educational value and as a tracking tool. Traffic patterns and safety issues will dictate when and where road checks are implemented.

Care needs to be taken in using road checks as a tracking tool. The amount of vegetation on/in watercraft stopped at road checks is dependent on what lakes the boats came from as well as how conscientious the owner was in removing attached vegetation. Depending on the access, a lot or a little vegetation removal

may be needed. Data collected in 2001 (Figure 6) showed wide variation in the percentage of watercraft with vegetation as they were pulled up onto the access ramp.

**Table 6. Results of 2001 Road Checks Conducted by DNR Enforcement Officers.**

| Location | Number of watercraft inspected | Number of watercraft with aquatic plants | Number of verbal warnings | Number of written warnings | Number of written citations |
|---|---|---|---|---|---|
| Anoka Co. - Anoka Highway 10 - 6/15/01 | 187 | 16 (8.6%) | 16 (8.6%) | 0 | 0 |
| Hennepin Co. - Orono Co. Rd. 51 - 6/23/01 | 149 | 16 (10.7%) | 12 (8.1%) | 4 (2.7%) | 0 |
| Kanabec Co. - Mora Wayside Rest - 8/19/02 | 45 | 18 (40.0%) | 1 (2.2%) | 16 (35.6%) | 0 |
| Hennepin Co. - Orono Co. Rd. 51 - 8/25/01 | 48 | 18 (37.5%) | 12 (25.0%) | 5 (10.4%) | 1 (2.1%) |
| **TOTALS** | **429** | **68 (15.9%)** | **41 (9.6%)** | **25 (5.8%)** | **1 (0.2%)** |

Road checks can be a very effective method of drawing public attention to an issue. Nevertheless, based on recent court decisions, the violation rates observed at the road checks need to be high enough to justify the public inconvenience and expense of the checks. In 2001, the violation rates ranged from 8.6% to 40% with a mean of 16% (Table 6). In comparison, the violation rates averaged 20%, 21%, and 17% in 1998, 1999, and 2000 (Table 7), respectively. This information about violation rates will be used to evaluate the appropriateness of proceeding with future road checks.

**Table 7. Summary of Trailered Watercraft Inspected by the DNR During Road Checks Conducted Between 1991 and 2001.**

| Year | Number of road checks | Number of watercraft inspected | Number of watercraft with aquatic plants | Number of warnings[1] | Number of written citations |
|---|---|---|---|---|---|
| **2001** | 4 | 429 | 68 (15.9%) | 66 (15.4%) | 1 (0.002%) |
| **2000** | 4 | 410 | 71 (17%) | 69 (16.8%) | 2 (0.5%) |
| **1999** | 4 | 491 | 101 (21%) | 95 (19.3%) | 7 (1.4%) |
| **1998** | 5 | 645 | 127 (20%) | 117 (18.1%) | 3 (0.5%) |
| **1997** | 7 | 638 | 161 (25%) | 152 (23.8%) | 2 (0.3%) |
| **1996** | 3 | 595 | 138 (23%) | 138 (23%) | 0 |
| **1995** | 3 | 202 | N/A | 9 (4.5%) | ? |
| **1994** | 7 | 775 | N/A | 35 (4.5%) | ? |
| **1993** | 37 | 982 | N/A | 63 (6.4%) | 9 (0.9%) |
| **1992** | 7 | 1,412 | N/A | 14 (1.0%) | 12 (0.8%) |
| **1991** | 8 | 818 | N/A | 9 (1.1%) | 5 (0.6%) |
| **Total** | **89** | **7,397** | **666** | **636** | **41** |

[1]Made assumption that between 1994 and 1996 all offenders were issued warnings

### Mississippi River

Conservation officers conducted exotics enforcement activities along the Mississippi River focusing on the transportation of zebra mussels and infested waters. Boaters using the Mississippi River south of the Twin Cities must empty bilges, live wells, and bait buckets so that they do not transport zebra mussel infested water from the Mississippi. During the summer of 2001, officers spent about 210 hours of enforcement time along the Mississippi River including accesses near Hastings, Red Wing, Lake City, Kellogg, Winona, and LaCrescent.

### Waterfowl Hunting Season

Conservation officers conducted exotics enforcement activities during the waterfowl hunting season to inform hunters about the laws prohibiting transportation of aquatic vegetation. Hunters must remove vegetation from their boats, decoys, and anchors before leaving the boat access. There is an exception for the transport of shooting blinds, and emergent vegetation cut above the water line can be transported. Conservation officers contacted hunters during the waterfowl hunting season at the following accesses along the Mississippi River: Verchota (Winona County), North Lake (Goodhue County), Dresbach (Houston County), Wilcox and Halfmoon (Wabasha County). Additional time was spent in Freeborn County, Otter Tail County, Beltrami County, and Mille Lacs County at several lakes frequented by waterfowl hunters.

**St. Croix River**

Divers continued to be employed for underwater inspection of both commercial and recreational vessels in the St. Croix River. Conservation officers also met with the Wisconsin DNR and the National Park Service several times to ensure interagency cooperation on zebra mussels. In 2001, the Department started handing out zebra mussel awareness cards to people on the water and at accesses. The distribution of these cards was to commence with the season opener, unfortunately, the opener was delayed. The cards were distributed once the season did open and for the duration of the summer.

## Effectiveness

The DNR believes that enforcement plays a critical role in reducing the spread of harmful exotic species. In order for the regulations on harmful exotic species to be effective in reducing their spread, there must be: a balanced mix of public education and awareness efforts, voluntary compliance from the general public, and enforcement of the regulations. An ideal measure of the effectiveness of enforcement efforts would be a long-term decrease in the percentage of boats carrying vegetation. If additional enforcement effort in specific areas of the state is necessary, the work planning process used by the Division of Enforcement will help to effectively allocate time to meet those identified needs. The DNR's ability to reduce the transportation of aquatic vegetation on public roads will be evaluated after several more seasons under the current statutes.

## Participation of Others

This year the DNR Exotic Species Program sought the participation of others to help look for violations and to enforce the state laws related to transport of prohibited exotic species on public roads. Staff from the Exotic Species Program trained the Civil Weights Division of the Department of Public Safety in identifying zebra mussels. This training was conducted at an annual in-service training for civil weights inspectors and some state troopers. Approximately 100 individuals participated in the training that included information about harmful exotic species such as zebra mussels, state exotic species laws, and how to respond if they see zebra mussels or other species on boats being transported through the scales. This training was considered valuable since zebra mussels have been detected at highway scales and inspection stations in other states.

# Management of Eurasian Watermilfoil

## 2001 Highlights

- Eurasian watermilfoil was discovered in 12 additional Minnesota waterbodies during 2001. One of these waterbodies is a lake in Rice County, which is the first discovery of milfoil in this part of the state.
- The annual rate of discovery of new infestations appears to be increasing, based on a trend that began in 1997 and continued through 2001
- There are now 133 Minnesota waterbodies known to contain Eurasian watermilfoil.
- In 2001, the growth of milfoil in Minnesota lakes, and so the problems caused by the plant, seemed to be somewhat less than the levels observed in some previous years. In the Twin Cities area, this may be related to high levels of precipitation during spring and early summer, which in turn led to low water clarity and limited growth of milfoil.
- The DNR Exotic Species Program continued to support and conduct research to improve management of Eurasian watermilfoil.

## Background

Eurasian watermilfoil *(Myriophyllum spicatum)* is an exotic submersed aquatic plant that was inadvertently introduced to Minnesota. Milfoil was first discovered in Lake Minnetonka during the fall of 1987. The DNR's Exotic Species Program manages milfoil because it can limit recreational activities on water bodies and alter aquatic ecosystems by displacing native plants. This report describes the Exotic Species Program's efforts in 2001 to manage this exotic plant and limit its spread in Minnesota.

## Progress in Management of Eurasian Watermilfoil

### Spread of Eurasian watermilfoil in Minnesota

Eurasian watermilfoil is now known to occur in 133 bodies of water in Minnesota (Figure 7). During 2001, the exotic was discovered in 12 new water bodies (Table 8). Nine of these water bodies are located in the seven-county metropolitan area where the majority of Minnesota lakes with milfoil are found. Two of these water bodies are located in counties adjacent to the seven-county metropolitan area. One of these is Rice County, where no milfoil had been found until the exotic was discovered in Cedar Lake this past summer. One newly discovered lake with milfoil is in Kandiyohi County, which is far removed from the Twin Cities.

Most of the newly discovered milfoil lakes were found by DNR staff (Table 9). Half of them were found by staff from the Division of Fisheries while engaged in regular duties, i.e., not searching for milfoil. Only three new infestations were reported by citizens. In the majority of new lakes that were surveyed by the Exotic Species Program, the milfoil was widespread.

As in previous years, the Exotic Species Program received a number of reports from the public of suspected new occurrences of Eurasian watermilfoil. Many of these reports were found to be occurrences of various native aquatic plants. In addition, the Exotic Species Program made cursory inspections near public water accesses on a number of Minnesota lakes and, in most cases, found no new infestations of milfoil.

**Table 8. Numbers of Lakes or Rivers in which Eurasian Watermilfoil is Known to Occur in Minnesota as of December 2001.**

| Year | Number of lakes in which milfoil was discovered | Running three-year average for number of lakes in which milfoil was discovered | Number of rivers in which milfoil was discovered | Cumulative number of water bodies with milfoil |
|---|---|---|---|---|
| 1987 | 1 | -- | 0 | 1 |
| 1988 | 8 | 8 | 0 | 9 |
| 1989 | 14 | 11 | 1 | 24 |
| 1990 | 12 | 13 | 1 | 37 |
| 1991 | 14 | 12 | 0 | 51 |
| 1992 | 10 | 10 | 2 | 63 |
| 1993 | 5 | 5 | 0 | 68 |
| 1994 | 2 | 5 | 0 | 70 |
| 1995 | 7 | 5 | 1 | 78 |
| 1996 | 5 | 5 | 0 | 83 |
| 1997 | 5 | 6 | 0 | 88 |
| 1998 | 9 | 7 | 1 | 98 |
| 1999 | 8 | 10 | 0 | 106 |
| 2000 | 14 | 11 | 1 | 121 |
| 2001 | 12 | -- | 0 | 133 |

**Table 9. Minnesota Lakes Discovered in 2001 to have Eurasian watermilfoil.**

| | Lake | Date | Who found the milfoil | Survey distribution of milfoil |
|---|---|---|---|---|
| 1 | Parley | 22 May 2001 | Fisheries | Y - widespread |
| 2 | Eagle | 22 May 2001 | Fisheries | Y - widespread |
| 3 | Wasserman | 30 May 2001 | Fisheries | Y - widespread |
| 4 | Galpin | 30 May 2001 | Exotic Species Program | No - |
| 5 | Sunset | 14 June 2001 | Citizen | Y - scattered |
| 6 | Cedar | 21 July 2001 | Citizen | Y - scattered |
| 7 | French | 26 July 2001 | Citizen | Y - widespread |
| 8 | Unnamed | 1 August 2001 | Fisheries | No- |
| 9 | Norway | 20 August 2001 | Fisheries | Y - Limited distribution, but large amount of milfoil |
| 10 | O'Dowd | 27 August 2001 | Fisheries | Y - widespread |
| 11 | Thole | 4 September 2001 | Exotic Species Program | Y - widespread |
| 12 | Stieger | 20 September 2001 | Exotic Species Program | No - |

**A special attempt to limit the spread of Eurasian watermilfoil**

Eurasian watermilfoil was discovered during 1999 in two small lakes, McKinney and Ice, in Itasca County. Due to their location in northern Minnesota, in an area with no other known occurrences of milfoil, these two lakes represented a potential source of the exotic that might be spread to many uninfested lakes. To reduce the risk of spread, the DNR attempted to significantly reduce the lake-wide abundance of milfoil in these lakes by whole-lake treatment in 1999 with fluridone herbicide, the active ingredient in Sonar® (Welling et al. 1997; see also Exotic Species Program 2000). Inspection of the lakes by the DNR in 2001 found no Eurasian watermilfoil. It is likely at some point that milfoil will reappear in these lakes. At that time, the potential benefits of, and concerns about, a second treatment with fluridone will be evaluated.

**Effectiveness of efforts to limit the spread of Eurasian watermilfoil**

The discovery of Eurasian watermilfoil in 12 additional Minnesota water bodies during 2001 suggests that the rate of discovery of new infestations is increasing. The running three-year average for number of lakes in which milfoil was discovered suggests that this is a trend that began in 1997 and continued through

2001 (Table 8). The increase in the number of new infestations is likely due, at least in part, to the fact that the number of lakes and rivers with milfoil is increasing, so there are more sources of milfoil to be spread to uninfested waters.

The rate of discovery of new infestations presumably is lower than the actual rate of spread and establishment of the exotic. The reports received in 2001 of lakes where milfoil was widespread suggest that the plant had been present in those lakes for at least several years. This observation is consistent with the belief that there are infestations of the plant, probably a significant number of them, of which we are not yet aware.

The participation of other divisions of the DNR and outside agencies, citizens, etc. in reporting new occurrences of milfoil remains critical. This assistance is very important because those of us in the Exotic Species Program are few in number and so we rely on other people to report suspected occurrences of milfoil. The program investigates likely reports of new infestations as soon as possible for two reasons. First, it is important to determine whether Eurasian watermilfoil actually is present in the lake. Second, if the exotic is present, then it is important to minimize the risk of spread to uninfested waters by notification of the users of the lake. It is hoped that, once people are aware of the presence of Eurasian watermilfoil, they will be especially careful to not transport vegetation from the lake on their boats and trailers or other equipment.

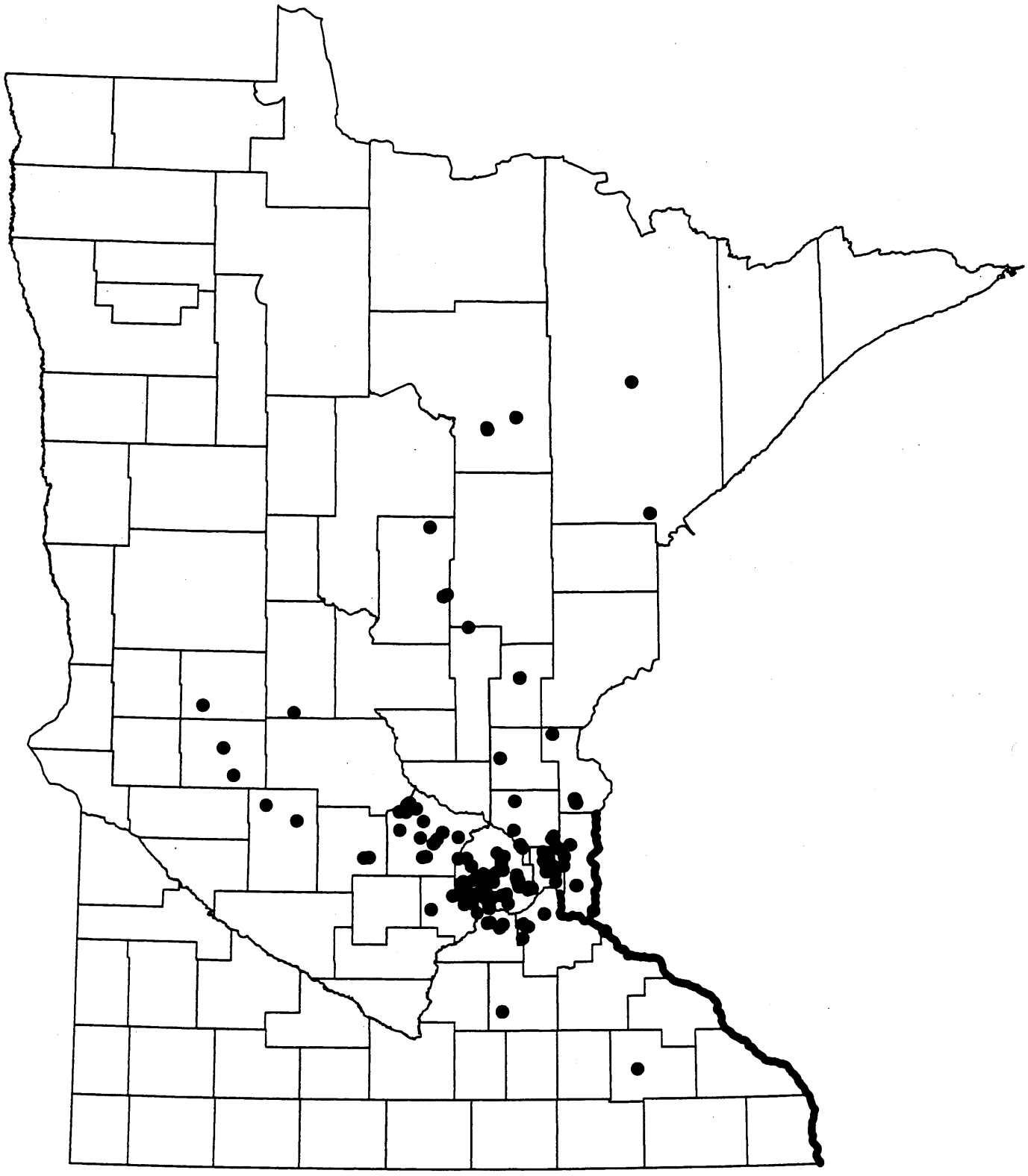

**Figure 7. Distribution of Water Bodies Infested with Eurasian Watermilfoil in Minnesota as of December, 2001.**

# Management of Eurasian Watermilfoil in Minnesota Lakes

**Classification of water-bodies for management of Eurasian watermilfoil**
Management of Eurasian watermilfoil by the Exotic Species Program starts with the classification of water bodies known to have the plant. In the spring of 2001, the Exotic Species Program classified the 121 bodies of water known to have milfoil on the basis of information available in 2000. Ninety lakes were determined to be eligible for management with state funds because they have public water accesses and are protected waters that are regulated by the State of Minnesota (Minnesota Statutes 103G.005, Subd. 15) (Table 10). Another 24 lakes were determined to be ineligible for management with state funds because they either do not have public water accesses or are not protected waters. Lastly, seven bodies of water with milfoil are rivers or streams where management of this exotic is not usually attempted.

Of the 12 water bodies that were discovered to have milfoil during 2001, three had no public water accesses and consequently were ineligible for management with State funds. All of the nine water bodies with public water accesses that were discovered to have milfoil during 2001 were classified for maintenance management (Table 10) because the exotic plant was widespread in these lakes. Consequently, there was no basis for placing them in the high-intensity class, one of the purposes of which is to attempt to prevent spread of milfoil within the lake.

**Table 10. Classification of water bodies in Minnesota with Eurasian watermilfoil during 2001.**

| Classification | Spring | New in Summer | Fall |
|---|---|---|---|
| **Eligible for management with State funds** | | | |
| High-intensity management | 16 | 0 | 15 |
| Maintenance management | 74 | 9 | 84 |
| **Ineligible for management with State funds** | | | |
| Public water but no public access | 20 | 3 | 23 |
| Not public water | 4 | 0 | 4 |
| **Other** | | | |
| Rivers or streams | 7 | 0 | 7 |
| **Total** | **121** | **12** | **133** |

**High-intensity management of Eurasian watermilfoil**
The goals of high-intensity management are to reduce the abundance of milfoil within a lake and slow the spread of the exotic to other lakes. Based on our past experiences with attempts to eradicate Eurasian watermilfoil, the Exotic Species

Program believes that eradication of the exotic from Minnesota lakes is not a realistic goal.

During 2001, the Exotic Species Program conducted high-intensity management on 16 lakes with Eurasian watermilfoil (Table 11). High-intensity management began with surveys of lakes by staff of the Exotic Species Program. Following these surveys, applications of herbicide were made to nine of these lakes by commercial applicators under contract to the DNR. Six lakes were not treated because no milfoil plants were found in them (Table 11). Three lakes that were in the high-intensity management class in 2000 were moved to the maintenance management class for 2001 because milfoil had spread within the lake.

In the case of Eagle Lake, milfoil was discovered nine years ago. Every year since, the lake was inspected by the DNR. Finding the milfoil among the other plants in the lake was often difficult because the natives, including native watermilfoil species and water lilies were abundant. Nevertheless, the exotic milfoil was treated in most, if not all years, and it was thought that these efforts were limiting the spread of the exotic within the lake. After inspecting the lake in 2000, when a very small amount of milfoil was found and one acre was treated, one year later milfoil was found along perhaps half of the shoreline. Treatment of all the milfoil found in 2001 might have required application of herbicide to 50 acres or more. Consequently, Eagle Lake was reclassified as a maintenance management lake.

## Table 11. Minnesota lakes which received high-intensity management of Eurasian watermilfoil during 1999-2001.

| | Lake Name | County | Year discovered | Treated with herbicide 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|
| 1 | Sugar | Wright | 1990 | N | Y | Y |
| 2 | Christmas | Hennepin | 1992 | Y | To MM[1] | -- |
| 3 | Eagle | Hennepin | 1992 | Y | Y | To MM [1] |
| 4 | Sauk | Todd | 1994 | N [2] | N [2] | N [2] |
| 5 | Ruth | Crow Wing | 1997 | Y | Y | N |
| 6 | George | Anoka | 1998 | Y | N [2] | Y |
| 7 | Minnewaska | Pope | 1998 | Y | N [2] | N [2] |
| 8 | Ice | Itasca | 1999 | whole-lake [3] | N [2] | N [2] |
| 9 | McKinney | Itasca | 1999 | whole-lake [3] | N [4] | N [2] |
| 10 | Stella | Meeker | 1999 | Y | Y | N [2] |
| 11 | Washington | Meeker | 1999 | Y | Y | Y |
| 12 | Green | Kandiyohi | 2000 | -- | Y | Y |
| 13 | McCarrons | Ramsey | 2000 | -- | Y - To MM [1] | -- |
| 14 | North Twin | Itasca | 2000 | -- | Y | Y |
| 15 | Owasso | Ramsey | 2000 | -- | Y - To MM [1] | -- |
| 16 | Turtle | Ramsey | 2000 | -- | Y | Y |
| | Access only | | | | | |
| 17 | Gilchrist | Pope | 1996 | Y | N [4] | Y |
| 18 | Mille Lacs | Mille Lacs | 1998 | Y | Y | Y |
| 19 | Gilbert-Pit | St. Louis | 1999 | N | Y | N [2] |

[1] Lake moved to maintenance management class because milfoil spread within the lake.
[2] No milfoil found this year.
[3] Whole lake treatment with fluridone herbicide.
[4] Milfoil found, but not treated because plants were in poor condition.

The amounts of state funds spent on high-intensity management during both 2000 and 2001 were lower than the amount spent in 1999 (Table 12). This is due largely to the high cost of treatments done with fluridone on McKinnney and Ice lakes in Itasca County in 1999, which cost $46,000.

**Table 12. Number of lakes managed and amount of state funds used for management of Eurasian watermilfoil in Minnesota during 1999-2001.**

| Year | Maintenance Management | | | High-Intensity Management | | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Number of lakes in class at the beginning of the year | Number of lakes where DNR funds were spent | Funds from DNR spent on management | Number of lakes in class at the beginning of the year | Number of lakes in class where DNR funds were spent | Funds from DNR spent on management | Number of lakes where DNR funds were spent | Funds from DNR spent on management |
| 1999 | 61 | 36 | $ 65,000 | 9 | 12 | $ 65,000 | 49 | $ 130,000 |
| 2000 | 64 | 35 | $ 72,000 | 13 | 12 | $ 31,000 | 47 | $ 103,000 |
| 2001 | 74 | 31 | $ 73,000[1] | 16 | 8 | $ 34,000 | 39 | $ 107,000[1] |

[1] This is an estimate for the amount of DNR funds that will be spent for 2001 because some of the projects eligible for reimbursement have not been completed as of January 22, 2002.

**Maintenance management of Eurasian watermilfoil**

The goals of maintenance management are to manage nuisances caused by milfoil, but not necessarily reduce the abundance of the plant lake-wide, and to slow the spread of the exotic to other lakes. Most management of milfoil on maintenance management lakes was initiated by cooperators, who were reimbursed by the DNR for the costs of the management, up to the maximum available for their lake. The amount of state funds available for eligible lakes varied according to the extent of the potential habitat for milfoil, the size of the littoral zone in each lake. The littoral zone is that portion of a lake where submersed plants can grow and is legally defined as the portion of the lake with water depths of up to 15 feet. The grant program for milfoil management on maintenance lakes is described in the Announcement of Availability of Funds (DNR 2001).

During 2001, state funding and technical assistance were available from the Exotic Species Program to potential cooperators for management of Eurasian watermilfoil on 84 lakes in the maintenance management class (Table 10). The number of lakes exceeds the number of cooperators because we seek one cooperator for connected lakes. This offer of assistance is described in a document that is mailed to potential cooperators each year during spring (DNR 2001).

As of January 22, 2002, we had reimbursed four cooperators on 22 lakes for costs of management of milfoil. We expect to reimburse an additional nine cooperators on nine lakes for costs of milfoil management (Table 12). These efforts ranged from a survey of milfoil at a cost of $400 to a mechanical harvesting program on Lake Minnetonka for which the DNR provided $24,000. During 2001, the majority of cooperators chose to spend state funds on treatment of milfoil with herbicide. Three cooperators applied for state funds for mechanical harvesting of milfoil on 13 lakes. Four cooperators applied for state funds to have contractors survey milfoil. In addition, the Exotic Species Program initiated treatment of milfoil in the immediate vicinity of public water accesses operated by the DNR on one lake in the maintenance management class.

## Effectiveness of management of Eurasian watermilfoil in Minnesota lakes

### Observations on 2001

In 2001, the growth of milfoil in Minnesota lakes, and so the problems caused by the plant, seemed to be somewhat less than the levels observed in some previous years. This observation is based in part on the fact that the number of cooperators who will be reimbursed by the DNR for control of milfoil during 2001 is approximately the same as in the two previous years, despite the increase in the number of lakes in the maintenance management class from 61 to 84 (Tables 10 and 12). In addition, staff of the Exotic Species Program observed that water clarity on many lakes in the Twin Cities area visited during 2001 was relatively low, at least during the spring and early summer. Reduced water clarity might have resulted from high levels of precipitation (Table 13); April, 2001, was the wettest April on record. The high levels of precipitation in turn would create high levels of overland run-off that would carry nutrients such as phosphorous into the lakes. These nutrients can promote the growth of algae, both growing on plants and in the water column, which can suppress the growth of submersed aquatic plants like milfoil.

**Table 13. Precipitation in the Twin Cities during 2001. (Source:http://climate.umn.edu/doc/prelim_lcd_msp.htm)**

| Month | Precipitation (inches) | |
|---|---|---|
| | Total for the month | Departure from normal |
| April | 7.00 | 4.58 |
| May | 4.52 | 1.13 |
| June | 6.35 | 2.30 |
| July | 2.12 | - 1.41 |
| August | 2.31 | - 1.31 |

**Observations on 1989-2001**

Over the last twelve years, the DNR has accumulated a large body of experience in high-intensity management of milfoil that is intended to limit the spread of the plant within a lake. Regarding control of milfoil by use of herbicides, we have learned much about what we can and cannot accomplish:

1. We can reduce the abundance of the plant in a site or area,

2. We cannot reliably prevent spread of the plant within most lakes, and

3. We cannot eliminate or eradicate the plant from lakes.

The bases for these observations can be found in a report by Crowell (1999) on the use of 2,4-D herbicide to control milfoil and also in documents and unpublished information on fluridone herbicide. The DNR has subjected several Minnesota lakes to whole-lake treatment with fluridone in an attempt to eradicate milfoil (Welling et al 1997). In four lakes that were studied between 1992 and 1999, milfoil was not found during annual surveys for up to four years after treatment, but the exotic reappeared in all lakes within five years after treatment (DNR, unpublished data). We hope that milfoil will not reappear in either McKinney or Ice lakes, which were treated with fluridone in 1999. Nevertheless, our experience in other Minnesota lakes leads us to expect that the plant has not been eradicated from these two lakes.

Over the last eight years, the DNR has accumulated a large body of experience in maintenance management that is intended to provide relief from the nuisances caused by milfoil. Regarding control of milfoil, whether by use of herbicides or physical removal or cutting of plants, we have learned that

1. We can reduce the abundance of the plant in a site or area, which means we can reduce, at least temporarily, the nuisances caused by matted milfoil

2. The DNR is offering potential cooperators on lakes in the maintenance management class significantly more funding than they have used.

The second point above suggests that not all cooperators on Minnesota lakes with milfoil are experiencing problems that are sufficient to cause them to take advantage of the funding and technical assistance available from the DNR. This observation is consistent with our observation that milfoil does not produce matted vegetation at the waters surface, which in turn can interfere with surface use, in all lakes, or in all sites in certain lakes every year. In some cases, cooperators on lakes in the maintenance management class have proposed or undertaken control that is not targeted at matted milfoil that is causing an unavoidable nuisance for users of the lake.

One important goal of control of milfoil is to attempt to limit the spread of milfoil from infested to uninfested waters. Unfortunately, despite the investment of much time and money into control of milfoil, the exotic plant continues to spread within Minnesota. As the number Minnesota lakes with milfoil increases, funding and staff available to manage the plant remain constant. This in turn means that the average amount of funding and staff available to individual lakes is decreasing.

## Participation in control efforts by other state agencies, local units of government, and interested groups

The success achieved in management of Eurasian watermilfoil and the problems it causes in Minnesota is due in large part to cooperation between the Exotic Species Program and organizations outside the DNR such as lake associations, and various local units of government. The Exotic Species Program has also received valuable assistance in management of Eurasian watermilfoil from staff from DNR's Division of Fisheries and the DNR's Aquatic Plant Management Program in the divisions of Fisheries and Ecological Services.

## Research on Eurasian watermilfoil and potential approaches to management in Minnesota

The Exotic Species Program has supported or conducted a number of research projects to improve management of Eurasian watermilfoil. In this section, we briefly summarize the most important or interesting results of recent efforts by researchers.

### Potential for biological control of Eurasian watermilfoil

Evaluation of potential biological control agents for Eurasian watermilfoil by researchers at the University of Minnesota is primarily focused on a weevil (*Euhrychiopsis lecontei*), which is a native insect. Declines in milfoil in some lakes have been associated with weevils, while other lakes with weevils have not experienced declines in Eurasian watermilfoil. Information about the University of Minnesota's research on the potential for biological control of milfoil can be found on their website at: http://www.fw.umn.edu/research/milfoil/milfoilbc.html.

During 2001, Minnesota researchers conducting the weevil studies published one paper in a peer-reviewed journal (Newman and Biesboer 2000). The researchers also have a manuscript in review (Newman et al. 2001 In Review).

Experience has shown that development of biological controls may require research conducted over a period of ten years or more. Consequently, the Exotic Species Program's evaluation of the potential for biological control of Eurasian watermilfoil is considered to be a long-term effort, the outcome of which cannot be guaranteed.

The research described above was supported by funding provided through the DNR with appropriations made in 1992, 1993, 1995, 1997, and 1999, by the

Minnesota Legislature as recommended by the Legislative Commission on Minnesota Resources (LCMR). During 2001, the Minnesota Legislature accepted the recommendation of the LCMR and appropriated $45,000 for continued research on biocontrol of milfoil during the FY 2002-2004 period. This appropriation was matched by a commitment of $50,000 from DNR Exotic Species Program funds, which comes from a surcharge on watercraft licenses (see Overview of Minnesota Exotic Species Programs, Funding).

**Review of the potential to use fluridone herbicide to selectively control Eurasian watermilfoil.**

The potential use of fluridone herbicide, which is formulated as Sonar™, to control Eurasian watermilfoil has been the subject of much discussion in Minnesota because the product is usually applied to whole bays or lakes (see Exotic Species Program 2001). Operational treatment of whole bays or lakes with herbicide is not allowed in Minnesota because this destroys more vegetation than is necessary to give users access to lakes.

In February, 2001, the Exotic Species Program organized two meetings to review information on the use of fluridone to manage milfoil. The purpose of the first meeting was to review the Exotic Species Program's general plan for experimental whole-lake treatments with fluridone and give attendees a sense of the levels of support for, as well as opposition to, further evaluation by the DNR of the possible use of this herbicide in Minnesota. These topics were addressed with the assistance of several researchers and managers who have extensive experience with this herbicide and milfoil in states outside Minnesota. A second meeting was organized by the Exotic Species Program to provide an opportunity for representatives of lake associations, lake managers, commercial applicators, consultants, researchers, other interested parties, and DNR staff to discuss the potential to use fluridone herbicide to selectively control Eurasian watermilfoil in Minnesota.

After these meetings, the Exotic Species Program selected six lakes in the Twin Cities area for study. Three of these lakes will be treated with fluridone in 2002; the other three will be serve as untreated reference lakes. The vegetation of all six lakes was surveyed in 2001 to document pre-treatment conditions.

## Management of Eurasian watermilfoil in other states

In 2001, the total number of states known to have milfoil was 45. The only states where it is not known to occur are: Alaska, Hawaii, Maine, Montana, and Wyoming. In Canada, milfoil is known to occur in British Columbia, Ontario, and Quebec.

### Iowa

During 2001, one new water-body in Iowa was discovered to have Eurasian watermilfoil (personal communication: Kim Bogenschutz, Iowa DNR, Boone). During 2001, the Iowa Department of Natural Resources continued to monitor boat

accesses, survey lakes for the presence of Eurasian watermilfoil, conduct various public awareness activities aimed at preventing the spread of milfoil, and treat a limited number of infested lakes with herbicide.

**Manitoba**

During 2001, a botanist from Manitoba Conservation searched the Souris River location where Eurasian watermilfoil had been reported to occur (Exotic Species Program 2001). No Eurasian watermilfoil was discovered; consequently, there are no documented occurrences of the exotic plant in the province of Manitoba (personal communication: Geoff Jones, Manitoba Conservation, Winnipeg).

## Future plans and needs of the Eurasian watermilfoil program:

Priorities for the Eurasian Watermilfoil Program include:

- Keep the public informed about Eurasian watermilfoil and the problems that it can cause;
- Reduce the plant's spread by targeting access inspection and enforcement efforts in areas of the state where infestations occur;
- Monitor the distribution of milfoil in the state with emphasis on verification of reports of new occurrences of milfoil;
- Attempt to control milfoil in Minnesota lakes, especially new populations in areas of the state without other milfoil infestations; and
- Support research on the potential for biological control of milfoil, including Exotic species program match of the proposal recommended by the LCMR for continued funding, as well as research on the biology of this species.

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# Management of Purple Loosestrife

## 2001 Highlights

- Biological control insects significantly damaged 121 of 307 release sites visited. Sites with severe damage (greater than 75% defoliation of infestations) occurred from Houston County in the southeast, to Becker County in the west, and to St. Louis County in the north.

- Approximately 2 million purple loosestrife leaf-eating beetles were released at more than 250 sites statewide. This brings the release sites statewide to 654.

- Over 80 percent of insect releases made for biological control of purple loosestrife between 1992 and 2000 have established reproducing populations.

- A 16% increase in the number of insects released for biological control of purple loosestrife in the year 2001, compared with 2000.

- 60 high priority purple loosestrife infestations were treated with herbicide and insects were released on 36 sites, previously planned for herbicide treatment.

- No purple loosestrife was found at three sites where purple loosestrife plants were treated with herbicide in 2000. This control success is limited to small infestations that are treated soon after loosestrife invades an area.

## Background

Purple loosestrife (*Lythrum salicaria, L. virgatum* and their hybrids) is a wetland plant from Europe and Asia that invades marshes and lakeshores, replacing cattails and other wetland plants. The DNR and other agencies manage purple loosestrife because it harms ecosystems and reduces biodiversity by displacing native plants. The Purple Loosestrife Program was established in the DNR in 1987. State statutes direct the DNR to coordinate a control program to curb the growth of purple loosestrife (see M.S. 84D.02, Subd. 2 in Appendix A) and a significant amount of progress has been made toward the development of a sound approach to manage this harmful exotic. This management program integrates chemical and biological control approaches and cooperates closely with local, state, and federal groups involved in purple loosestrife management.

## Statewide inventory of purple loosestrife

In 1987, the DNR began to inventory sites in Minnesota where purple loosestrife was established. DNR Area Wildlife Managers, county agricultural inspectors, local weed inspectors, personnel of the Minnesota Department of Transportation,

and the general public report purple loosestrife sites to the DNR. The DNR maintains a computerized list or database of sites that includes the observer's name, location, type of site and number of loosestrife plants present (see Figure 8).

In 2001, 53 new purple loosestrife infestations were identified in Minnesota. There are now 2,128 purple loosestrife infestations recorded statewide (Table 14). Of those sites the majority (70%) are lakes, rivers, or wetlands. Inventory totals indicate that MN presently has over 63,000 acres infested with purple loosestrife.

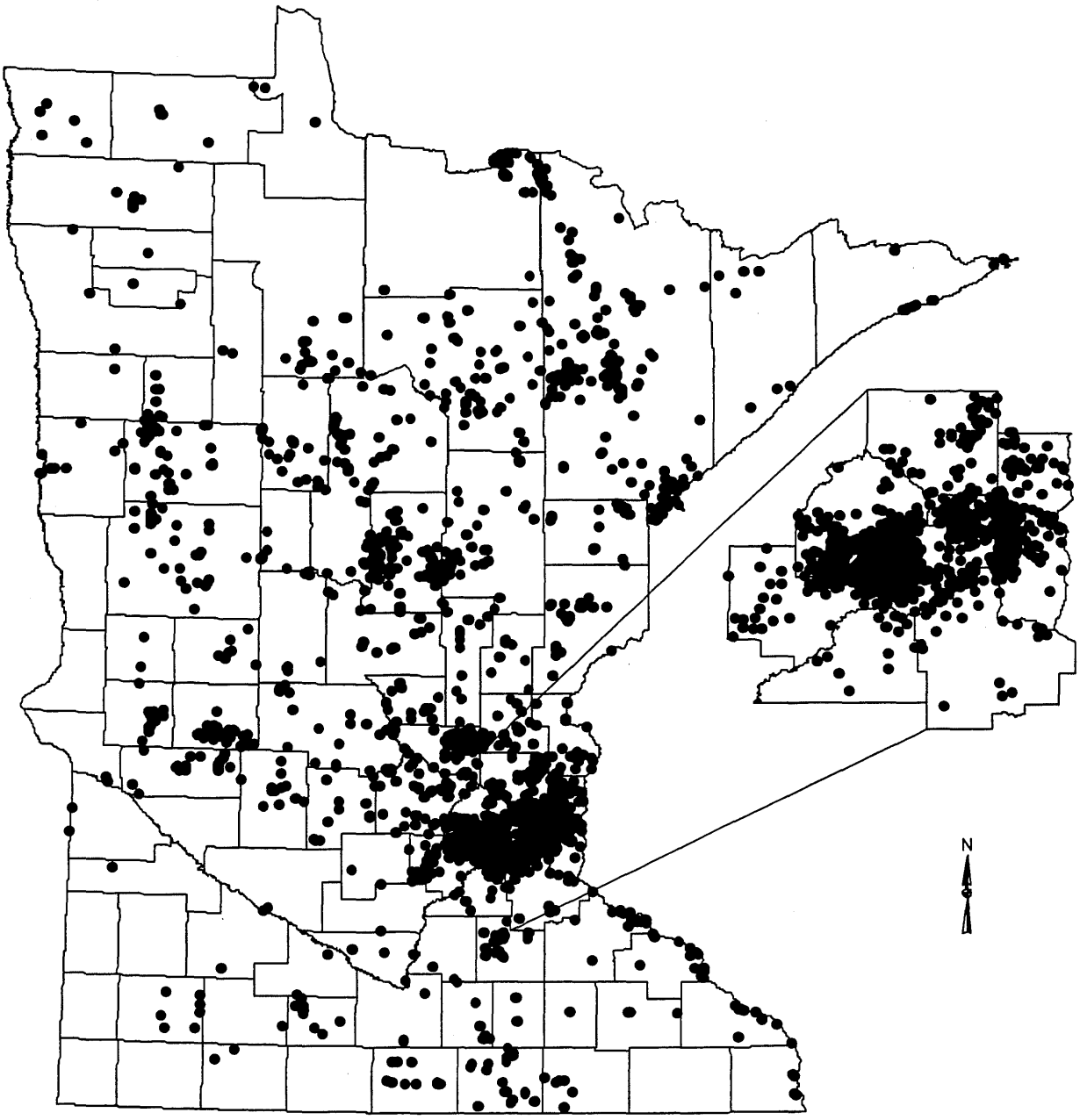


**Figure 8. Purple loosestrife infestations in Minnesota as of December, 2001.**

**Table 14. Purple Loosestrife infestations in Minnesota recorded by the Minnesota Department of Natural Resources in 2000 and 2001.**

| Site Type | Total sites 2000 | New sites - 2001 | Total sites 2001 |
|---|---|---|---|
| Lake | 621 | 12 | 633 |
| River | 184 | 12 | 196 |
| Wetland | 666 | 10 | 676 |
| Roadsides and Ditches | 451 | 14 | 465 |
| Other[1] | 153 | 5 | 158 |
| **Total** | **2075** | **53** | **2128** |

[1] Includes gardens and other misc. sites.

## Progress in Management of Purple Loosestrife - 2001

### Chemical control of purple loosestrife

Initial attempts by the DNR to control purple loosestrife have relied mainly on the use of herbicides. The most effective herbicide was found to be Rodeo™, a formulation of glyphosate, which is a broad spectrum herbicide that is also toxic to desirable, native plants. To allow maximum survival of native plants, Rodeo™ is most frequently applied by backpack sprayer as a 'spot-treatment' to individual loosestrife plants. A second herbicide, 2,4-D, or 2,4-dichlorophenoxyacetic acid, is less frequently used. 2,4-D is more selective than Rodeo™ because it affects primarily broad-leaved or dicotyledonous plants but it is less effective than Rodeo™. A third herbicide, Renovate™, a formulation of triclopyr, has been applied to purple loosestrife on a trial basis (1991-1997) to test its effectiveness and selectivity. Renovate™ which is not yet registered for aquatic use in the U.S., will be the herbicide of choice for loosestrife control if it becomes registered because it has proven to be very effective and is more selective than Rodeo™ (i.e., it is less harmful to non-target plants). Renovate is also less expensive than Rodeo™.

Beginning in 1991, a prioritization plan was developed for selecting control sites in public waters and wetlands where herbicide would be used for purple loosestrife control. This was done because there are insufficient resources to apply herbicides to all known purple loosestrife sites in Minnesota. In addition, DNR personnel observed that herbicide treatments do not result in long lasting reductions of loosestrife when applied to large populations that have been established for a number of years. This is due partly to the plants ability to reestablish from an extensive purple loosestrife seed bank. Research done by the

University of Minnesota, under contract to the DNR, demonstrated that long-established stands of loosestrife develop very large and persistent seed banks. Herbicide treatments which kill the existing loosestrife population only create space for additional seeds to sprout. Consequently, small and recently established populations of loosestrife, which are likely to have small seed banks, are given the highest priority for treatment. In addition, because seeds of this species are dispersed by water movements, the DNR tries to keep loosestrife from infesting downstream lakes. Sites located in the upper reaches of watersheds with little loosestrife are treated before those located in watersheds with large amounts of loosestrife. Implementation of the prioritization scheme in 1991 resulted in fewer large sites (> 1000 plants) being treated. Only two sites had greater than 1,000 plants and were treated in 2001.

Between 1990 and 2001, herbicides were applied to an average of 136 sites per year. This summary includes applications made by DNR personnel, commercial applicators working under contract to DNR, and various cooperators; it is not a complete listing of all herbicide applications made in Minnesota. During the summer of 2001, the DNR or licensed contractors visited 87 purple loosestrife stands for herbicide control work. At 27 sites, workers found no loosestrife plants to treat. One site had loosestrife plants which were hand pulled. Insects were released on 35 sites that were initially planned to be herbicide treatments. A total of 60 sites were treated with herbicides. Most of the sites were very small, 72% had less than 100 plants. In total, all sites visited used a total of 1.05 gallons of Rodeo™, took 359 worker hours, and cost $19,702.

**Biological control of purple loosestrife**

Insects for biological control of purple loosestrife were first released at a research site by DNR staff in 1992. This initial release occurred after years of testing to make sure the insects were purple loosestrife specific and would not damage other native plants or agricultural crops. Once the insects were approved for release by the United States Department of Agriculture (USDA), insects were provided by Cornell University for release in Minnesota. This research was expanded in 1993, 1995, 1997, 1999, and 2001 through funding appropriated by the Legislature as recommended by the Legislative Commission on Minnesota Resources (LCMR). Four species of insects, two leaf-eating beetles, *Galerucella calmariensis* and *G. pusilla*; a root-boring weevil, *Hylobius transversovittatus;* and a flower-feeding weevil, *Nanophyes marmoratus*, have been released as potential biological controls for loosestrife in Minnesota.

*Leaf-Eating Beetles*: Biocontrol insects released between 1992 and 2000 have established reproducing populations at more than 80% of the sites. Insect populations increased significantly at many locations with pronounced damage to loosestrife plants. More than 307 insect release sites were visited during the summer of 2001 to assess the insects establishment and level of control achieved. At 39% (121 sites) of the sites surveyed, the insect populations are rapidly

increasing and causing significant damage to the loosestrife infestations. At 15% of all visited sites, the loosestrife was severely defoliated (90-100%) (Figure 9).

From 1997 to 2001, rearing efforts were increased by recruiting more partners to rear insects throughout the state. This cooperative effort has had a significant effect on total number of insects released (Figure 10). Insect rearing "starter kits" were provided to rearing partners including county agricultural inspectors, Minnesota Department of Agriculture staff, Minnesota Department of Transportation staff, DNR area wildlife managers, nature centers, lake associations, 4-H and garden clubs.

A starter kit is composed of pots, potting soil, insect cages, leaf eating beetles, and other materials necessary to rear 20,000 leaf-eating beetles (*Galerucella* spp.). The insects were then released on high priority areas. Cooperators statewide reared and release more than 1.9 million leaf-eating beetles in 2001. All insect rearing was completed outdoors for ease of production and to produce hardier insects. In total, approximately 2.2 million leaf-eating beetles were produced and released on more than 250 sites statewide. As of December 2001, insects have been released at more than 654 sites statewide (see Figure 11 and Table 15).

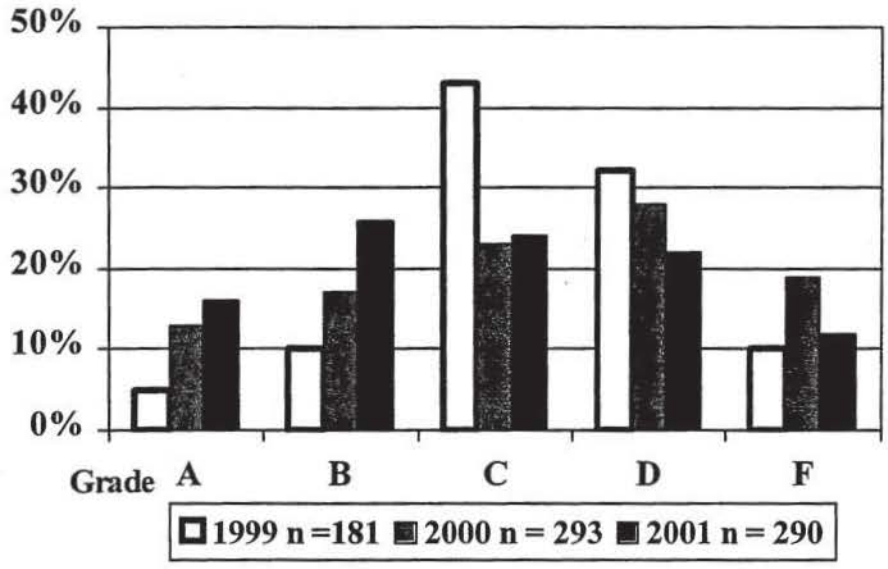


**Figure 9. Sites graded for insect establishment and control**
A= 90-100% defoliation, B= 50-89% defoliation, C= damage near release point with insects visible, D= No damage, few insects visible, F= no insects or damage present

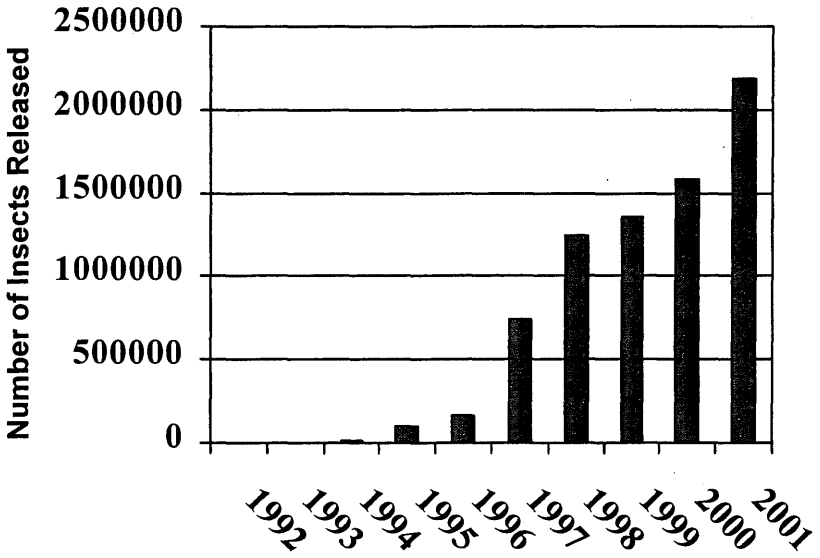


**Figure 10. Number of insects released to control purple loosestrife by year.**

**Table 15. Summary of number of insects released in each region to control purple loosestrife .**

| Minnesota DNR Regions | Number of Release Sites | Number of Insects Released |
|---|---|---|
| I - Northwest | 81 | 656,322 |
| II - Northeast | 137 | 1,026,992 |
| III - North Central | 116 | 1,105,980 |
| IV - Southwest | 19 | 225,500 |
| V - Southeast | 32 | 372,713 |
| VI- Metro | 265 | 2,673,622 |
| **Totals** | **650** | **6,061,129** |

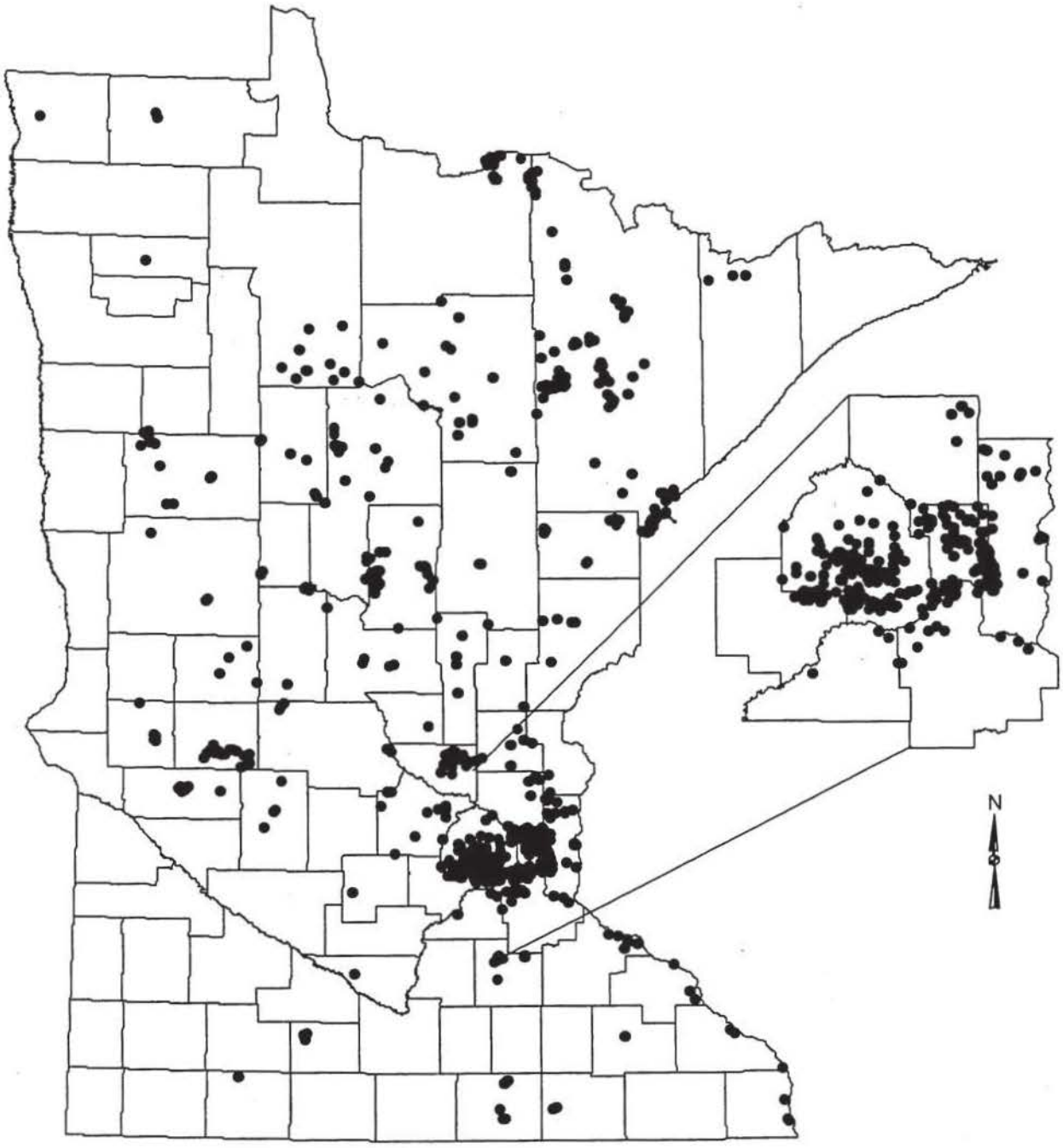


**Figure 11. Locations of insects released to control purple loosestrife in Minnesota.**

With success of insect establishment in the field, organized rearing efforts are anticipated to come to an end in the next several years. Resource managers will be able to collect insects from established release sites and redistribute to new infestations. This collect and move method will reduce the effort and costs needed to further distribute leaf-eating beetles in Minnesota. In 2000-2001, insects were collected and redistributed to 39 of the locations statewide.

*Root-Boring Weevils:* Initially, only a small number of root-boring weevils were brought to Minnesota. As of December 2001, there are 12,223 weevils comprising 30 releases, at 23 different sites. In 2001, Cornell University provided 2,000 adult root-boring weevils for field release. The weevils were released at four sites (two in Hennepin County by Minnesota Valley National Wildlife Refuge and two in Sherburne County by DNR and Sherburne National Wildlife Refuge. A fall survey of two weevil release sites (Hugo and New Brighton -1999) revealed that the weevils are not only surviving the winter and reproducing, but damaging purple loosestrife roots by burrowing through them. The weevils are slow growing and it will take many years to build up populations in Minnesota wetlands.

## Research on Insects as Biological Control Agents

During 2001, funding from the Minnesota Legislature, as recommended by the Legislative Commission on Minnesota's Resources (LCMR), was used to monitor impacts to loosestrife populations by the insects used as purple loosestrife biological control agents. In particular, the leaf-eating beetles, *Galerucella* spp., were monitored at several locations to assess their impacts on loosestrife seed production, seed germination, and carbohydrate stores in roots. The study has shown that *Galerucella* feeding on shoot tips resulted in dramatically fewer seed capsules and shorter inflorescences compared with control plants. The study also showed that *Galerucella* feeding, with complete defoliation, does not immediately kill a plant. More than two years of successive *Galerucella* feeding is required to kill purple loosestrife plants, even when high amounts of defoliation occur. However, *Galerucella* feeding on shoot tips does result in shorter loosestrife plants and reduces seed production. This will reduce the competitiveness of purple loosestrife in wetlands and should help to increase abundance of native plant species. This research is nearly complete with a final report provided by June 30, 2002.

In 2001, a study began monitoring the landscape movements of *Galerucella* spp. The main objectives are to track the beetles within a wetland as well as wetland to wetland movement. The study will ultimately give us information on what we can expect these beetles to do on their own and where we need to step in and augment the population. Early indications show that the loosestrife-eating beetles can move up to ten miles from where they were released. This usually happens once the insect population has increased dramatically.

## Management of Purple Loosestrife in Other States

In 1997, the DNR received two federal grants to rear and distribute insects for purple loosestrife control nationwide. A total of $312,000 was received from two U.S. Fish and Wildlife Service programs (Federal Aid Program-$212,000; North American Wetlands Conservation Act-$100,000). The DNR contracted with Cornell University to rear and distribute the insects to states and federal agencies involved with loosestrife control. More than 500,000 leaf-eating beetles and 30,000 root-boring weevil eggs were reared and distributed to 30 states and four federal agencies (States include: Alabama, California, Connecticut, Deleware, Iowa, Idaho, Illinois, Indiana, Maryland, Maine, Michigan, Minnesota, Montana, Nebraska, New Hampshire, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Washington, Wisconsin). Among the recipients were: universities; state Departments of Natural Resources, Environmental Conservation, Fish and Game or Agriculture; National Wildlife Refuges; Bureau of Reclamation; United States Department of Agriculture-Animal Plant Health Inspection Service; and the Tennessee Valley Authority.

In 1999, the DNR received a second grant from the USFWS-Federal Aid Program for $300,000 to continue rearing and distributing the root-boring weevil nationwide. Distribution of insects began during the summer of 2000 where more than 14,000 weevils were distributed to cooperators in 17 states. The rearing and distribution efforts continued through 2001 with thousand of weevils shipped to more than 15 states. This rearing effort ended in fall of 2001.

Many states continue to increase their control efforts by rearing and releasing insects in their states. Nationwide, many states are starting to see impacts by the leaf-eating beetles on loosestrife infestations.

## Effectiveness

Effectiveness of control efforts will be based on short-term and long-term objectives. Control or eradication of small infestations statewide with herbicides is the primary short-term objective. Each year, a small number of purple loosestrife infestations (3 in 2001) are eradicated with herbicides. This is critical because these infestations are in watersheds that have very few infestations of loosestrife. This effort helps prevent the spread of purple loosestrife into uninfested wetlands and lakeshores.

A long-term objective is to utilize biological controls to reduce the abundance/importance of loosestrife in wetland habitats throughout Minnesota. Biological controls, if effective, will reduce the impact loosestrife has on wetland flora and fauna communities. DNR's goal is to reduce the abundance of loosestrife in wetlands where it is the dominant plant in Minnesota by at least 70% within 15-20 years. Purple loosestrife will likely not be eradicated from most wetlands where it presently occurs, but its abundance will be significantly reduced so that it is only one of many plant species in the community, and not a dominant one. Assessment efforts in 2001 demonstrated that *Galerucella* introductions

have severe defoliation of loosestrife populations on some sites. The DNR will continue to track these wetlands to assess how loosestrife abundance changes over time and to determine what combinations of biological control agents provided the desired level of control.

## Participation of others in purple loosestrife control efforts

In 2001, the DNR worked with a variety of local governments and other organizations to control purple loosestrife in Minnesota (Table 16). Control information and technical assistance was provided to landowners and local units of government.

The DNR initiated an insect rearing program providing county agricultural inspectors, Minnesota Department of Agriculture field staff, and DNR area wildlife managers with a starter kit for rearing their own leaf-eating beetles (described above in the biological control section). There were 64 rearing partners, in the 33 counties who reared an estimated 1.9 million leaf beetles for release in the participating counties (Table 16).

**Table 16. List of cooperators in Minnesota during 2001 that were participating in purple loosestrife control efforts and the type of participation.**

| Government/Organization | Type of Cooperation |
|---|---|
| University of Minnesota | Partner with DNR in statewide biological control efforts, including rearing, releasing, and monitoring of insects. |
| Leech Lake Indian Reservation, Dept. of Resource Management | Partner with DNR in biological control efforts, including rearing, releasing, and monitoring of insects on or near the Reservation |
| Mille Lacs Band of Ojibwe, Natural Resource Department | Partner with DNR in biological control efforts, including rearing, releasing, and monitoring of insects on the Reservation |
| USFWS, MN Valley NWR; Sherburne NWR; Upper Mississippi NWR | Partner with DNR in biological control efforts, including rearing, releasing, and monitoring of insects. |
| Cornell University, Ithaca NY | Working under contract to the DNR to develop an artificial diet for rearing the root-boring weevil. Rear and distribute weevils nationwide. |
| MN Department of Agriculture | Partner with DNR in statewide biological control efforts including releasing and monitoring insects. |
| Anoka, Becker, Beltrami, Carlton, Carver, Cass, Chisago, Crow Wing, Dakota, Douglas, Freeborn, Goodhue, Hennepin, Hubbard, Isanti, Itasca, Kanabec, Kandiyohi, McLeod, Mille Lacs, Morrison, Mower, Otter Tail, Pope, Ramsey, Rice, Scott, Sherburne. St. Louis, Stearns, Stevens, Swift, Todd, Wadena, Washington, Watonwan, Wright | Counties where insects were reared and released by county agricultural inspectors, Minnesota Department of Agriculture field staff, MnDOT field staff, DNR area wildlife managers, 4H clubs, lake associations and schools. |

## Future needs for purple loosestrife management

- Continue research on biological controls of purple loosestrife, including the development of insect rearing and release strategies. Implementation strategies are needed for actual distribution in the field and subsequent monitoring of the insects.
- Continue DNR funding of herbicide control efforts on small, high priority infestations.
- Continue to assess effectiveness of management efforts including chemical and biological control.
- Continue to develop new in-state partners (e.g., County Agriculture Inspectors, MnDOT, DNR area wildlife managers, nature centers) to expand scale of management efforts.

# Management of Flowering Rush

## 2001 Highlights

- For a third year, DNR Exotic Species Program staff removed flowers from flowering rush in Forest Lake, the only known population in Minnesota which produces fertile seeds.

- Two new flowering rush populations were discovered in 2001; Hart Lake in Itasca County and an unnamed lake in Dakota County.

- DNR Exotic Species Program coordinated and assisted with the control of flowering rush at a public swimming beach in Twin Lakes, Itasca County, for a fourth year.

## Background

Flowering rush (*Butomus umbellatus* L.) is a perennial aquatic plant, native to Europe and Asia. It grows along lake and river shores as an emergent plant with three-angled fleshy leaves and may produce an umbel-shaped cluster of pink flowers. Flowering rush may also grow as a non-flowering submersed plant with limp, ribbon like leaves.

The plant spreads primarily vegetatively from thick rhizomes, from small tubers that break off the rhizome, and from small bulblets that form in the inflorescence. Water currents, ice movement (Haber 1997) and muskrats (Gaiser 1949) can easily move these reproductive structures to new locations within a waterbody.

Flowering rush was likely brought to North America in the late 1800s in ship ballast and has also been repeatedly introduced as an ornamental plant. Resource managers and researchers have expressed concern that flowering rush may grow more aggressively in North America than in its native Europe and may become an aggressive competitor with native wetland vegetation (Anderson et al 1974, Staniforth and Frego 1980).

## Flowering rush in Minnesota

Flowering rush was first recorded in Anoka County, Minnesota in 1968 (Moyle 1968) and has since been located in six other counties (Table 17). Despite its 30-year presence in the state, the distribution of flowering rush remains disjunct. New introductions are likely the result of intentional planting from horticultural sales. More information about the distribution of flowering rush in the state can be found in the year 2000 Exotic Species Annual Report (Exotic Species Program 2001).

There were two new discoveries of flowering rush infestations in 2001. Following a report from a local conservation officer, Exotic Species staff surveyed the entire lakeshore of Hart Lake in Itasca County. Flowering rush was found in many areas of the lake. Nevertheless, it is not growing densely in any of those areas. In

Dakota County, about 25 flowering rush plants were found growing along the lakeshore of an unnamed lake, just south of Cliff Road.

## Management of Flowering Rush - 2001

- Flowering rush is a prohibited exotic plant in Minnesota, which means that it is unlawful to possess, purchase, or sell this exotic in Minnesota. Nevertheless, horticultural sales are the most likely means of introducing this plant into a new area. The sale of flowering rush in many large discount stores was stopped following contact from the Exotic Species Program in 1999 (Exotic Species Program 2001). Nevertheless, flowering rush continues to be sold as an ornamental plant and is advertised through the Internet as a desirable, hardy plant for water gardens.

- Hand-cutting appears to be the most successful method to seasonally reduce dense stands of emergent flowering rush. The DNR Exotic Species Program again coordinated and assisted with a flowering rush hand-cutting project at a public swimming beach in Twin Lakes, Itasca County for a fourth year. Flowering rush impedes fishing and swimming activities at this beach and fishing pier. This beach was cut in the springs of 1998 and 1999, and in the spring and fall of 2000. In 2001, the beach was cut in both June and September. The caretaker of the beach is pleased with the control of flowering rush by hand cutting and wants to cut again in 2002. The Exotic Species Program will continue to coordinate this effort.

- Exotic Species Program staff and DNR Fisheries staff toured the flowering rush in the Detroit Lakes area lakes (Big Detroit down stream to Lake Melissa) with Pelican River Watershed District staff, and interested members of the public. Flowering rush is quite abundant in Detroit Lakes specifically, and is fairly sparse in Lake Melissa. The Pelican River Watershed District continues extensive mechanical harvesting of flowering rush and other aquatic plants in Detroit Lakes to reduce the nuisance they cause lake residents and users.

- The Forest Lake infestation is the only known infestation in Minnesota known to produce fertile seeds. These seeds may pose an increased risk of these plants spreading to neighboring waters. In an effort to reduce this risk, the Exotic Species Program staff removed the umbels (flowers) from the plants in this lake.

## Effectiveness of management

Flowering rush often grows in stands with native vegetation, making it difficult to control this exotic without harming the native plants. Mechanical control by cutting appears the most effective method of reducing dense stands of flowering rush. Cutting is most effective if done early and repeated several times during the growing season (Hroudova 1989). Disadvantages of cutting include that it is not

selective, is labor intensive, and does not eliminate the exotic. Digging flowering rush may increase its spread if the entire rhizome is not removed. Herbicide applications, particularly in water, have been ineffective because herbicide is quickly washed away from the plant.

The DNR's goals for flowering rush management include: 1) Stop the sale of flowering rush in Minnesota; 2) Monitor sites to assess population changes; 3) Support research to develop and implement better management methods, and 4) Provide lake shore owners in the vicinity of flowering rush infestations with information on the proper way of reducing the abundance of this exotic where it is causing a nuisance without facilitating the spread of this plant within the waterbody.

## Research on flowering rush

In 2001, researchers from Queen's University in Ontario produced their final report on the distribution and genetic variation of flowering rush populations in Minnesota. The DNR Exotic Species Program helped fund a portion of this research. Key findings from this research are:

- There appear to be only two genotypes of flowering rush in Minnesota, a fertile diploid genotype at Forest Lake, and a sterile triploid genotype at all other seven locations.

- Fertile populations appear to have greater powers to spread than sterile populations, which may be due to small pea-sized clonal bulbils that form on the flowers of fertile plants. These bulbils can readily "germinate" and form new plants.

- There does not appear to be a higher genetic diversity among the fertile populations than the sterile populations. (Eckert, 2001; Exotic Species Programs, 2001)

## Table 17. Recorded locations of flowering rush in Minnesota.

| County | Water body | DNR Division of Waters No. | Year identified | Source |
|---|---|---|---|---|
| Anoka | Amelia Lake | 02-0014 | 1968 | MNDNR survey |
| | Bass Lake | 02-0135 | 1968 | MNDNR survey |
| | Reshanau Lake | 02-0009 | 1970 | MNDNR survey |
| Becker | Detroit Lakes | 03-0381 | 1976 | Univ MN herbarium collection |
| | Pelican River | ------ | 1987 | Pelican River Watershed District (PRWD) |
| | Muskrat Lake | 03-0360 | 1987 | PRWD |
| | Sallie Lake | 03-0359 | 1989 | PRWD |
| | Melissa Lake | 03-0475 | 1993 | PRWD |
| Dakota | unnamed lake | 19-0064 | 2001 | MNDNR survey |
| Itasca | Twin Lakes | 31-0191 | 1995 | MNDNR survey |
| | Hart Lake | 31-0020 | 2001 | MNDNR survey |
| Rice | Cannon Lake | 66-0008 | 1972 | Univ MN herbarium collection |
| | Cannon River | ------ | 1977 | Univ MN herbarium collection |
| | Wells Lake | 66-0010 | 1998 | Queen's University |
| Todd | Sauk River | ------ | 1997 | MNDNR survey |
| Washington | Forest Lake | 82-0159 | 1998 | MNDNR survey |

## Participation by other groups

Others involved in flowering rush management in Minnesota in 2001 include: DNR Fisheries and Wildlife, DNR Minnesota Conservation Corps (MCC), Pelican River Watershed District (PRWD), Greenway Township in Itasca County, and Queen's University, Ontario.

## Future needs for flowering rush management

- Continue efforts to prevent introductions of flowering rush in Minnesota. Inform the public, the nursery industry, and other businesses selling flowering rush of the problems associated with this plant and the existing laws against its possession and sale in Minnesota.
- More information is needed on the distribution, reproductive biology, and potential impacts of flowering rush in Minnesota. The DNR will continue to encourage research in these areas.
- Continue to investigate new methods of controlling flowering rush and to evaluate the results of ongoing flowering rush management within the state.

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# Management of Curly-Leaf Pondweed

## 2001 Highlights

- Exotic Species Program staff assisted the U.S. Army Corps of Engineers in its continuing study of the effectiveness of the contact herbicide endothall to control curly-leaf pondweed in spring when water temperatures are low. Spring 2001 surveys showed some carry-over control of curly-leaf pondweed from spring 2000 treatments. Study lakes were treated again in April 2001.

- The DNR funded research at Minnesota State University - Mankato on carbohydrate allocation in curly-leaf pondweed. This information can be used to help maximize the effectiveness of curly-leaf management programs.

- Information about curly-leaf pondweed and its management was provided to the public through literature, public presentations, public meetings, and watercraft inspections.

## Background

Curly-leaf pondweed (*Potamogeton crispus* L) is a perennial, rooted, submersed aquatic vascular plant which was first noted in Minnesota about 1910 (Moyle and Hotchkiss, 1945). Native to Eurasia, Africa, and Australia, this species has been found in most of the United States since 1950, and is currently found in most parts of the world (Catling and Dobson, 1985).

Curly-leaf pondweed has a unique life cycle which gives it competitive advantages over many native aquatic plants. Unlike most native plants, curly-leaf pondweed may be in a photosynthetically active state even under thick ice and snow cover (Wehrmeister and Stuckey, 1978). Therefore, it is often the first plant to appear after ice-out. By late spring it can form dense mats which may interfere with recreation and limit the growth of native aquatic plants (Catling and Dobson, 1985). Curly-leaf plants usually die back in early summer in response to increasing water temperatures, but they first form vegetative propagules called turions (hardened stem tips). New plants sprout from turions in the fall (Catling and Dobson, 1985).

## Progress in Management and Research

- Exotic Species Program staff organized a technical meeting on the control of curly-leaf pondweed which was held on February 16, 2001. This meeting was attended by both public and private sector individuals from various states. Presentation topics included: SePRO Corporation's recent research on curly-leaf pondweed, Hennepin County Parks' experience with curly leaf pondweed, US. Army Corps of Engineers (ACOEs) recent research on

curly-leaf pondweed, and planned research at Minnesota State University - Mankato on curly-leaf pondweed seasonal biomass and carbohydrate allocation.

- DNR provided Minnesota State University - Mankato funding to study seasonal biomass and carbohydrate allocation in Minnesota curly-leaf pondweed populations. Dr. John Madsen will be conducting this research aimed at determining the best time of year to manage curly-leaf. The final report from this study should be available in May, 2002.

- The U.S. Army Corps of Engineers continued its studies to evaluate both the efficacy of contact herbicides to control curly-leaf pondweed at low temperatures, and to reduce the next summer's curly-leaf growth by reducing turion production (Netherland et al 2000). ACOE tests of whole lake endothall treatments to control curly-leaf pondweed and to reduce turion production in small lakes in Minnesota began in the summer of 1999. On April 27 and 28, 2000, three small lakes were treated with endothall, the north bay of Gleason Lake (Hennepin County), Blackhawk Lake (Dakota County), and Schwanz Lake (Dakota County). Staff from the ACOE assisted by staff from Exotic Species Program and the City of Eagan surveyed the plant communities in the treated ponds, collected biomass samples, and collected water samples from the treated lakes and two untreated reference lakes. There were noticeably fewer curly-leaf turions in the treated lakes than in the untreated reference lakes in late summer sampling. Surveys of the treated lakes in early spring in 2001 showed some carry over control. Nevertheless, because there was some regrowth of curly-leaf in the treated lakes they were treated again in the spring of 2001. Surveys done in the spring and summer of 2002 showed healthy native plant populations.

## Effectiveness

The DNR Exotic Species Program has three main goals for curly-leaf pondweed management: 1) To keep an inventory of the known distribution of curly-leaf pondweed in Minnesota, 2) To support, conduct, and communicate research to improve the management of curly-leaf pondweed; and 3) To reduce the intentional and unintentional introduction of curly-leaf pondweed into uninfested waterbodies in Minnesota. A summary of the curly-leaf inventory is found in the 1998 Exotic Species Annual Report (1999). During 2001, we have supported and helped conduct research on new curly-leaf pondweed control methods. In addition, we have communicated information to many people and organizations interested in curly-leaf pondweed management.

The Exotic Species Program has ongoing programs to educate the public about the transportation of exotic species (see the Watercraft Inspection and Enforcement sections). These programs teach the public to help prevent the

movement of any aquatic plant from one water body to another and are very useful in preventing the spread of curly-leaf pondweed.

## Future needs for curly-leaf management

- Continue to gather information about the extent of ecological and recreational problems caused by curly-leaf pondweed in Minnesota.
- Continue public awareness efforts focused on containing curly-leaf pondweed to where it is already found. Opportunities include our watercraft inspection program, literature, and public speaking engagements.
- Continue to provide information on the current state of curly-leaf pondweed in Minnesota and existing management technology through the preparation of a fact sheet, a report on the current state of curly-leaf control, speaking engagements, articles, and work with individual lake managers.
- Continue to provide technical assistance to researchers working on curly-leaf control, and the relationships between curly-leaf populations and lake water quality in Minnesota.
- Explore opportunities for cooperative research on curly-leaf pondweed management with universities and other government agencies.

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# Management of Zebra Mussels

## 2001 Highlights

- Zebra mussels continue to be found in the lower 25 miles of the St. Croix River during dive searches, although the numbers of zebra mussels collected were lower than the previous year.

- Sampling in Lake Zumbro (dive searches, settling plate samplers, and veliger tows) revealed that zebra mussels reproduced at high levels during 2001, with extensive settlement in the lake.

- Watercraft inspections and public awareness efforts continued and increased in areas near zebra mussel infested waters (see Education and Watercraft Inspections).

- The volunteer zebra mussel monitoring program continued in 2001 with over 160 people sending in reports from lakes throughout Minnesota.

## Background

The zebra mussel *(Dreissena polymorpha)* is a small striped exotic bivalve brought to North America in the ballast waters of trans-Atlantic freighters in the late 1980s. Unlike our native mussels, the zebra mussel secretes sticky threads which it uses to firmly attach itself to any hard surface in the water. The bio-fouling nature of this exotic has created numerous problems, such as clogging water pipes for industry and killing native species of molluscs. Attachment to recreational boats or to aquatic vegetation which may be transported by boaters can both serve to move mussels to other waters. The high reproductive capacity and free-floating microscopic larval life stage of this exotic allows rapid dispersal of this exotic within a waterbody. The zebra mussel has established populations throughout most of the eastern United States and its eventual distribution could include most of the U.S. and southern Canada.

## Progress on management of zebra mussels - 2001

Progress was made in the following areas that were identified as future needs for 2001:

- Coordination with other agencies on the St. Croix River (dive searches, public education and information) continued.

- The database for the Volunteer Zebra Mussel monitoring program was completed and a distributional map from monitoring in 2001 was produced.

## Current distribution/inventory of zebra mussels

Zebra mussel population levels in the Mississippi River showed a significant die off in some areas. This was theorized to be a result of high water, higher temperatures and higher silt loads. However, this reduction will not likely result in any permanent elimination of zebra mussels. Environmental conditions will continue to occasionally reduce zebra mussel populations in some areas, but have not yet been shown to control or eliminate established populations. Zebra mussels have not yet been documented above Lock and Dam 1 on the Mississippi River. Zebra mussels also continue to successfully reproduce in the Duluth Harbor. Zebra mussel populations expanded in Lake Zumbro, and settled zebra mussels continue to be found in dive searches in the lower 25 miles of the St. Croix River.

Dive searches, settling plate samplers and veliger tows were used to document population levels in Lake Zumbro. DNR biologists also assisted the National Park Service in their monitoring efforts on the St. Croix River.

The Volunteer Zebra Mussel Monitoring program continued in 2001. Over 160 people sent back forms from their monitoring on lakes and rivers throughout the state (Figure 12). No additional zebra mussel infestations were reported in 2001 from this program.

DNR Exotic Species Program funded and coordinated efforts to conduct scuba diving searches for zebra mussels in the vicinity of Grand Portage and Grand Marais. This effort followed reports that barges from Duluth may have introduced zebra mussels to the harbors of Lake Superior at these locations. The divers did not find any zebra mussels where the barges had been anchored.

## Public Awareness

Watercraft inspections increased significantly at the two newest areas of infestation of zebra mussels. Almost 1300 hours of inspections were conducted on the St. Croix River, with most hours of inspections occurring in the infested waters area. This effort was an increase of 45% over the previous year, resulting in over 5000 inspections done. New waterproof wallet cards were developed with brief messages on actions to prevent spread of zebra mussels. These cards were handed out by watercraft access inspectors, conservation officers from both Minnesota and Wisconsin, and National Park Service (NPS) staff. Watercraft inspections totaled 360 hours at Lake Zumbro in the first full season of access inspection on this lake. The new cards were also distributed at these inspections.

## Control of zebra mussels

The DNR conducted a trial cold weather drawdown of Lake Zumbro to try and kill zebra mussels settled in shallow areas of the lake. This drawdown was very effective in killing exposed zebra mussels. However, monitoring this season revealed that this action had no impact on the continued infestation and population expansion in Lake Zumbro. This is likely due to sufficient numbers of adult mussels surviving at depths below the drawdown level. While drawdown can

control zebra mussels, it is not likely to be an effective management tool, as most lakes lack the ability to drawdown water to sufficient depths to freeze out zebra mussel populations. There are still no other environmentally safe control methods available for natural systems. Because control is not a viable option once the zebra mussel becomes established in a lake or river, it is essential that a strong effort remain focused on public education and awareness to prevent spread. Boat checks, access inspections and talks/displays all serve to make the public aware of this exotic and how to prevent its spread.

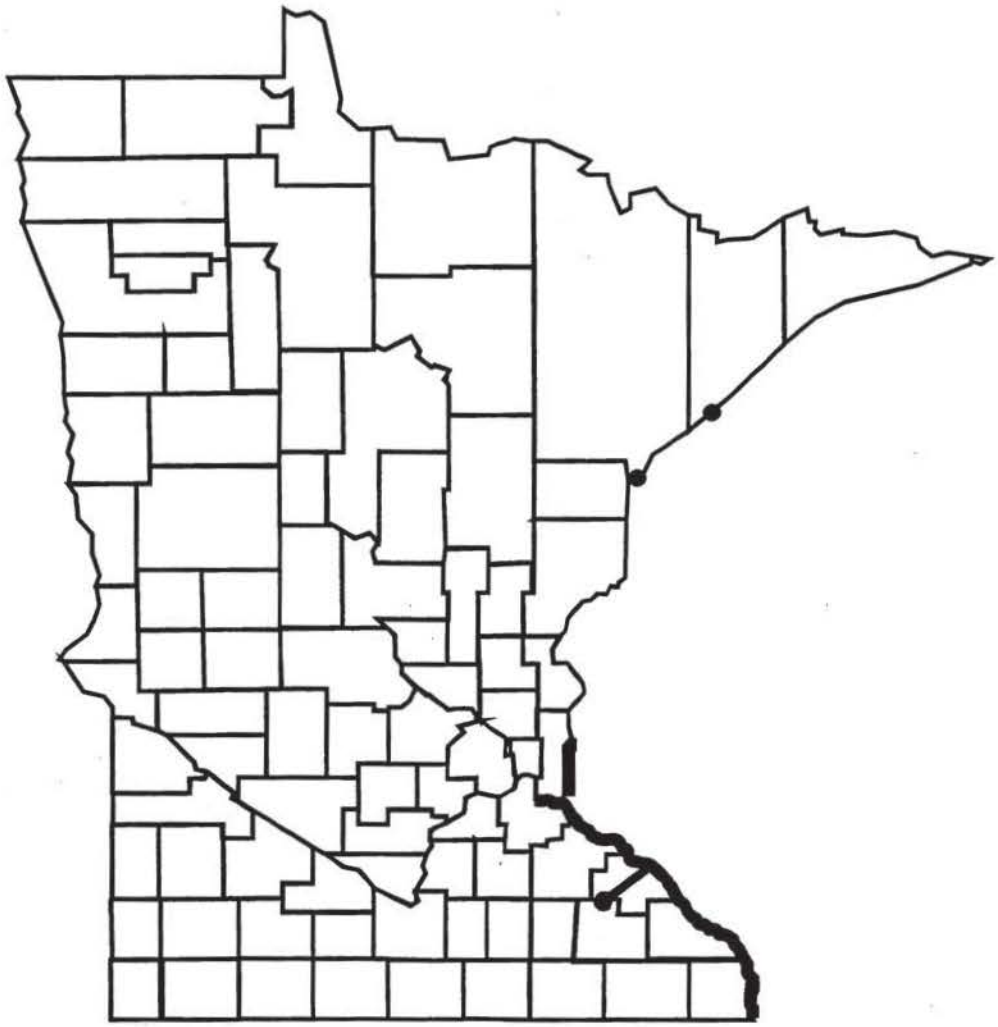

**Figure 12. Zebra mussel distribution in Minnesota, December 2001. (Heavy lines indicates Mississippi River from St. Paul downstream, the St. Croix River from the Federal zone to the confluence, and the Zumbro River downstream of Lake Zumbro)**

## Research on zebra mussels

Staff biologists examined slides set out on settling plate samplers and collected by NPS personnel from the St. Croix River. Despite the continued presence of zebra mussels attached to river substrate in the lower 25 miles of the river, all slides from the NPS collected in the river above Stillwater were negative. Staff biologists also examined veliger tows, dive samples and settling plate samples from Lake Zumbro to document population changes in that lake.

## Management of zebra mussels in other states

Management efforts in other states vary according to funding and priorities. With no control options available, management focuses mainly on public awareness to prevent or slow the spread of the zebra mussel. The concept of "management of zebra mussels" must be viewed realistically. Because this organism can withstand a lack of water for extended periods, has no environmentally acceptable control options for natural waters, spreads rapidly once established in a lake or river, and has free-living microscopic life stages, few management options are available. It is highly likely that management of zebra mussels will remain focused on identifying and minimizing vectors which would spread this exotic and developing targeted regulatory, public awareness, and educational efforts.

## Effectiveness

The primary goals of DNR's zebra mussel management efforts are to contain zebra mussels to water bodies where they presently occur and to support research to track their impacts and improve control methods. The occurrence of only one inland waterbody with zebra mussels in almost a decade suggests that efforts to slow the spread of this exotic have succeeded at a level not seen in many other areas.

## Participation with other groups

An interagency workgroup for the St. Croix River Zebra Mussel Response Plan continued to meet and coordinate efforts to try and prevent the zebra mussel from spreading upstream in the St. Croix River.

Funding of an interstate management plan for coordinated actions against the zebra mussel for the St. Croix River was continued by Federal agencies. The Minnesota DNR, Wisconsin DNR and Great Lakes Indian Fish and Wildlife Commission received funding assistance for zebra mussel activities on the St. Croix River outlined in the management plan.

## Future needs for management of zebra mussels

- Continue monitoring and efforts on the St. Croix River with other resource agencies; continue monitoring zebra mussels in Lake Zumbro.
- Present results of Lake Zumbro drawdown at the Aquatic Exotic Species International Research Conference in February 2002.
- Continue Volunteer Zebra Mussel monitoring program.

# Management of Rusty Crayfish

## Background

The rusty crayfish (*Orconectes rusticus*) is native to streams and rivers in Illinois, Indiana and western Ohio. Through human activities over the past 30 years its distribution has expanded so that it is now found in states throughout the northeast and central United States, as far west as New Mexico, north into Ontario, Canada and is widely distributed in Minnesota. The rusty crayfish lives in permanent water bodies and can grow slightly larger than Minnesota's native crayfish species. It is more aggressive than native species of crayfish, and in many lakes where it was introduced, it has displaced other species of crayfish or altered the community composition of this group. Its activities may also reduce diversity and abundance of native vegetation when rusty crayfish occurs at high densities; however, this reduction has also been seen in some lakes with native crayfish. It is more active than our native species during the day, and thus tends to be more visible to the lake user. To defend itself from fish during daytime activity, the rusty crayfish has somewhat larger claws than native species, and is more prone to aggressive displays towards predators, rather than evasion. While this makes it more difficult for some fish to eat, other fish such as walleye and bass have been reported to feed heavily on rusty crayfish.

## Progress in management of rusty crayfish - 2001

The Minnesota Department of Natural Resources (DNR) Exotic Species Program does not currently conduct active management of rusty crayfish.

## Current distribution of rusty crayfish

Rusty crayfish have been reported from lakes and rivers scattered across the state, from the far northeast down to southcentral Minnesota. Division of Fisheries staff have reported additional lakes where rusty crayfish are present when they find them during routine fisheries survey work. The proximity of "new" lakes to other recorded occurrences suggests that these locations are not new movements, but were simply not collected in initial surveys. Judging from the widespread geographic distribution, rusty crayfish are likely present in more Minnesota waters. The majority of the lakes found in St. Louis and Lake counties are often interconnected, presenting no barriers to the spread of the rusty crayfish. It is likely that as more lakes are more closely examined, they will also be found to contain this exotic.

## Control of rusty crayfish

There are no environmentally safe control methods available for the rusty crayfish that can be used in natural systems. While trapping has been suggested as a control option, this action removes mainly large male rusty crayfish which has little effect on population density. A study of trapping in small ponds by the U. S. Fish and Wildlife Service (USFWS) (Bills and Marking 1988) found that while trapping may harvest adults, it was doubtful that it could be used as a successful control method. Additionally, trapping efforts are labor intensive, both in terms of numbers of traps needed and the daily removal and rebaiting of the traps. Finally, intensive

commercial trapping efforts often result in creating a crayfish population that is larger in numbers and smaller in body size. Thus, in any large lake, while trapping may temporarily reduce the annoyance levels, it is not likely to succeed in elimination of this exotic.

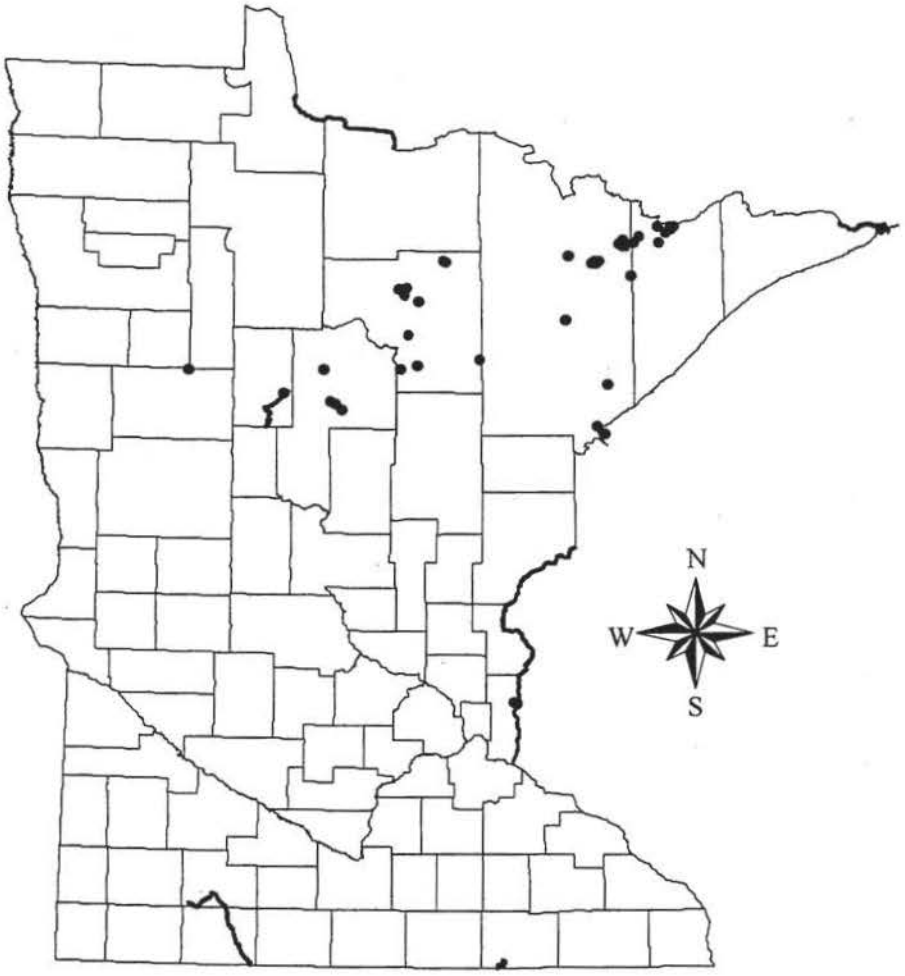


**Figure 13. Rusty crayfish distribution in Minnesota, December 2001.**

## Management of rusty crayfish in other states

There are no states that have active management activities specifically for the rusty crayfish. Wisconsin prohibits the use of live crayfish for bait, and prohibits their release in natural waters. A draft management plan was written for one lake district (Long Lake, Wisconsin) in 1980 at the request of the Long Lake Inland Lake District members. However, no activities were initiated from this management plan, with the exception of annual trapping at set sites to monitor population levels. Discussions with fisheries managers from the Long Lake area indicated that the problems with rusty crayfish have declined to a minimal or non-existent level, aquatic vegetation has re-established in some areas of the lake, and a thriving fisheries is present.

A study recently began in Wisconsin that is examining the use of highly intensive trapping and strict fish limits to enhance the predator populations. This research is still in the initial stages and will be followed as it progresses.

## Future needs for management of rusty crayfish

- Continue to collect information from Fisheries surveys and other reports on the extent of rusty crayfish distribution in Minnesota waters.

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# Management of Ruffe

## 2001 Highlights

- No ruffe have been discovered in inland waters of Minnesota.

## Background

The ruffe (*Gymnocephalus cernuus*) a Eurasian fish of the perch family, was introduced into Minnesota in the mid-1980s. Its likely source of introduction was from ballast water discharge by transoceanic ships. Since the discovery of the ruffe in the St. Louis River near Duluth in 1987, many agencies from Minnesota, Wisconsin, and Ontario as well as the U.S. Fish and Wildlife Service (USFWS) and U.S. Geological Survey, Biological Resources Division (USGS-BRD) have been studying this exotic fish to better understand its impacts on North American fish communities. The rapid increase in the ruffe population, the replacement of fish biomass by ruffe, its continued spread to more locations in the Great Lakes, and its potential spread to inland waters, concern many fish management agencies and sportfishing interests.

## Progress in management of ruffe - 2001

Educational activities conducted by the DNR and other cooperating agencies in past years to prevent the spread of ruffe were continued in 2001. Information about the ruffe has been included in brochures and in the state fishing regulations synopsis. Advisory signs remain posted in Wisconsin and Minnesota to alert boaters and anglers of the presence of ruffe in the St. Louis River estuary and watercraft inspections continue at public access points in Minnesota's ruffe infested waters to inform boaters and anglers about ruffe and precautions they should take.

## Current distribution and inventory of ruffe

The USGS-BRD, Lake Superior Biological Station has taken the lead role in ruffe population investigations in the Great Lakes and their tributaries. USGS-Lake Superior Biological Station has been conducting bottom trawling in the St. Louis River and estuary since 1988 as part of a long term effort to monitor abundance of ruffe and native species (U.S. Fish and Wildlife Service 2001). Ruffe in the St. Louis River Estuary, increased to nearly 2,000/ha in 1995, but slowly declined since 1995 to nearly 1,000/ha currently (Evrard and Gorman 2001). In 2001, ruffe density of 1,019/ha was similar to the previous two years. Ruffe recruitment there has been poor for the last three years, and this has been attributed to high amounts of precipitation during the spawning month of May (Hoff et al. 2001). With exception to yellow perch, USGS trawl data indicates that native forage species abundance in the St. Louis River Estuary is improving. However, the most abundant native forage species captured in trawls was spottail shiner at 323/ha compared to nearly 1,000 ruffe per hectare captured in trawls (Evrard and Gorman 2001). Ruffe length-at-age in the SLRE has declined indicating that ruffe growth has slowed.

In the St. Louis River Estuary (SLRE), where ruffe and round goby are known to co-exist, it is not clear to what extent round gobies are feeding on ruffe eggs. The estimated round goby population in the SLRE is still quite small (74,450) compared to the estimated ruffe population (4,444,734) (Evrard and Gorman 2001). Ruffe predation on round goby eggs is probably occurring as well in the St. Louis River Estuary, but the level is not known.

According to their surveys, the density and biomass of ruffe in the St. Louis River estuary have varied annually. The USFWS Fishery Resources offices continue to conduct and coordinate surveillance sampling in potential infestation areas in U.S. waters of the Great Lakes. The Ontario Ministry of Natural Resources conducts surveillance in Canadian waters of Lake Superior and other Great Lakes.

The DNR is not conducting special surveillance surveys for ruffe in Minnesota inland waters. Division of Fisheries' lake surveys and angler reports will be the primary method of detecting movement of ruffe populations to inland waters. No ruffe were confirmed in Minnesota inland waters in 2001. A map showing the distribution of ruffe in North America is available on line at: http://nas.er.usgs.gov/fishes/images/ruffe_map.gif.

## Effectiveness of ruffe management

Predator stocking and restrictive angler regulations in Minnesota and Wisconsin appear to have had little effect in slowing the expansion of the ruffe in Lake Superior and the St. Louis estuary. Those activities were the only control strategies initially available. Regulations, inspections, and other public awareness efforts to prevent the transportation of ruffe to inland waters have, to date, been effective.

## Management in other states

The Lake Superior waters of Wisconsin, Ontario, and Michigan, and Michigan waters of Lake Huron contain the only other known populations of ruffe. The fish have not been found in any inland waters of those states or provinces. Wisconsin DNR (WIDNR) has established regulations to prohibit possession of ruffe and harvest of bait fish in Lake Superior and its tributaries up to the first fish barriers. Angling regulations, similar to Minnesota's, in the St. Louis River estuary were also used in an attempt to increase predation on ruffe by native fish. WIDNR has also prepared a plan to respond to nonindigenous fish introductions in inland lakes. This plan will help provide a decision making process in the event ruffe are found in inland waters of Wisconsin. To date, no state, federal, or Indian entity has used chemical control to manage ruffe in tributaries along the south shore of Lake Superior. Chemical control of ruffe had been proposed for Wisconsin or Michigan waters. Laboratory tests show that ruffe are vulnerable to available fish toxicants, but most information indicates that treatments would not be effective in preventing the spread of ruffe in open systems like the Great Lakes.

## Participation of others in ruffe management

The USGS-Biological Resources Division has been involved in ruffe research and a USFWS biologist is the chairperson of the Ruffe Control Committee. Employees of provinces, tribes, and other Great Lakes states have been involved in development of reports and plans regarding ruffe.

Minnesota Sea Grant-sponsored research is ongoing at the Natural Resource Research Institute of U of M - Duluth and the U of M - St. Paul Campus. The research focuses on ruffe response to pheromones.

## Future needs for ruffe management

If ruffe are to be contained in existing waters, continued efforts in the areas of public awareness, watercraft inspections, regulations, and enforcement will be necessary. The state and cooperators within the state should:

- Support national and regional efforts to reduce the potential for ruffe to enter the Mississippi River via outlets from Lake Michigan such as the Dispersal Barrier Demonstration Project by the U.S. Army Corps of Engineers and long-term solutions.
- Invest in and/or support research to develop environmentally sound control methods by the USFWS and others.
- Support continued biological assessment efforts by the DNR Division of Fisheries, University of Minnesota, USFWS, and USGS-BRD so that the impact of ruffe on native communities can be ascertained.
- Continue monitoring using routine fish sampling and angler reports.
- Expand efforts to increase public awareness of ruffe in areas of Minnesota where introduction of ruffe may occur.

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Hoff, M.H., L.M. Evrard, and O.T. Gorman. 2001. Population dynamics of ruffe in the St. Louis River, Lake Superior, with special emphasis on recruitment. Research paper presented to the Ruffe Control Committee of the National Aquatic Nuisance Species Task Force, Mark P. Dryer, Chairperson, October 16, 2001.

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# Management of Round Goby

## 2001 Highlights

- U.S. Army Corps of Engineers made some progress in 2001 toward installing an electrical barrier in the Illinois waterways, as required by the National Invasive Species Act of 1996, but they have continually delayed construction and now the earliest that installation could occur is early 2002 (This is more than two years later than we reported in the 1999 report).

- The spread of round gobies in the Illinois waterways, beyond a proposed electric barrier site which the U.S. Army Corps of Engineers failed to install in early 2000, means almost certain introduction of round gobies throughout the Mississippi River watershed. In Minnesota, the Mississippi River up to the Coon Rapids dam, the St. Croix River, and other Mississippi River tributaries are likely to become infested if no barrier exists upstream of the confluence of the Illinois River and the Mississippi River.

## Background

The round goby *(Neogobius melanstomus)* is a small bottom-dwelling fish native to the Black and Caspian Seas. The first reported finding of round goby in the Great Lakes was in the St. Clair River, Michigan in 1990. This fish was likely introduced through transoceanic ballast water discharge. The first round gobies in Minnesota were discovered during the summer of 1995 in the Duluth-Superior Harbor (St. Louis River estuary). There is documented harm to native fish populations, such as mottled sculpins, where round gobies have invaded. Populations of other species such as logperch and lake sturgeon may be harmed as well. If round gobies enter the Mississippi River basin, they may have harmful impacts on darters, several of which are federally listed threatened and endangered species (personal communication: Tom Busiahn, USFWS). Because round gobies eat zebra mussels, there is also concern about the potential for round gobies to pass contaminants from zebra mussels to game fish such as smallmouth bass. Gobies appear to have another impact on recreational angling — because they can reach high densities and quickly strike at live bait— they can make it difficult to catch game fish such as yellow perch.

The round goby was designated a prohibited exotic species in the Department's permanent rules (see Appendix B). Under Minnesota laws, it is illegal to possess, transport, sell, or import species in this regulatory classification (under Minnesota Statutes 84D.05 and 84D.13 in Appendix A). Preventing these actions can reduce the risk that gobies will be dispersed to inland waters of the state.

## Progress in management of round goby - 2001

Because there are not any acceptable management options available to reduce or eliminate the established round goby population, management of gobies has not occurred in the Duluth-Superior Harbor. Prevention of their spread to inland waters continues to be the focus of round goby management in the state. Round

goby identification cards (Minnesota Sea Grant 1995) and fact sheets continue to be distributed to anglers and others in the state by DNR offices and by Minnesota Sea Grant. This information will help ensure that if round gobies are discovered in inland waters they will be reported to the DNR. DNR watercraft inspectors continue to inform boaters and anglers who visit public water accesses on infested waters.

## Current distribution of the round goby

From its initial introduction into the St. Clair River, which connects Lake Huron and Lake St. Clair, the round goby has spread to the Detroit River, all the Great Lakes, the Illinois waterways, and to the Lake Superior watershed. Many round gobies were located in several locations in the Duluth-Superior Harbor. Round gobies have not been identified in any inland waters in the state. Current distribution maps for the round goby are available on line at:
http://nas.er.usgs.gov/fishes/images/goby_map.gif

## Participation of others - 2001

The U.S. Army Corps of Engineers is responsible for installing a demonstration dispersal barrier in the Illinois waterways to block the movement of round gobies and other harmful exotic species into the Illinois River and throughout the Mississippi River drainage. The Army Corps made changes to the proposed design of the dispersal barrier and delayed issuing the contract to build the project by more than a year. According to the Army Corps, the project will not be finished until early 2002. This date is well beyond the dates previously promised by the Corps.

Research funded by Illinois-Indiana Sea Grant and completed in 2001 showed that where round gobies exist in large numbers in the Great Lakes and nearby waterways, mottled sculpin — a fish that is the major part of the yellow perch's diet — disappear (Illinois-Indiana Sea Grant 2001). The gobies are out-competing them. One reason is round gobies ability to interfere with mottled sculpin spawning. According to the study, the round gobies appear to force defending mottled sculpins from spawning shelters. John Janssen, a biologist at the University of Wisconsin-Milwaukee involved with the research, found that when round gobies were added to successful mottled sculpin nest areas in an artificial stream, they ate the sculpin egg masses, changed to their spawning coloration and began to defend the sites. "Both fish are bottom-dwellers that nest in rock cavities, but round gobies prefer sites with larger rocks and more surface area because unlike the sculpin, they lay their eggs in a single layer," said Janssen.

Nine research papers related to round gobies were published in a special section of the Journal of Great Lakes Research, Volume 27, No. 3.

## Future needs for round goby management

State

- Continue to distribute round goby identification cards and fact sheets as part of the ongoing Exotic Species public awareness activities in the state.
- Continue watercraft inspections at waters with round goby populations.

Regional/National

- Support management actions that can be taken to limit round goby spread to or within the Mississippi River drainage.
- Invest in and/or support research of environmentally sound control methods and other priorities established at the 1996 Round Goby Conference.

## References Cited

Dawson, V.K., Theresa M. Schreier, and Wendi Larson. 2000. Piscicides as an Emergency Tool for Controlling Range Expansion of the Round Goby (*Neogobius melanostomus*) in the Illinois Waterway. (Abstract) U. S. Geological Survey, Biological Resources Division, Upper Midwest Environmental Sciences Center, 2630 Fanta Reed Road, La Crosse, Wisconsin 54603.

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Minnesota Sea Grant. 1995. *Round Goby Watch Card.*

# Management of Mute Swan

## 2001 Highlights

- A total of 20 mute swans were observed in the wild and not confined under a game farm license as required by state law. The birds were located in eight Minnesota counties: Anoka, Blue Earth, Freeborn, Hennepin, Olmsted, Mower, Ramsey, and Winona. One pair produced three young.

- The DNR removed two mute swans from the wild.

- A federal appeals court decision will alter the role of states and the U.S. Fish and Wildlife Service in mute swan management.

## Background

Mute swans (*Cygnus olor*) are native to Europe and Asia and were brought to the United States from the mid 1800s through the early 1900s (Lever 1987, Ciaranca et al 1997). Mute swans have occasionally escaped or been released from golf courses, avicultural, and park settings in Minnesota. There have been documented wild nesting pairs in some locations of the state, such as the Cannon River in Rice County, and in Cass and Mower counties. Ciaranca et al (1997) reports that all North American populations of mute swans originated from release or escape of individuals from captive flocks.

Mute swans are currently regulated in part by the state game farm statutes in M.S. 97A.105 (see Appendix A) and they are designated as a regulated exotic species (see Appendix B). It is illegal to release mute swans into the wild under the game farm and regulated exotic species statutes.

In Michigan, Ontario, Wisconsin, and eastern states from Maine to South Carolina, mute swan populations have naturalized and are expanding rapidly causing concern for native species and their habitat (Allin, Chasko, and Husband 1987, Ciaranca et al 1997). For example, Lever (1987) reported that around the Chesapeake Bay one or two pairs escaped captivity during a storm in 1962. By 2000, the Maryland mute swan population, that originated from the 1962 escape, had grown to about 4,000 individuals (source: Washington Post article).

With increasing goose populations, more people may be interested in possessing and releasing mute swans to compete with Canada geese (Mr. Kent Solberg, pers. comm., June 1997). However, this management approach has not been proven to work.

The potential adverse impacts of mute swans is high because: 1) Mute swans can be extremely aggressive during the spring and summer breeding season, excluding other wildlife from their breeding territories (Allin, Chasko, and Husband 1987); 2) There is evidence that mute swans have displaced loons on traditional loon nesting sites in Michigan; 3) While Conover and McIvor (1993) did not find

significant impacts from mute swans at low population densities, it is difficult to maintain low population levels once mute swans are established. Ciaranca, et. al. (1997) gave overgrazing of aquatic vegetation and displacement of native waterfowl as potential effects on native ecosystems. Delacour (1954) describes mute swans as "jealous and bad-tempered, sometimes persecuting and killing even ducks."

## Progress in Management in 2001

During 2001, the DNR recorded and investigated ten reports of wild or escaped mute swans in the state. Birds were reported in the wild in eight different counties (see Table 19). The DNR responses to the mute swans reported in the wild varied. Some birds flew away from their reported locations before DNR staff could confirm their presence or attempt to capture them, DNR conservation officers contacted game farm licensees who had unconfined birds to inform them of state laws requiring the birds to be confined. Two birds from unknown sources were captured and removed from the wild by DNR.

**Table 19. Mute swans reported in Minnesota counties during 2001.**

| County | Number | Month(s) Reported |
|---|---|---|
| Anoka | 2 | July |
| Blue Earth | 2 | September |
| Freeborn | 3 | December |
| Hennepin | 5 | July (2), Oct. (2), Nov. (1) |
| Mower | 5 | April |
| Olmstead | 1 | December |
| Ramsey | 1 | August |
| Winona | 1 | January/February |
| Total for all counties | 20 | |

## Federal Responsibility for Mute Swan Management

Mute swan management by the states has not had federal oversight in the past, because the U. S. Fish and Wildlife Service (USFWS) did not consider mute swans to be subject to the international Migratory Bird Treaty Act. On December 28, 2001, a ruling by the U.S. Circuit Court of Appeals for the District of Columbia (which has jurisdiction over federal agencies) found that mute swans are covered by the act – the decision indicated that nothing the Secretary of the Interior referenced in the statute, applicable treaties, or administrative record justifies the exclusion of mute swans from the List of Migratory Birds. The decision states,

"Furthermore, including the mute swan in the List of Migratory Birds does not prevent the Secretary from controlling any potential harmful effects caused by mute swans, because 16 U.S.C. s 704 delegates authority to the Secretary to adopt regulations allowing the 'hunting, ... capture, [or] killing' of protected migratory birds." The full court decision is at: http://pacer.cadc.uscourts.gov/common/opinions/200112/00-5432a.txt.

Changes in mute swan management will result from the ruling: the USFWS will require federal permits for possession, sale and purchase of mutes swans; and control of mute swans by states or others will require a depredation permit from the USFWS. However, because this ruling was very recent, it is not entirely clear how it will affect all aspects of mute swan management.

## Management in Other States

State wildlife agencies have conducted varying levels of mute swan population control dependant upon population size and distribution, available resources, and socio-political concerns. Many states have not protected mute swans under state law (*e.g.*, DE, PA, VT). Six states (DE, MD, NY, RI, VA, and VT) in the Atlantic flyway have attempted to control mute swan population growth in recent years. Several states in the Mississippi, Central, and Pacific flyways have attempted to control mute swan populations.

**Atlantic flyway states** - The Atlantic Flyway Council endorses mute swan management. Among several recommendations are:

- Both state and federal wildlife species should institute programs to prevent the establishment and/or eliminate mute swans.

- States and provinces should seek to make mute swans an unprotected species if this is not already the case.

The full flyway policy on mute swans is available at: http://www.dnr.state.md.us/wildlife/afcres25.html

**Maryland** - Information titled "Mute Swans - Population Status, Impacts On Native Wildlife and People, and Management Needs In Maryland" (A Summary of Information Prepared by the Maryland Department of Natural Resources Mute Swan Task Force, January 2001) is available at the following web site: http://www.dnr.state.md.us/wildlife/mstfpc.html#mh.

A long-planned state of Maryland effort to control the mute swans' exploding population in Chesapeake Bay waters has been halted, at least temporarily by the decision by a federal appeals court (U.S. Court of Appeals for the D.C. Circuit) on December 28, 2001.

**Vermont** - In 1997, the Vermont Fish and Wildlife Department (VTFWD) developed a position to prevent the establishment and expansion of mute swans in

the state (VDFW Position Statement August 5, 1997). In addition to removing all mute swans, including nests and eggs, from the lands and waters of the state, it also prohibits the importation and the release of this species into public waters.

**Michigan** - Michigan DNR has begun the development of a mute swan management and control program. The estimated mute swan population is about 4,000 swans (Michigan DNR files). The mute swan is a protected bird in Michigan. Presently, Michigan DNR removes swans from state-owned wildlife management areas and occasionally removes birds causing safety problems.

**New York** - New York Department of Environmental Conservation (DEC) is concerned about potential impacts of the growing naturalized population of mute swans. In New York, the mute swan is an introduced species that has proven to be troublesome in many ways. Control of the wild population is necessary to prevent and provide relief from potential problems. DEC believes that the public's desire to observe mute swans can be largely met with a smaller naturalized population and by controlled use of captive birds. Therefore, properly licensed individuals are allowed to keep, raise, and display mute swans, as long as no birds are released or escape to the wild.

**Oregon** - Mute swans are classified as a controlled species in Oregon. Swans may be possessed and sold, but all males must be neutered and all individuals must be surgically pinioned. Importation of mute swans into Oregon is prohibited.

**Washington** - Washington has been removing mute swans in attempts to reestablish trumpeter swan populations. The Department of Fish and Wildlife classified the mute swan as a "deleterious," exotic species, and feral birds are removed. This classification infers that mute swans are animals that pose a serious threat to native wildlife and habitat. It is illegal to possess mute swans in Washington (WSDA Regulations Nov. 1997).

**Wisconsin** - Populations of mute swans are present in Wisconsin, particularly in two southeastern townships. The State of Wisconsin is considering controlling mute swans in the wild and has a Natural Resources Board meeting in February 2002 when a proposed policy to control mute swans will be discussed.

## Future management needs

- Verify occurrences of mute swans in the state and take appropriate actions to have the birds confined under game farm licenses or remove the naturalized birds from the wild.
- Establish an interagency mute swan management team to address mute swan management and related issues in the state and on border waters.
- Develop and distribute informational materials about mute swans and related laws.

## References Cited

Allin, C.C., Chasko, G.G., and T.P. Husband. 1987. Mute swans in the Atlantic flyway: a review of the history, population growth, and management needs. Trans. NE Sect. Wildl. Soc. 44: 32-47.

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Delacour, J. 1954. Waterfowl of the World - Volume One. Country Life Limited, London.

Lever, C. 1987. Naturalized Birds of the World. Longman Scientific & Technical, copublished in the United States with John Wiley and Sons, Inc., New York, NY. Maryland Department of Natural Resources Mute Swan Task Force. 2001. "Mute Swans - Population Status, Impacts On Native Wildlife and People, and Management Needs In Maryland" (A Summary of Information Prepared by the Maryland Department of Natural Resources Mute Swan Task Force, January 2001) available at: http://www.dnr.state.md.us/wildlife/mstfpc.html#mh.

New York State Department of Environmental Conservation. 1993. Mute Swans in New York: A Fact Sheet.

# Aquatic Plant Research and Prevention

## 2001 Highlights

- Two research projects were continued at the University of Minnesota: one investigated the winter hardiness of aquatic exotic plants; the other assessed the sale of prohibited aquatic plants into the state.

## Introduction

The commercial sale of aquatic plants represents a large and growing pathway that could introduce new exotic species into Minnesota. Aquatic plants represent the largest taxonomic group of aquatic exotics introduced into the Great Lakes area (Mills *et al.* 1993). Major pathways of introduction include accidental escape of cultivated plants and dumping of aquarium waters. Today, new pathways are emerging as activities such as water gardening, wetland restoration projects, and shoreline plantings increase in popularity.

Experience has shown that proactive prevention efforts need to be a key component of a comprehensive approach to addressing the exotic species issue. There are many commercial (e.g., biological supply houses) and recreational activities (e.g., water gardening and boating) which bring exotic species into Minnesota and move them throughout the state. In addition, control of established populations of aquatic exotic species is expensive (if feasible at all) and eradication is rarely, if ever, achieved. It is therefore important to be aware of the potential for new species to invade and to target prevention efforts on high risk species and high risk pathways.

## Background

The Exotic Species Program pursued two studies in 1998 to help identify potential sources of introduction of exotic aquatic plants and determine species of high concern. Under contract, the Army Corps of Engineers' Aquatic Plant Control Research Program completed a study, "The Potential for Nonindigenous Aquatic Plants to Colonize Minnesota" (McFarland *et al.* 1998). The study suggested that growth of four species, water chestnut (*Trapa natans*), variable milfoil *(Myriophyllum heterophyllum)*, hydrilla *(Hydrilla verticillata)* (monoecious biotype), and fanwort (*Cabomba caroliniana)*, was expected to be most severe if introduced into Minnesota waters. Exotic Species Program staff evaluated the risks associated with mail order shipments of aquatic plants into Minnesota (Perleberg 1998). Objectives of that study were: 1) Identify exotic aquatic plant species that may be harmful to Minnesota resources; 2) Identify businesses that sell aquatic plants to Minnesotans; and 3) Evaluate the risk of exotic introductions associated with the sale of aquatic plants (see 2000 annual report for summary).

## Progress in 2001

Two studies to further knowledge of exotic aquatic plant sales in the state and assess the risk of exotic aquatic plants invading and naturalizing in state waters

were continued in 2001. The first study is a survey of vendors that expands upon a previous DNR study (Perleberg 1998) by evaluating level of trade of unrestricted plants that include shipments of prohibited species or misidentified unrestricted taxa, and other plant and animal contaminants. This study will also develop a comprehensive list of aquatic plant vendors and identify how many vendors sell prohibited or regulated exotic species in Minnesota. The DNR and Minnesota Sea Grant are funding the research project at the University of Minnesota. The project is undertaken by Dr. Susan Galatowitsch and her graduate student Kristine Maki.

During the summer of 2001, they placed 40 orders from vendors across the U.S. and locally. These orders were placed over the phone and via the internet. The orders were received, examined for contaminants, and grown in the greenhouse until plants were identified. Seed contamination was investigated by filtering water or spreading soil that plants were grown in. Preliminary results show that there is not a seed contamination problem. There is a general contamination rate of 92.5% in the orders that were received (personal communication, Kristy Maki). The contaminants included fish, invertebrates, and aquatic plants.

During 2001, work progressed on the second project a cold tolerance assay project using *Hydrilla verticillata* dioecious and monecious turions. This is considered important because the ability for many exotic aquatic plants to naturalize in the state may be limited by their ability to survive winter temperatures. Developing a measure for winter hardiness will aid DNR efforts to assess the risk of exotic aquatic plants becoming invasive in the state and aid in prioritizing state prevention efforts. The preliminary report for this project is due on May 15, 2002, the final report is due June 30, 2002.

## Future needs for aquatic plants

- Continue to identify exotic species that may be likely to enter Minnesota and evaluate their potential to cause problems if they become established in the wild.
- Encourage, fund, and support research to enhance techniques that predict which exotic aquatic plants are likely naturalize and be harmful in Minnesota.
- Develop a database and maintain files at the DNR with literature about exotic aquatic plant and wild animal species to guide regulatory classification.
- Cooperatively develop and distribute information about regulations regarding selling, buying, and introducing aquatic plants and animals in Minnesota.
- Work with industries which might bring prohibited exotic species into Minnesota to reduce the likelihood of those occurrences.

## References Cited

McFarland, D.G., A.G. Poovey, and J.D. Madsen. 1998. Evaluation of the Potential of Selected Nonindigenous Aquatic Plant Species to Colonize Minnesota Water Resources. Unpublished report prepared by the Environmental Laboratory, US Army Engineer Waterways Experiment Station, Vicksburg, MS 39180-6199 for the Minnesota Department of Natural Resources, Saint Paul, MN 55155-4025.

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Perleberg, D. 1998. Evaluation of aquatic plant trade in Minnesota. Minnesota Department of Natural Resources. Ecological Services Section. Exotic Species Program. 1601 Minnesota Dr., Brainerd, MN 56401. 16 pps.

# Appendix A - Minnesota Statutes Regarding Exotic Species

## CONTENTS

### MINNESOTA STATUTES - HARMFUL EXOTIC SPECIES



### SELECTED MINNESOTA STATUTES - DEPT. OF NATURAL RESOURCES



### SELECTED MINNESOTA STATUTES - NOXIOUS WEEDS



### SELECTED MINNESOTA STATUTES - RESTRICTED SPECIES

# MINNESOTA STATUTES - HARMFUL EXOTIC SPECIES

**M.S. 84D.01 DEFINITIONS.**

Subdivision 1. **Terms.** For the purposes of this chapter, the following terms have the meanings given them.

Subd. 2. **Aquatic macrophyte.** "Aquatic macrophyte" means a macroscopic nonwoody plant, either a submerged, floating leafed, floating, or emergent plant that naturally grows in water.

Subd. 3. **Commissioner.** "Commissioner" means the commissioner of the department of natural resources.

Subd. 4. **Department.** "Department" means the department of natural resources.

Subd. 5. **Exotic species.** "Exotic species" means a wild animal species or aquatic plant species that is not a native species.

Subd. 6. **Eurasian water milfoil.** "Eurasian water milfoil" means Myriophyllum spicatum.

Subd. 7. **Harmful exotic species.** "Harmful exotic species" means an exotic species that can naturalize and either:

(1) causes or may cause displacement of, or otherwise threaten, native species in their natural communities; or

(2) threatens or may threaten natural resources or their use in the state.

Subd. 8. **Infested waters.** "Infested waters" means waters of the state designated by the commissioner under sections 84D.03, subdivision 1, and 84D.12.

Subd. 9. **Introduction.** "Introduction" means the release or escape of an exotic species into a free- living state.

Subd. 10. **[repealed]**

Subd. 11. **Native species.** "Native species" means an animal or plant species naturally present and reproducing within this state or that naturally expands from its historic range into this state.

Subd. 12. **Naturalize.** "Naturalize" means to establish a self-sustaining population of exotic species in the wild outside of its natural range.

Subd. 13. **Prohibited exotic species.** "Prohibited exotic species" means a harmful exotic species that has been designated as a prohibited exotic species in a rule adopted by the commissioner under section 84D.12.

Subd. 14. **Purple loosestrife.** "Purple loosestrife" means Lythrum salicaria, Lythrum virgatum, or combinations thereof.

Subd. 15. **Regulated exotic species.** "Regulated exotic species" means a harmful exotic species that has been designated as a regulated exotic species in a rule adopted by the commissioner under section 84D.12.

Subd. 16. **Transport.** "Transport" means to cause or attempt to cause a species to be carried or moved into or within the state, and includes accepting or receiving the species for transportation or shipment. Transport does not include the unintentional transport of a species within a water of the state or to a connected water of the state where the species being transported is already present.

Subd. 17. **Unlisted exotic species.** "Unlisted exotic species" means an exotic species that has not been designated as a prohibited exotic species, a regulated exotic species, or an unregulated exotic species in a rule adopted by the commissioner under section 84D.12.

Subd. 18. **Unregulated exotic species.** "Unregulated exotic species" means an exotic species that has been designated as an unregulated exotic species in a rule adopted by the commissioner under section 84D.12.

Subd. 19. **Watercraft.** "Watercraft" means a contrivance used or designed for navigation on water and includes seaplanes.

Subd. 20. **Waters of the state.** "Waters of the state" has the meaning given in section 97A.015, subdivision 54.

Subd. 21. **Wild animal.** "Wild animal" means a living creature, not human, wild by nature, endowed with sensation and power of voluntary motion.

Subd. 22. **Zebra mussel.** "Zebra mussel" means a species of the genus Dreissena.

**M.S. 84D.02 HARMFUL EXOTIC SPECIES MANAGEMENT PROGRAM.**

Subdivision 1. **Establishment.** The commissioner shall establish a statewide program to prevent and curb the spread of harmful exotic species. The program must provide for coordination among governmental entities and private organizations to the extent practicable. The commissioner shall seek available federal funding and grants for the program.

Subd. 2. **Purple loosestrife and Eurasian water milfoil programs.** (a) The program required in subdivision 1 must include specific programs to curb the spread and manage the growth of purple loosestrife and Eurasian water milfoil. These programs must include: (1) compiling inventories and monitoring the growth of purple loosestrife and Eurasian water milfoil in the state, for which the commissioner may use volunteers;

(2) publication and distribution of informational materials to boaters and lakeshore owners;

(3) cooperative research with the University of Minnesota and other public and private research facilities to study the use of nonchemical control methods, including biological control methods; and

(4) managing the growth of Eurasian water milfoil and purple loosestrife in coordination with appropriate local units of government, special purpose districts, and lakeshore associations, to include providing requested technical assistance.

(b) The commissioners of agriculture and transportation shall cooperate with the commissioner to establish, implement, and enforce the purple loosestrife program.

Subd. 3. **Management plan.** By July 1, 1997, the commissioner shall prepare a long-term plan, which may include
specific plans for individual species, for the statewide management of harmful exotic species. The plan must address:

(1) coordinated detection and prevention of accidental introductions;

(2) coordinated dissemination of information about harmful exotic species among resource management agencies and organizations;

(3) a coordinated public education and awareness campaign;

(4) coordinated control of selected harmful exotic species on lands and public waters;

(5) participation by lake associations, local citizen groups, and local units of government in the development and implementation of local management efforts;

(6) a reasonable and workable inspection requirement for watercraft and equipment including those participating in organized events on the waters of the state;

(7) the closing of points of access to infested waters, if the commissioner determines it is necessary, for a total of not more than seven days during the open water season for control or eradication purposes;

(8) maintaining public accesses on infested waters to be reasonably free of aquatic macrophytes; and

(9) notice to travelers of the penalties for violation of laws relating to harmful exotic species.

Subd. 4. **Inspection of watercraft.** The commissioner shall authorize personnel to inspect, for a minimum of 20,000 hours during the open water season, watercraft and associated equipment, including weed harvesters, that leave or are removed from waters of the state.

Subd. 5. **Regional cooperation.** The commissioner shall seek cooperation with other states and Canadian provinces for the purposes of management and control of harmful exotic species.

Subd. 6. **Annual report.** By January 15 each year, the commissioner shall submit a report on harmful exotic species to the legislative committees having jurisdiction over environmental and natural resource issues. The report must include:

(1) detailed information on expenditures for administration, education, management, inspections, and research;

(2) an analysis of the effectiveness of management activities conducted in the state, including chemical control, harvesting, educational efforts, and inspections;

(3) information on the participation of other state agencies, local government units, and interest groups in control efforts;

(4) information on management efforts in other states;

(5) information on the progress made in the management of each species; and

(6) an assessment of future management needs.

**M.S. 84D.03 INFESTED WATERS.**

Subdivision 1. **Infested waters; restricted activities.** (a) The commissioner shall designate a water of the state as an infested water if the commissioner determines that the water contains a harmful exotic species that could spread to other waters if use of the water and related activities are not regulated to prevent this.

(b) When determining which harmful exotic species comprise infested waters, the commissioner shall consider:

(1) the extent of a species distribution within the state;

(2) the likely means of spread for a species; and

(3) whether regulations specific to infested waters containing a specific species will effectively reduce that species' spread.

(c) The presence of common carp and curly-leaf pondweed shall not be the basis for designating a water as infested.

Subd. 2. **[repealed]**

Subd. 3. **Bait harvest from infested waters.**

(a) The taking of wild animals from infested waters for bait or aquatic farm purposes is prohibited, except as provided in paragraph (b).

(b) In waters that are designated as infested waters except those designated because they contain prohibited exotic species of fish, the taking of wild animals may be permitted for:

(1) commercial taking of wild animals for bait and aquatic farm purposes according to a permit issued under section 84D.11, subject to rules adopted by the commissioner; and

(2) bait purposes for noncommercial personal use in waters that contain Eurasian water milfoil.

**M.S. 84D.04 CLASSIFICATION OF EXOTIC SPECIES.**

Subdivision 1. **Classes**. The commissioner shall, as provided in this chapter, classify exotic species according to the following categories:

(1) prohibited exotic species, which may not be possessed, imported, purchased, sold, propagated, transported, or introduced except as provided in section 84D.05;

(2) regulated exotic species, which may not be introduced except as provided in section 84D.07;

(3) unlisted exotic species, which are subject to the classification procedure in section 84D.06; and

(4) unregulated exotic species, which are not subject to regulation under this chapter.

Subd. 2. **Criteria.** The commissioner shall consider the following criteria in classifying an exotic species under this chapter:

(1) the likelihood of introduction of the species if it is allowed to enter or exist in the state;

(2) the likelihood that the species would naturalize in the state were it introduced;

(3) the magnitude of potential adverse impacts of the species on native species and on outdoor recreation, commercial fishing, and other uses of natural resources in the state;

(4) the ability to eradicate or control the spread of the species once it is introduced in the state; and

(5) other criteria the commissioner deems appropriate.

**M.S. 84D.05 PROHIBITED EXOTIC SPECIES.**

Subdivision 1. **Prohibited activities.** A person may not possess, import, purchase, sell, propagate, transport, or introduce a prohibited exotic species, except:

(1) under a permit issued by the commissioner under section 84D.11;

(2) in the case of purple loosestrife, as provided by sections 18.75 to 18.88;

(3) under a restricted species permit issued under section 17.457;

(4) when being transported to the department, or another destination as the commissioner may direct, in a sealed container for purposes of identifying the species or reporting the presence of the species;

(5) when being transported for disposal as part of a harvest or control activity under a permit issued by the commissioner pursuant to section 103G.615, or as specified by the commissioner;

(6) when the specimen has been lawfully acquired dead and, in the case of plant species, all seeds are removed or are otherwise secured in a sealed container;

(7) in the form of herbaria or other preserved specimens;

(8) when being removed from watercraft and equipment, or caught while angling, and immediately returned to the water from which they came; or

(9) as the commissioner may otherwise prescribe by rule.

Subd. 2. **Seizure.** Under section 97A.221, the commissioner may seize or dispose of all specimens of prohibited exotic species unlawfully possessed, imported, purchased, sold, propagated, transported, or introduced in the state.

**M.S. 84D.06 UNLISTED EXOTIC SPECIES.**

Subdivision 1. **Process.** After the effective date of the rules adopted under section 84D.12, subdivision 1, clause (1), a person may not introduce an unlisted exotic species unless:

(1) the person has notified the commissioner in a manner and form prescribed by the commissioner;

(2) the commissioner has made the classification determination required in subdivision 2 and designated the species as appropriate; and

(3) the introduction is allowed under the applicable provisions of this chapter.

Subd. 2. **Classification.** (a) If the commissioner determines that a species for which a notification is received under subdivision 1 should be classified as a prohibited exotic species, the commissioner shall:

(1) adopt a rule under section 84D.12, subdivision 3, designating the species as a prohibited exotic species; and

(2) notify the person from which the notification was received that the species is subject to section 84D.04.

(b) If the commissioner determines that a species for which a notification is received under subdivision 1 should be classified as an unregulated exotic species, the commissioner shall:

(1) adopt a rule under section 84D.12, subdivision 3, designating the species as an unregulated species; and

(2) notify the person from which the notification was received that the species is not subject to regulation under this chapter.

(c) If the commissioner determines that a species for which a notification is received under subdivision 1 should be classified as a regulated exotic species, the commissioner shall notify the applicant that the species is subject to the requirements in section 84D.07.

**M.S. 84D.07 REGULATED EXOTIC SPECIES.**

Except as provided in rules adopted under section 84D.12, subdivision 2, clause (1), a person may not introduce a regulated exotic species without a permit issued by the commissioner.

**M.S. 84D.08 ESCAPE OF EXOTIC SPECIES.**

(a) A person that allows or causes the introduction of an animal that is a prohibited, regulated, or unlisted exotic species shall, within 48 hours after learning of the introduction, notify the commissioner, a conservation officer, or another person designated by the commissioner. The person shall make every reasonable attempt to recapture or destroy the introduced animal. If the animal is a prohibited exotic species, the person is liable for the actual costs incurred by the department in capturing or controlling, or attempting to capture or control, the animal and its progeny. If the animal is a regulated exotic species, the person is liable for these costs if the introduction was in violation of the person's permit issued under section 84D.11.

(b) A person that complies with this section is not subject to criminal penalties under section 84D.13 for the introduction.

**M.S. 84D.09 AQUATIC MACROPHYTES.**

Subdivision 1. **Transportation prohibited.** A person may not transport aquatic macrophytes on any state forest road as defined by section 89.001, subdivision 14, any road or highway as defined in section 160.02, subdivision 7, or any other public road, except as provided in this section.

Subd. 2. **Exceptions.** Unless otherwise prohibited by law, a person may transport aquatic macrophytes:

(1) that are duckweeds in the family Lemnaceae;

(2) for disposal as part of a harvest or control activity conducted under an aquatic plant management permit pursuant to section 103G.615, under permit pursuant to section 84D.11, or as specified by the commissioner;

(3) for purposes of constructing shooting or observation blinds in amounts sufficient for that purpose, provided that the aquatic macrophytes are emergent and cut above the waterline;

(4) when legally purchased or traded by or from commercial or hobbyist sources for aquarium, wetland or lakeshore restoration, or ornamental purposes;

(5) when harvested for personal or commercial use if in a motor vehicle;

(6) to the department, or another destination as the commissioner may direct, in a sealed container for purposes of identifying a species or reporting the presence of a species;

(7) when transporting a commercial aquatic plant harvester to a suitable location for purposes of cleaning any remaining aquatic macrophytes;

(8) that are wild rice harvested under section 84.091; or

(9) in the form of fragments of emergent aquatic macrophytes incidentally transported in or on watercraft or decoys used for waterfowl hunting during the waterfowl season.

**M.S. 84D.10 PROHIBITED ACT; WATERCRAFT.**

Subdivision 1. **Launching prohibited.** A person may not place or attempt to place into waters of the state a watercraft, a trailer, or plant harvesting equipment that has aquatic macrophytes, zebra mussels, or prohibited exotic species attached except as provided in this section.

Subd. 2. **Exceptions.** Unless otherwise prohibited by law, a person may place into the waters of the state a watercraft or trailer with aquatic macrophytes:

(1) that are duckweeds in the family Lemnaceae;

(2) for purposes of shooting or observation blinds in amounts sufficient for that purpose, if the aquatic macrophytes are emergent and cut above the waterline;

(3) that are wild rice harvested under section 84.091; or

(4) in the form of fragments of emergent aquatic macrophytes incidentally transported in or on watercraft or decoys used for waterfowl hunting during the waterfowl season.

Subd. 3. **Removal and confinement.**. A conservation officer or other licensed peace officer may order:

(1) the removal of aquatic macrophytes or prohibited exotic species from a trailer or watercraft before it is placed into waters of the state;

(2) confinement of the watercraft at a mooring, dock, or other location until the watercraft is removed from the water; and

(3) removal of a watercraft from waters of the state to remove prohibited exotic species if the water has not been designated by the commissioner as being infested with that species.

**M.S. 84D.11 PERMITS.**

Subdivision 1. **Prohibited exotic species.** The commissioner may issue a permit for the propagation, possession, importation, purchase, or transport of a prohibited exotic species for the purposes of disposal, control, research, or education.

Subd. 2. **Regulated exotic species.** The commissioner may issue a permit for the introduction of a regulated exotic species.

Subd. 2a. **Harvest of bait from infested waters.** The commissioner may issue a permit to allow the harvest of bait from waters that are designated as infested waters, except those designated because they contain prohibited exotic species of fish. The permit shall include conditions necessary to avoid spreading harmful exotic species. Before receiving a permit, a person annually must satisfactorily complete harmful exotic species-related training provided by the commissioner.

Subd. 3. **Standard.** The commissioner may issue a permit under this section only if the commissioner determines that the permitted activity would not pose an unreasonable risk of harm to natural resources or their use in the state. The commissioner may deny, issue with conditions, modify, or revoke a permit under this section as necessary to ensure that the proposed activity will not pose an unreasonable risk of harm to natural resources or their use in the state.

Subd. 4. **Appeal of permit decision.** A permit decision may be appealed as a contested case under chapter 14.

**M.S. 84D.12 RULES.**

Subdivision 1. **Required rules.** The commissioner shall adopt rules:

(1) designating infested waters, prohibited, regulated, and unregulated exotic species;

(2) governing the application for and issuance of permits under this chapter, which rules may include a fee schedule; and

(3) governing notification under section 84D.08.

Subd. 2. **Authorized rules.** The commissioner may adopt rules:

(1) regulating the possession, importation, purchase, sale, propagation, transport, and introduction of harmful exotic species; and

(2) regulating the appropriation, use, and transportation of water from infested waters.

Subd. 3. **Expedited rules.** The commissioner may adopt rules under section 84.027, subdivision 13, that designate:

(1) prohibited exotic species;

(2) regulated exotic species;

(3) unregulated exotic species; and

(4) infested waters.

**M.S. 84D.13 ENFORCEMENT; PENALTIES.**

Subdivision 1. **Enforcement.** Unless otherwise provided, this chapter and rules adopted under section 84D.12 may be enforced by conservation officers under sections 97A.205, 97A.211, and 97A.221 and by other licensed peace officers.

Subd. 2. **Cumulative remedy.** The authority of conservation 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.

Subd. 3. **Criminal penalties.** (a) A person who violates a provision of section 84D.05, 84D.06, 84D.07, 84D.08, or 84D.10, or a rule adopted under section 84D.12, is guilty of a misdemeanor.

(b) A person who refuses to obey an order of a peace officer or conservation officer to remove prohibited exotic species or aquatic macrophytes from any watercraft, trailer, or plant harvesting equipment is guilty of a misdemeanor.

Subd. 4. **Warnings; civil citations.** After appropriate training, conservation officers, other licensed peace officers, and other department personnel designated by the commissioner may issue warnings or citations to a person who:

(1) unlawfully transports prohibited exotic species or aquatic macrophytes;

(2) unlawfully places or attempts to place into waters of the state a trailer, a watercraft, or plant harvesting equipment that has prohibited exotic species attached;

(3) unlawfully angles, anchors, or operates a watercraft in a marked area of a Eurasian water milfoil limited infestation; or

(4) intentionally damages, moves, removes, or sinks a buoy marking, as prescribed by rule, Eurasian water milfoil.

Subd. 5. **Civil penalties.** A civil citation issued under this section may impose civil penalties up to the following penalty amounts:

(1) for transporting aquatic macrophytes on a forest road as defined by section 89.001, subdivision 14, road or highway as defined by section 160.02, subdivision 7, or any other public road, $50;

(2) for placing or attempting to place into waters of the state a watercraft, a trailer, or plant harvesting equipment that has aquatic macrophytes attached, $100;

(3) for transporting a prohibited exotic species other than an aquatic macrophyte, $100;

(4) for placing or attempting to place into waters of the state a watercraft, a trailer, or plant harvesting equipment that has prohibited exotic species attached when the waters are not designated by the commissioner as being infested with that species, $500 for the first offense and $1,000 for each subsequent offense;

(5) for angling, anchoring, or operating a watercraft in a marked area of a Eurasian water milfoil limited infestation, other than as provided by law, $100; and

(6) for intentionally damaging, moving, removing, or sinking a buoy marking, as prescribed by rule, Eurasian water milfoil, $100.

Subd. 6. **Watercraft license suspension.** A civil citation may be issued to suspend, for up to a year, the watercraft license of an owner or person in control of a watercraft or trailer who refuses to

submit to an inspection under section 84D.02, subdivision 4, or who refuses to comply with a removal order given under section 84D.13.

Subd. 7. **Satisfaction of civil penalties.** A civil penalty is due and a watercraft license suspension is effective 30 days after issuance of the civil citation. A civil penalty collected under this section is payable to the commissioner and must be credited to the water recreation account.

Subd. 8. **Appeal of civil citations and penalties.** A civil citation and penalty may be appealed under the procedures in section 116.072, subdivision 6, if the person to whom the citation was issued requests a hearing by notifying the commissioner within 15 days after receipt of the citation. If a hearing is not requested within the 15-day period, the citation becomes a final order not subject to further review.

**M.S. 84D.14 CERTAIN SPECIES NOT SUBJECT TO CHAPTER.**

This chapter does not apply to: (1) pathogens and terrestrial arthropods regulated under Minnesota Statutes, sections 18.44 to 18.61; or (2) mammals and birds defined by statute as livestock.

## SELECTED MINNESOTA STATUTES - DEPARTMENT OF NATURAL RESOURCES

**M.S. 84.027 POWERS AND DUTIES.**

Subd. 13. **Game and fish rules.**

(a) The commissioner of natural resources may adopt rules under sections 97A.0451 to 97A.0459 and this subdivision that are authorized under:

(1) chapters 97A, 97B, and 97C to set open seasons and areas, to close seasons and areas, to select hunters for areas, to provide for tagging and registration of game, to prohibit or allow taking of wild animals to protect a species, and to prohibit or allow importation, transportation, or possession of a wild animal; and

(2) sections 84.093, 84.14, 84.15, and 84.152 to set seasons for harvesting wild ginseng roots and wild rice and to restrict or prohibit harvesting in designated areas ; and

(3) section **84D.12** to designate prohibited exotic species, regulated exotic species, unregulated exotic species, and infested waters .

Clause (2) does not limit or supersede the commissioner's authority to establish opening dates, days, and hours of the wild rice harvesting season under section 84.14, subdivision 3.

(b) If conditions exist that do not allow the commissioner to comply with sections 97A.0451 to 97A.0459, the commissioner may adopt a rule under this subdivision by submitting the rule to the attorney general for review under section 97A.0455, publishing a notice in the State Register and filing the rule with the secretary of state and the legislative commission to review administrative rules, and complying with section 97A.0459, and including a statement of the emergency conditions and a copy of the rule in the notice. The notice may be published after it is received from the attorney general or five business days after it is submitted to the attorney general, whichever is earlier.

(c) Rules adopted under paragraph (b) are effective upon publishing in the State Register and may be effective up to seven days before publishing and filing under paragraph (b), if:

(1) the commissioner of natural resources determines that an emergency exists;

(2) the attorney general approves the rule; and

(3) for a rule that affects more than three counties the commissioner publishes the rule once in a legal newspaper published in Minneapolis, St. Paul, and Duluth, or for a rule that affects three or fewer counties the commissioner publishes
the rule once in a legal newspaper in each of the affected counties.

(d) Except as provided in paragraph (e), a rule published under paragraph (c), clause (3), may not be effective earlier than seven days after publication.

(e) A rule published under paragraph (c), clause (3), may be effective the day the rule is published if the commissioner gives notice and holds a public hearing on the rule within 15 days before publication.

(f) The commissioner shall attempt to notify persons or groups of persons affected by rules adopted under paragraphs (b) and (c) by public announcements, posting, and other appropriate means as determined by the commissioner.

(g) Notwithstanding section 97A.0458, a rule adopted under this subdivision is effective for the period stated in the notice but not longer than 18 months after the rule is adopted.

**M.S. 86B.415 LICENSE FEES.**

Subd. 7. **Watercraft surcharge.** A $5 surcharge is placed on each watercraft license under subdivisions 1 to 5, for control, public awareness, law enforcement, monitoring, and research of nuisance aquatic exotic species such as zebra mussel, purple loosestrife and Eurasian water milfoil in public waters and public wetlands.

**History:** *1990 c 391 art 9 s 24; 1991 c 199 art 1 s 12; 1991 c 254 art 2 s 19; 1992 c 594 s 10; 1993 c 235 s 3; 1995 c 220 s.*

**M.S. 97A.105 GAME AND FUR FARMS.**

Subdivision. 1, **License requirements.**

(a) A person may breed and propagate fur-bearing animals, game birds, bear, moose, elk, caribou, **mute swans**, or deer only on privately owned or leased land and after obtaining a license. Any of the permitted animals on a game farm may be sold to other licensed game farms. "Privately owned or leased land" includes waters that are shallow or marshy, are not actually navigable, and are not of substantial beneficial public use. Before an application for a license is considered, the applicant must enclose the area to sufficiently confine the animals to be raised in a manner approved by the commissioner. A license may be granted only if the commissioner finds the application is made in good faith with intention to
actually carry on the business described in the application and the commissioner determines that the facilities are adequate for the business.

(b) A person may purchase live game birds or their eggs without a license if the birds or eggs, or birds hatched from the eggs, are released into the wild, consumed, or processed for consumption within one year after they were purchased or hatched. This paragraph does not apply to the purchase of migratory waterfowl or their eggs.

(c) A person may not introduce **mute swans** into the wild without a permit issued by the commissioner.

**M.S. 97A.205 ENFORCEMENT OFFICER POWERS.**

An enforcement officer is authorized to:

(1) execute and serve court issued warrants and processes relating to wild animals, wild rice, public waters, water pollution, conservation, and use of water, in the same manner as a constable or sheriff;

(2) enter any land to carry out the duties and functions of the division;

(3) make investigations of violations of the game and fish laws;

(4) take an affidavit, if it aids an investigation;

(5) arrest, without a warrant, a person who is detected in the actual violation of the game and fish laws, a provision of chapters 84, 84A, **84D**, 85, 86A, 88 to 97C, 103E, 103F, 103G, sections 86B.001 to 86B,815, 89.51 to 89.61; or 609.66, subdivision 1, clauses (1), (2), (5), and (7); and 609.68; and (6) take an arrested person before a court in the county where the offense was committed and make a

complaint. Nothing in this section grants an enforcement officer any greater powers than other licensed peace officers.

**M.S. 97A.221 SEIZURE AND CONFISCATION OF PROPERTY.**

Subdivision 1. **Property subject to seizure and confiscation.** (a) An enforcement officer may seize:

(1) wild animals, wild rice, and other aquatic vegetation taken, bought, sold, transported, or possessed in violation of the game and fish laws or chapter 84 or **84D** ; ...

## SELECTED MINNESOTA STATUTES - NOXIOUS WEEDS

**M.S. 18.75 PURPOSE**

It is the policy of the legislature that residents of the state be protected from the injurious effects of noxious weeds on public health, the environment, public roads, crops, livestock, and other property. Sections 18.76 to 188.88 contain procedures for controlling and eradicating noxious weeds on weeds on all lands within the state.

**M.S. 18.76 CITATION.**

Sections 18.76 to 18.88 may be cited as the "Minnesota noxious weed law."

**M.S. 18.77 DEFINITIONS.**

Subd. 8. **Noxious weed**. "Noxious weed" means an annual, biennial, or perennial plant that the commissioner ( of agriculture) designates to be injurious to public health, the environment, public roads, crops, livestock, or other property. (MN Department of Agriculture Commissioner's Order declares purple loosestrife, both *L. salicaria* and *L. virgatum* to be a noxious weed.)

**M.S. 18.78 CONTROL OR ERADICATION OF NOXIOUS WEEDS.**

Subdivision 1. **Generally** Except as provided in section 18.85, a person owning land, a person occupying land, or a person responsible for the maintenance of public land shall control or eradicate all noxious weeds on the land at a time and in a manner ordered by the commissioner (of agriculture), a county agricultural inspector, or a local weed inspector.

Subdivision 2. **Control of purple loosestrife** Except as provided below, an owner of nonfederal lands underlying public waters or wetlands designated under section 103G.201 is not required to control or eradicate purple loosestrife below the ordinary high water level of the public water or wetland. The commissioner of natural resources is responsible for control and eradication of purple loosestrife on public waters and wetlands designated under section 103G.201, except those located upon lands owned in fee title or managed by the United States. The officers, employees, agents and contractors of the commissioner of natural resources may enter upon public waters and wetlands designated under section 103G.201 and, after providing notification to the occupant or owner of the land, may cross adjacent lands as necessary for the purpose of investigating purple loosestrife infestations, formulating methods of eradication, and implementing control and eradication of purple loosestrife. The commissioner, after consultation with the commissioner of agriculture, shall, by June 1 of each year, compile a priority list of purple loosestrife infestations to be controlled in designated public waters. The commissioner of agriculture must distribute the list to county agriculture inspectors, local weed inspectors, and their appointed agents. The commissioner of natural resources shall control listed purple loosestrife infestations in priority order within the limits of appropriations provided for that purpose. This procedure shall be the exclusive means for control of purple loosestrife on designated public waters by the commissioner of natural resources and shall supersede the other provisions for

control of noxious weeds set forth elsewhere in Minnesota Statutes, chapter 18. The responsibility of the commissioner to control and eradicate purple loosestrife on public waters and wetlands located on private lands and the authority to enter upon private lands ends ten days after receipt by the commissioner of natural resources of a written statement from the landowner that the landowner assumes all responsibility for control and eradication of purple loosestrife under sections 18.78 to 18.88. State officers, employees, agents, and contractors of the commissioner of natural resources are not liable in a civil action for trespass committed in the discharge of their duties under this section and are not liable to anyone for damages, except for damages arising from gross negligence.

**M.S. 18.79 DUTIES OF THE COMMISSIONER [OF AGRICULTURE].**

Subd. 1. **Enforcement**. The commissioner of agriculture shall administer and enforce sections 18.76 to 18.88.

Subd. 4. **Rules**. The commissioner may adopt necessary rules under chapter 14 for the proper enforcement of sections 18.76 to 18.88.

Subd. 5. **Order For Control Or Eradication Of Noxious Weeds**. The commissioner [of agriculture], a county agricultural inspector, or a local weed inspector may order the control or eradication of noxious weeds on any land within the state.

## MINNESOTA STATUTES - RESTRICTED SPECIES

**M.S. 17.457 RESTRICTED SPECIES.**

Subdivision 1. **Definitions.** (a) The definitions in this subdivision apply to this section.

(b) "Commissioner" means the commissioner of agriculture.

(c) "Restricted species means Eurasian wild pigs and their hybrids (Sus scrofa subspecies and Sus scrofa hybrids), excluding domestic hogs (Sus scrofa domesticus).

(d) "Release" means an intentional introduction or escape of a species from the control of the owner or responsible party.

Subd. 2. **Importation; possession; release of restricted species.** It is unlawful for a person to import, possess, propagate, transport, or release restricted species, except as provided in subdivision 3.

Subd. 3. **Permits.** (a) The commissioner may issue permits for the transportation, possession, purchase, importation of restricted species for scientific, research, education, or commercial purposes. A permit issued under this subdivision may be revoked by the commissioner if the conditions of the permit are not met by the permittee or for any unlawful act or omission, including accidental escapes.

(b) The commissioner may issue permits for a person to possess and raise a restricted species for commercial purposes if the person was in possession of the restricted species on March 1, 1993. Under the permit, the number of breeding stock of the restricted species in the possession of the person may not increase by more than 25 percent and the person must comply with the certification requirements in subdivision 7.

(c) A person may possess a restricted species without a permit for a period not to exceed two days for the purpose of slaughtering the restricted species for human consumption.

Subd. 4. **Notice of escape of restricted species.** In the event of an escape of a restricted species, the owner must notify within 24 hours a conservation officer and the board of animal health and is responsible for the recovery of the species. The commissioner may capture or destroy the escaped animal at the owner's expense.

Subd. 5. **Enforcement.** This section may be enforced under sections 97A.205 and 97A.211.

Subd. 6. **Penalty.** A person who violates subdivision 2, 4, or 7 is guilty of a misdemeanor.

# Appendix B - Minnesota Rules Regarding Harmful Exotic Species

**(as amended by emergency rule)**

**CONTENTS**

Subd. 7. **Certification and identification and identification requirements.** (a) A person who possesses restricted species on July 1, 1993, must submit certified numbers of restricted species in the person's possession to the board of animal health by June 1, 1993.

(b) Restricted species in the possession of a person must be marked in a permanent fashion to identify ownership. The restricted species must be marked as soon as practicable after birth or purchase.

Subd. 8. **Containment.** The commissioner, in consultation with the commissioner of natural resources, shall develop criteria for approved containment measures for restricted species with the assistance of producers of restricted species.

Subd. 9. **Bond; security.** A person who possesses restricted species must file a bond or deposit with the commissioner security in the form and amount determined by the commissioner to pay for the costs and damages caused by an escape of restricted species.

Subd. 10. **Fee.** The commissioner shall impose a fee for permits in an amount sufficient to cover the costs of issuing the permits and for facility inspections. The fee may not exceed $50. Fee receipts must be deposited in the state treasury an credited to the special revenue fund and are appropriated to the commissioner for the purposes of this section.

**History:** *1993 c 129 s 3; 1994 c 623 art 1 s 16-18, 46.*

(2) waters whose shorelines are entirely within the land owned by a person, not continually or intermittently connected to public waters, and not identified by the department as public waters; or

(3) water-using facilities, such as fish hatcheries, aquatic farms, zoos, and minnow retail or wholesale operations, with outflows that do not provide direct access for species to enter public waters.

Subp. 4. **Repealed, 22 SR 2076**

Subp. 4a. **Introduction.** "Introduction" has the meaning given in Minnesota Statutes, section 84D.01, subdivision 9. Introduction does not include the immediate return of an exotic species to waters of the state from which it was removed.

"Introduce" means the act of introduction.

Subp. 5. **Littoral area.** "Littoral area" means any part of a body of water 15 feet deep or less.

Subp. 6. **Person.** "Person" has the meaning given in Minnesota Statutes, section 645.44, subdivision 7.

Subp. 7. **Public waters.** "Public waters" means public waters as defined under Minnesota Statutes, section 103G.005, subdivision 15, that have been designated as public waters under the public waters inventory pursuant to Minnesota Statutes, section 103G.201.

STAT AUTH: MS s 84.9691; 84D.12

**HIST:** *20 SR 2292(NO. 43); L 1996 c 385 art 2 s 7; 22 SR 2076*

**6216.0230 NOMENCLATURE.**

The scientific taxonomic nomenclature used in parts 6216.0100 to 6216.0600 follows the nomenclature assigned by the following sources, which are incorporated by reference. The sources are available through the Minitex interlibrary loan system and are not subject to frequent change:

A. The American Fisheries Society, Common and Scientific Names of Fishes from the United States and Canada (fifth edition 1991);

B. John J. Mayer and I. Lehr Brisbin, Jr., Wild Pigs in the United States (1991);

C. The American Ornithologists' Union, Checklist of North American Birds (sixth edition 1983 and subsequent supplements);

D. John T. Kartesz, A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland (second edition 1994);

E. Ronald M. Nowak, Walker's Mammals of the World (fifth edition 1991);

F. A.J. Healy and Elizabeth Edgar, Flora of New Zealand, volume III (1980);

G. C.J. Webb, W.R. Sykes, and P.J. Garnock-Jones, Flora of New Zealand, volume IV (1988); and

H. Flora of North America Editorial Committee, Flora of North America North of Mexico, volume 3 (1997) (for waterlilies only).

STAT AUTH: MS s 84D.12

**HIST:** *22 SR 2076*

**6216.0250 PROHIBITED EXOTIC SPECIES.**

Subpart 1. **Designation.** The species in subparts 2 to 5 and any hybrids, cultivars, or varieties of the species are designated as prohibited exotic species.

Subp. 2. **Aquatic plants.** The following aquatic plants are designated as prohibited exotic species:

A. African oxygen weed (*Lagarosiphon major*) (Ridley) Moss ex Wagner;

B. aquarium watermoss or giant salvinia (*Salvinia molesta*) Mitchell;

C. Australian stonecrop (*Crassula helmsii*) (Kirk) Cockayne;

D. curly-leaf pondweed (*Potamogeton crispus*) Linnaeus;

E. Eurasian water milfoil (*Myriophyllum spicatum*) Linnaeus;

## WATERWAY MARKERS

**6110.1500, Subp. 7. Milfoil areas**. Buoys or signs indicating an area that is infested with Eurasian watermilfoil may be marked using a solid yellow sign or buoy. If a buoy is used, it shall be no less than four inches in diameter and extend at least 30 inches above the surface of the water. The words "Milfoil Area" must appear on opposing sides of the buoy in at least two-inch high black letters. If a sign is used, it shall be no more than 12 inches in width or more than 18 inches in height and extend 30 inches above the surface of the water at normal water level. The words "Milfoil Area" must appear on the sign in at least two-inch high black letters.

## MINNESOTA RULES CHAPTER 6216 - HARMFUL EXOTIC SPECIES

(Revised June 26, 2000 and as amended by emergency rule)

### 6216.0100 PURPOSE.

The purpose of parts 6216.0100 to 6216.0600 is to prevent the spread of harmful exotic species, including prohibited and regulated exotic aquatic plants and wild animals, into and within the state as authorized by Minnesota Statutes, sections 17.497 and 84D.12, while allowing flexibility for conditional possession of harmful exotic species. Parts 6216.0100 to 6216.0600 also provide a public process for designation of infested waters and classification and designation of exotic species according to criteria in statute.

STAT AUTH: MS s 84.9691; 84D.12

**HIST:** *20 SR 2292(NO. 43); L 1996 c 385 art 2 s 7; 22 SR 2076*

### 6216.0200 DEFINITIONS.

Subpart 1. **Scope.** For the purposes of parts 6216.0100 to 6216.0600, the terms used have the meanings given to them in Minnesota Statutes, section 84D.01, unless otherwise noted in this part.

Subp. 1a. **Applicant.** "Applicant" means a person who applies for a Minnesota Department of Natural Resources prohibited exotic species permit or regulated exotic species permit according to part 6216.0265, a water appropriation permit or public works permit according to Minnesota Statutes, chapter 103G, or an infested water permit according to part 6216.0500, subpart 6, or who requests a determination of the appropriate classification of an unlisted exotic species for introduction according to Minnesota Statutes, section 84D.06.

Subp. 2. **Commissioner.** "Commissioner" means the commissioner of natural resources of Minnesota or the commissioner's designated representative.

Subp. 3. **Department.** "Department" means the Minnesota Department of Natural Resources.

Subp. 3a. **Free-living state.** "Free-living state" means to be unconfined or outside the control of a person, and:

A. in the case of animals other than fish, includes the ability to fly, walk, or swim out of human control;

B. in the case of a fish or aquatic plants, the following locations shall be considered to be in a free- living state:

(1) waters identified as public waters;

(2) natural or artificial waters that are continually or intermittently connected to public waters; or

(3) water-using facilities, such as fish hatcheries, aquatic farms, zoos, and minnow retail or wholesale operations, with outflows that provide direct access for species to enter public waters; and

C. in the case of a fish or aquatic plant, the following locations are not considered a free-living state:

(1) artificial ponds such as water gardens that have no outlet to public waters;

C. spiny water flea (*Bythotrephes cederstroemi*) Schoedler.

Subp. 5. **Birds.** The following birds are designated as regulated exotic species:

A. Egyptian goose (*Alopochen aegyptiaus*) Linne;

B. mute swan (*Cygnus olor*) Gmelin; and

C. Sichuan pheasant (*Phasianus colchicus strachi*).

STAT AUTH: MS s 84D.12

**HIST:** *22 SR 2076*

**6216.0265 PERMITS FOR PROHIBITED AND REGULATED EXOTIC SPECIES.**

Subpart 1. **Requirement.** No person may possess, import, purchase, propagate, or transport a prohibited exotic species without a permit from the commissioner issued according to this part, except as authorized by Minnesota Statutes, section 84D.05. No person may introduce a regulated exotic species without a permit from the commissioner issued according to this part, except as authorized in subpart 2. A regulated exotic species permit is not required for a person to possess, import, purchase, propagate, transport, own, or sell a regulated exotic species.

Subp. 2. **Exemptions and alternate permits for regulated exotic species.** In lieu of an additional permit issued under Minnesota Statutes, section 84D.11, permits and licenses issued under Minnesota Statutes, sections 17.4981 to 17.4994 and chapter 97C, and rules adopted thereunder, may authorize the introduction of regulated exotic species, provided that the conditions specified in those permits and licenses are in accordance with the conditions specified under this part.

Subp. 3. **Prohibited exotic species permit limitation.** A person may apply for a permit for prohibited exotic species only for the purposes of disposal, control, research, or education according to Minnesota Statutes, section 84D.11, subdivision 1.

Subp. 4. **Eligibility; prohibited exotic species permit.** An applicant for a prohibited exotic species permit must:

A. have experience in the skills necessary for handling potentially harmful species, including:

(1) knowledge of precautions necessary to prevent spread through handling; or

(2) previous experience handling harmful exotic species without allowing escapes;

B. maintain a facility or transportation equipment that prevents the escape of exotic species;

C. if the applicant is an individual, be at least 18 years of age at the time the application is received by the department; and

D. if the applicant is a corporation, limited partnership, or other business entity, be qualified to do business in Minnesota as shown by a certificate of authority to transact business in Minnesota or a certificate of limited partnership from the Minnesota Secretary of State.

Subp. 5. **Permit application.**

A. Written application for a permit for a prohibited or regulated exotic species shall be made on a form prescribed by the commissioner and shall contain the following:

(1) the legal name, address, daytime and evening telephone numbers, and, if an individual, date of birth of the applicant;

(2) the scientific and common names of either the prohibited exotic species that the applicant desires to propagate, possess, import, purchase, or transport or the regulated exotic species that the applicant desires to introduce;

(3) a detailed description of the activity the applicant will be undertaking;

(4) a detailed description of the facilities or transportation equipment to be used and an explanation of how the equipment is sufficient to prevent an unauthorized introduction of a prohibited exotic species;

(5) a description of the applicant's experience in handling the same or similar species;

F. European frog-bit (*Hydrocharis morsus-ranae*) Linnaeus;

G. flowering rush (*Butomus umbellatus*) Linnaeus;

H. hydrilla (*Hydrilla verticillata*) (Carl von Linnaeus) Royle;

I. Indian swampweed (*Hygrophila polysperma*) (Roxburgh)T. Anders;

J. purple loosestrife (*Lythrum salicaria*, *Lythrum virgatum*, or any variety, hybrid, or cultivar thereof) Linnaeus;

K. water aloe or water soldiers (*Stratiotes aloides*) Linnaeus; and

L. water chestnut (*Trapa natans*) Linnaeus.

Subp. 3. **Fish.** The following fish are designated as prohibited exotic species:

A. bighead carp (*Hypophthalmichthys nobilis*) Richardson;

B. black carp (*Mylopharyngodon piceus*) (Richardson) Peters;

C. grass carp (*Ctenopharyngodon idella*) Valenciennes;

D. round goby (*Neogobius melanostomus*);

E. rudd (*Scardinius erythrophthalmus*) Linnaeus;

F. ruffe (*Gymnocephalus cernuus*) Linnaeus;

G. sea lamprey (*Petromyzon marinus*) Linnaeus;

H. silver carp (*Hypophthalmichthys molitrix*) Valenciennes;

I. white perch (*Morone americana*) Gmelin; and

J. zander (*Stizostedion lucioperca*) Linnaeus.

Subp. 4. **Invertebrates.** The following invertebrate is designated as a prohibited exotic species: zebra mussel (*Dreissena* spp.).

Subp. 5. **Mammals.** The following mammals are designated as prohibited exotic species:

A. Asian raccoon dog, also known as finnraccoon (*Nyctereutes procyonoides*);

B. Eurasian swine, European wild boar (*Sus scrofa scrofa*) Linnaeus;

C. European rabbit (*Oryctolagus cuniculus*); and

D. nutria, any strain (*Mycocastor coypu*).

STAT AUTH: MS s 84.9691; 84D.12

**HIST:** *20 SR 2292(NO. 43); L 1996 c 385 art 2 s 7; 22 SR 2076*

**6216.0260 REGULATED EXOTIC SPECIES.**

Subpart 1. **Designation.** The species in subparts 2 to 5 are designated as regulated exotic species.

Subp. 2. **Aquatic plants.** The following aquatic plants are designated as regulated exotic species:

A. Carolina fanwort or fanwort (*Cabomba caroliniana*) A. Gray;

B. parrot's feather (*Myriophyllum aquaticum*) (da Conceicao Vellozo) Verdcourt; and

C. nonnative waterlilies (*Nymphaea* spp.) Linnaeus, or any variety, hybrid, or cultivar thereof. Native Minnesota waterlilies are: *Nymphaea odorata* Aiton subsp. *odorata* Aiton, *N. leibergeii* Morong, and *N. Odorata* Aiton subsp. *tuberosa* (Paine) Wiersema & Hellquist.

Subp. 3. **Fish.** The following fish are designated as regulated exotic species:

A. alewife (*Alosa pseudoharengus*) Wilson;

B. common carp, koi (*Cyprinus carpio*) Linnaeus;

C. goldfish (*Carassius auratus*) Linnaeus;

D. rainbow smelt (*Osmerus mordax*) Mitchell; and

E. tilapia (*Tilapia, Oneochromis, Sartheradon* spp.).

Subp. 4. **Invertebrates.** The following invertebrates are designated as regulated exotic species:

A. Chinese mystery snail, Japanese trap door snail (*Cipangopaludina* spp.) Hannibal;

B. rusty crayfish (*Orconectes rusticus*) Girard; and

D. Chinook salmon (*Oncorhynchus tshawytscha*) Walbaum;

E. pink salmon (*Oncorhynchus gorbuscha*) Walbaum;

F. rainbow trout (*Oncorhynchus mykiss*) Walbaum; and

G. subtropical, tropical, and saltwater fish, except anadromous species.

Subp. 3. **Invertebrates.** The following invertebrates are designated as unregulated exotic species: subtropical, tropical, and saltwater invertebrates.

Subp. 4. **Mammals.** The following mammal is designated as an unregulated exotic species: rat (*Rattus norvegicus* and *Rattus rattus*).

Subp. 5. **Birds.** The following birds are designated as unregulated exotic species:

A. chuckar partridge (*Alectoris chuckar*) Gray;

B. helmeted Guinea fowl (*Numida meleagris*) Linnaeus;

C. house sparrow (*Passer domesticus domesticus*) Linnaeus;

D. Hungarian partridge, gray partridge (*Perdix perdix*) Linnaeus;

E. peafowl (*Pavo cristatus*) Linnaeus;

F. pigeon or rock dove (*Columba livia*) Gmelin;

G. ring-necked pheasant (*Phasianus colchicus*) Linnaeus; and

H. starling (*Sturnus vulgaris vulgaris*) Linnaeus.

STAT AUTH: MS s 84D.12

**HIST:** *22 SR 2076*

**6216.0280 ESCAPE OF EXOTIC SPECIES.**

Subpart 1. **Reporting.** To report an unauthorized introduction of prohibited, regulated, or unlisted exotic animal species, in compliance with Minnesota Statutes, section 84D.10, a person shall notify the department's area or regional conservation officer or the exotic species program staff in the department's St. Paul office by telephone within 48 hours after learning of the unauthorized introduction.

Subp. 2. **Information required.** The following information shall be provided to the department about the unauthorized introduction:

A. the quantity and species;

B. the location of the introduction;

C. the date and time the introduction occurred or was discovered;

D. the last known location of the species; and

E. the reporter's address and daytime and evening telephone numbers.

STAT AUTH: MS s 84D.12

**HIST:** *22 SR 2076*

**6216.0290 PROCESS FOR REVIEW OF PROPOSED INTRODUCTIONS OF UNLISTED EXOTIC SPECIES.**

Subpart 1. **Applications and information required.**

A. A person who seeks to introduce an unlisted exotic species in the state according to Minnesota Statutes, section 84D.06, shall submit an application on a form prescribed by the commissioner. The form shall request the following information:

(1) the name, address, and telephone number of the applicant;

(2) the scientific and common names, family, and reference used for the scientific name of the unlisted exotic species proposed for introduction;

(3) the number of individual plants or animals proposed for introduction;

(4) the reason and need for the proposed introduction;

(5) the potential to use native species for the same purpose;

(6) a written contingency plan for eradication or recapture in the event of an unauthorized introduction of the prohibited exotic species; and

(7) an agreement to comply with the requirements of parts 6216.0100 to 6216.0600.

B. The commissioner may request additional information from the applicant in writing after the application is received if necessary to evaluate the potential risk to the state's resources.

C. The commissioner shall review the permit applications and respond to the applicant within 30 days of receipt of the application or the additional information requested in item B.

Subp. 6. **Inspection of facilities or equipment.** After receipt of an application for a prohibited exotic species permit, and a determination by the commissioner that the applicant has satisfied all the initial requirements for a permit as described in this part, the commissioner may inspect the applicant's holding facilities or other containment or transportation equipment. Facilities holding prohibited exotic species under permit are subject to inspection by the commissioner at any reasonable time.

Subp. 7. **Transferability.** A permit issued under this part is not transferable.

Subp. 8. **Expiration date and renewal.** All prohibited exotic species and regulated exotic species permits expire at midnight on December 31 of each year, unless otherwise specified in the permit. Applications for renewal of permits shall be made by October 1 of the year the permit expires. Applications for renewal shall describe any changes to the information initially required in subpart 5.

Subp. 9. **Revocation of permit.**

A. The commissioner may revoke all or part of a permit issued under this part when: (1) the commissioner determines that a permittee has failed to comply with parts 6216.0100 to 6216.0600; or (2) it is necessary to protect the interests of the public, to protect native plant and animal populations in the state, or to otherwise protect the state's natural resources.

B. Except in an emergency situation when delay would threaten the state's natural resources, the commissioner shall, at least 14 days prior to the effective date of the revocation, inform the permit holder in writing of the nature of the revocation and of the conditions that, in the commissioner's opinion, require revocation.

C. Within 30 days of receipt of a notice of revocation, the permit holder may apply for an amendment to the permit or request a hearing before the commissioner to contest the revocation, to support the permit holder's proposed amendment, or both.

D. The permit shall be revoked on the date stated on the revocation notice until such time that the decision is reversed or modified.

Subp. 10. **Disclaimer of liability.** A prohibited exotic species permit or regulated exotic species permit issued under this part is permissive only. No liability is assumed by the state or any of its officers, agents, or employees by issuing a prohibited or regulated exotic species permit or by any acts or operations of the permittee or any prohibited or regulated exotic species in possession of the permittee.

Subp. 11. **Effective date.** A person possessing, importing, purchasing, selling, propagating, transporting, or introducing a prohibited exotic species on June 2, 1998, must apply for a permit within 60 days of June 2, 1998.

STAT AUTH: MS s 84D.12

**HIST:** *22 SR 2076*

**6216.0270 UNREGULATED EXOTIC SPECIES.**

Subpart 1. **Designation.** The species in subparts 2 to 5 are designated as unregulated exotic species. These exotic species are not subject to regulation under Minnesota Statutes, chapter 84D.

Subp. 2. **Fish.** The following fish are designated as unregulated exotic species:

A. Atlantic salmon (*Salmo salar*) Linnaeus;

B. brown trout (*Salmo trutta*) Linnaeus;

C. coho salmon (*Oncorhynchus kisutch*) Walbaum;

**6216.0300 DESIGNATION, NOTICE, AND MARKING OF INFESTED WATERS.**

Subpart 1. **Designation of infested waters and notice.** The commissioner shall designate infested waters. The commissioner shall publish the names of designated water bodies in the State Register before May 1 of each year and provide notice through other available means where practical. The department shall post signs describing the infestation at all public accesses to designated water bodies. At any time, the commissioner may designate additional water bodies or remove from designation those water bodies which no longer are infested waters.

STAT AUTH: MS s 84.9691; 84D.12

**HIST:** *20 SR 2292(NO. 43); 22 SR 2076*

**6216.0350 DESIGNATED INFESTED WATERS.**

Subpart 1. **Listing of waters infested with Eurasian water milfoil.** The following water bodies are designated by the commissioner as infested with Eurasian water milfoil (*Myriophyllum spicatum*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

| Name | DNR Protected Waters Inventory Number |
|---|---|
| A. Anoka County | |
| (1) Cenaiko Lake | 02-0654 |
| (2) Centerville lake | 02-0006 |
| (3) Crooked Lake | 02-0084 |
| (4) Lake George | 02-0091 |
| (5) Otter Lake | 02-0003 |
| (6) Peltier | 02-0004 |
| (7) Unnamed lake in Springbrook Nature Center | 02-0688 |
| B. Carver County | |
| (1) Ann Lake | 10-0012 |
| (2) Auburn Lake | 10-0044 |
| (3) Bavaria Lake | 10-0019 |
| (4) Eagle Lake | 10-0121 |
| (5) Firemen's Lake | 10-0226 |
| (6) Lotus Lake | 10-0006 |
| (7) Lake Minnewashta | 10-0009 |
| (8) Parley Lake | 10-0042 |
| (9) Pierson Lake | 10-0053 |
| (10) Riley Lake | 10-0002 |
| (11) Schutz Lake | 10-0018 |
| (12) Stone Lake | 10-0056 |
| (13) Lake Virginia | 10-0015 |
| (14) Lake Waconia | 10-0059 |
| (15) Wasserman Lake | 10-0048 |
| (16) Lake Zumbra | 10-0041 |
| C. Chisago County | |
| (1) Ellen lake | 13-0047 |
| (2) Green Lake | 13-0041 |
| (3) Rush Lake | 13-0069 |

D. Crow Wing County

| | |
|---|---|
| (1) Bay Lake | 18-0034 |
| (2) Ripple river, between Bay Lake and Tame Fish lake | 18-0000 |
| (3) Ruth Lake | 18-0212 |

E. Dakota County

| | |
|---|---|
| (1) Crystal Lake | 19-0027 |
| (2) Lac Lavon | 19-0347 |
| (3) Lake Marion | 19-0026 |
| (4) Schultz lake | 19-0075 |
| (5) Twin Lakes | 19-0028 |

F. Douglas County

| | |
|---|---|
| (1) Oscar Lake | 21-0257 |

G. Hennepin County

| | |
|---|---|
| (1) Arrowhead Lake | 27-0045 |
| (2) Bass lake | 27-0098 |
| (3) Brownie Lake | 27-0038 |
| (4) Bryant Lake | 27-0067 |
| (5) Bush Lake | 27-0047 |
| (6) Lake Calhoun | 27-0031 |
| (7) Cedar Lake | 27-0039 |
| (8) Christmas Lake | 27-0137 |
| (9) Dutch Lake | 27-0181 |
| (10) Eagle Lake | 27-0111 |
| (11) Fish Lake | 27-0118 |
| (12) Forest Lake | 27-0139 |
| (13) Galpin Lake | 27-0144 |
| (14) Gleason lake | 27-0095 |
| (15) Lake Harriet | 27-0016 |
| (16) Hiawatha Lake | 27-0018 |
| (17) Lake Independence | 27-0176 |
| (18) Lake of the Isles | 27-0040 |
| (19) Libbs Lake | 27-0085 |
| (20) Little Long Lake | 27-0179 |
| (21) Long Lake | 27-0160 |
| (22) Medicine Lake | 27-0104 |
| (23) Minnehaha Creek | 27-0000 |
| (24) Lake Minnetonka | 27-0133 |
| (25) Niccum's Pond | private |
| (26) Lake Nokomis | 27-0019 |
| (27) Parker's Lake | 27-0107 |
| (28) Peavy Lake | 27-0138 |
| (29) Lake Rebecca | 27-0192 |
| (30) Rice Lake | 27-0116 |
| (31) Round Lake | 27-0071 |
| (32) Lake Sarah | 27-0191 |
| (33) Schmidt Lake | 27-0102 |
| (34) Swan Lake | 27-0000 |

| | |
|---|---|
| (35) Tanager Lake | 27-0141 |
| (36) unnamed wetland | 27-0900 |
| (37) Whaletail Lake | 27-0184 |
| (38) Wirth Lake | 27-0037 |
| H. Isanti County | |
| (1) Green Lake | 30-0136 |
| I. Itasca County | |
| (1) Ice Lake | 31-0372 |
| (2) McKinney Lake | 31-0370 |
| (3) North Twin | 310-190 |
| J. Kanabec County | |
| (1) Knife Lake | 33-0028 |
| K. Kandiyohi County | |
| (1) Green Lake | 34-0079 |
| L. Meeker county | |
| (1) Stella Lake | 47-0068 |
| (2) Lake Washington | 47-0046 |
| M. Mille Lacs county | |
| (1) Lake Mille Lacs | 48-0002 |
| (2) from the mouths of each tributary of Lake Mille Lacs upstream to the first public road | |
| N. Olmsted County | |
| (1) George Lake | 55-0008 |
| O. Pope County | |
| (1) Gilchrist Lake | 61-0072 |
| (2) Lake Minnewaska | 61-0130 |
| P. Ramsey County | |
| (1) Bald Eagle Lake | 62-0002 |
| (2) Lake Gervais | 62-0007 |
| (3) Island Lake | 62-0075 |
| (4) Keller Lake | 62-0010 |
| (5) Kohlmans Lake | 62-0006 |
| (6) McCarron Lake | 62-0054 |
| (7) Lake Owasso | 62-0056 |
| (8) Phalen Lake | 62-0013 |
| (9) Round Lake | 62-0012 |
| (10) Silver Lake | 62-0001 |
| (11) Spoon creek, between Keller and Phalen lakes | 62-0000 |
| (12) Snail lake | 62-0073 |
| (13) Sucker Lake | 62-0028 |
| (14) Turtle Lake | 62-0061 |
| (15) Lake Vadnais | 62-0038 |
| (16) Lake Wabasso | 62-0082 |
| Q. Rice County | |
| (1) Cedar Lake | 66-0052 |
| R. St. Louis County | |
| (1) Gilbert Pit Lake | 69-1306 |

S. Scott County

| | |
|---|---|
| (1) Lower Prior Lake | 70-0026 |
| (2) Upper Prior Lake | 70-0072 |

T. Stearns county

| | |
|---|---|
| (1) unnamed wetland along Clearwater river | 73-0312 |

U. Todd County

| | |
|---|---|
| (1) Sauk Lake | 77-0150 |

V. Washington County

| | |
|---|---|
| (1) Powers Lake | 82-0092 |
| (2) White Bear Lake | 82-0167 |
| (3) St. Croix River | 82-0001 |
| (4) Sunset Lake | 82-0153 |

W. Wright County

| | |
|---|---|
| (1) Augusta Lake | 86-0284 |
| (2) Beebe Lake | 86-0023 |
| (3) Buffalo Lake | 86-0090 |
| (4) Clearwater Lake | 86-0252 |
| (5) Clearwater River, downstream of Clearwater Lk | 86-0000 |
| (6) Deer Lake | 86-0107 |
| (7) Goose Lake | 86-0108 |
| (8) Lake Mary | 86-0156 |
| (9) Little Waverly Lake | 86-0106 |
| (10) Lake Pulaski | 86-0053 |
| (11) Rock Lake | 86-0182 |
| (12) Sugar Lake | 86-0233 |
| (13) Waverly Lake | 86-0114 |

X. Multiple Counties

(1) Mississippi River, downstream of St. Anthony Falls

Subp. 2. **Listing of waters infested with round goby.** The following water bodies are designated by the commissioner as infested with round goby (*Neogobius melanostomus*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

DNR Protected Waters

| Name | Inventory Number |
|---|---|
| Multiple Counties | |
| (1) Lake Superior | 16-0001 |
| (2) St. Louis River, downstream of the Fond du Lac dam | |

Subp. 3. **Listing of waters infested with ruffe.** The following water bodies are designated by the commissioner as infested with ruffe (*Gymnocephalus cernuus*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

| Name | DNR Protected Waters Inventory Number |
|---|---|
| Multiple Counties | |
| (1) Lake Superior | 16-0001 |
| (2) St. Louis River, downstream of the Fond du Lac dam | |

Subp. 4. **Listing of waters infested with spiny water flea.** The following water bodies are designated by the commissioner as infested with spiny water flea (*Bythotrephes cederstroemi*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

| Name | DNR Protected Waters Inventory Number |
|---|---|
| A. St. Louis County | |
| (1) Fish Lake | 69-0491 |
| (2) Island Lake | 69-0372 |
| B. Multiple Counties | |
| (1) Lake Superior | 16-0001 |
| (2) Cloquet River from Island Lake to the St. Louis River | |
| (3) St. Louis River, downstream of the Cloquet River | |

Subp. 5. **Listing of waters infested with white perch.** The following water bodies are designated by the commissioner as infested with white perch (*Morone americana*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

| Name | DNR Protected Waters Inventory Number |
|---|---|
| Multiple Counties | |
| (1) Lake Superior | 16-0001 |
| (2) St. Louis River, downstream of the Fond du Lac dam | |

Subp. 6. **Listing of waters infested with zebra mussels.** The following water bodies are designated by the commissioner as infested with zebra mussels (*Dreissena* spp.). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

| Name | DNR Protected Waters Inventory Number |
|---|---|
| A. Olmsted county | |
| (1) Lake Zumbro | 55-0400 |
| B. Washington county | |

(1) St. Croix River, downstream of the St. Croix Boomsite Recreation Area, managed by Minnesota Department of Transportation, at river mile 25.4.

C. Multiple counties

(1) Lake Superior 16-0001
(2) Mississippi River, downstream of St. Anthony Falls
(3) St. Louis River, downstream of the Fond du Lac dam
(4) Zumbro River, downstream of Lake Zumbro

**6216.0400 RESTRICTED ACTIVITIES ON INFESTED WATERS; PERMITS.**

Subpart 1. **Taking bait from infested waters.** The taking of wild animals from infested waters for bait or aquatic farm purposes is prohibited, except:

A. by permit according to part 6254.0200 and Minnesota Statutes, sections 84D.03, subdivision 3, and 84D.11, subdivision 2a; and

B. harvest for bait purposes from waters that are designated as infested waters solely because they contain Eurasian water milfoil is allowed for noncommercial personal use.

Subp. 1a. **Permit application.**

A. Written application for a permit to harvest wild animals from infested waters for bait or aquatic farm purposes shall be made on a form provided by the commissioner and shall contain:

(1) the applicant's legal name, business name, license number, address, and daytime and evening telephone numbers;

(2) the names of the waters and counties where the applicant desires to harvest wild animals for bait or aquatic farm purposes; and

(3) a description of the harvest and transportation equipment to be used, including boats, motors, and trailers.

B. An application for a permit according to part 6254.0200 and Minnesota Statutes, sections 84D.03, subdivision 3, and 84D.11, subdivision 2a, must be mailed or delivered to the Minnesota DNR-Commercial Fisheries Program Coordinator, 500 Lafayette Road, St. Paul, MN 55155-4012.

C. An application for a permit under this part must be submitted by March 1 to be considered for permits that are effective on April 10 of the same year.

Subp. 1b. **Expiration; renewal; transferability.** Permits issued under this part expire at midnight on April 9 of each year, unless otherwise specified in the permit. An application for renewal shall describe any changes to the information submitted in the prior year. A permit issued under this part is not transferable.

Subp. 1c. **Revocation of permit.**

A. When the commissioner determines that a permittee has failed to comply with conditions of the permit, the commissioner may issue a warning or, if deemed necessary for the protection of the aquatic resources, revoke all or part of a permit. The commissioner may revoke the permit if deemed necessary for the protection of the aquatic resources. When it is determined that a third offense has occurred, the commissioner must revoke the permit.

B. Except in an emergency situation when delay would threaten the state's natural resources, the commissioner shall, at least seven days before the effective date of the revocation, inform the permit holder in writing of the nature of the revocation and of the conditions that, in the commissioner's opinion, require revocation.

C. Upon notice of revocation, the permit holder may apply for an amendment to the permit or request a contested case hearing to contest the revocation. The permit is revoked on the date stated in the revocation notice until such time that the decision is reversed or modified.

Subp. 2. **Restrictions on sport gill netting for whitefish and ciscoe in infested waters.** If the commissioner designates waters that are open to sport gill netting for whitefish and ciscoe as infested waters, the commissioner may close the gill netting season for the designated water body require that gill nets used in the infested waters not be used in other water bodies, or require that nets used in infested waters must be dried for a minimum of ten days or frozen for a minimum of two days before they are used in noninfested waters. The commissioner shall publish the names of designated water bodies and new requirements or closures in the State Register and provide notice through media releases and other available means where practical. In addition, the commissioner shall post notice of the restrictions at public access points to designated water bodies.

Subp. 3. **Commercial fishing restrictions in infested waters.** Nets, traps, buoys, anchors, stakes, and lines used for commercial fishing or turtle, frog, or crayfish harvesting purposes that are used in infested waters must be dried for a minimum of ten days or frozen for a minimum of two days before they are used in noninfested waters. All aquatic vegetation must be removed from nets and other equipment when they are removed from infested waters. Commercial operators must notify the department's regional or area fisheries office or a conservation officer when removing nets or equipment from infested waters and before resetting those nets or equipment in noninfested waters.

**6216.0500 TRANSPORTATION AND APPROPRIATION OF WATER FROM INFESTED WATERS.**

Subpart 1. **Transporting water and wild animals from infested waters.** Water from infested waters may not be used to transport wild animals except as provided in subpart 4. Live fish taken under a commercial fishing license may be transported from infested waters to other waters or holding facilities from May 1 to October 31 with a transportation permit issued by the department pursuant to Minnesota Statutes, section 17.4985.

Subp. 2. **Disposition of water used to transport wild animals from infested waters.** Water used to transport live wild animals from infested waters pursuant to subpart 1, including water from waters or facilities permitted to hold fish from infested waters, may be disposed of only at sites approved in writing by the commissioner.

Subp. 3. **Persons leaving select infested waters.** A person leaving infested waters designated as having populations of zebra mussel or spiny water flea must drain bait containers, other boating-related equipment holding water excluding marine sanitary systems, and livewells and bilges by removing the drain plug before transporting the watercraft and associated equipment on public roads.

Subp. 4. **Diversion, appropriation, and transportation of infested waters.** Infested waters may not be transported on a public road or off property riparian to infested waters except:

A. in emergencies, such as fire emergencies;

B. as specified in a water appropriation or public waters work permit issued by the commissioner pursuant to Minnesota Statutes, chapter 103G; or

C. under a permit issued pursuant to this part.

Infested waters may not be diverted to other waters without a permit issued pursuant to this part, or as authorized in a public waters work permit or water appropriation permit issued by the commissioner pursuant to Minnesota Statutes, chapter 103G.

Subp. 5. **Fish hatchery or aquatic farm operations in infested waters.**

A. Natural lakes or wetland basins that are designated as infested waters will not be licensed by the department pursuant to Minnesota Statutes, section 17.4984, for aquatic farms or pursuant to Minnesota Statutes, section 97C.211, as private fish hatcheries.

B. Artificial water basins that have populations of prohibited or regulated exotic species may be used for aquatic farm or private hatcheries under license by the department. After notifying a licensee that an artificial water basin has a prohibited or regulated exotic species, the commissioner may require that nets, traps, buoys, stakes, and lines that have been used in such artificial water basins must be

dried for a minimum of ten days, or frozen for a minimum of two days, before they are used in noninfested waters.

All aquatic plants must be removed from nets and other equipment that are removed from the artificial water basins.

C. The commissioner may license aquatic farm or private fish hatchery facilities to use infested waters as a source for the facilities' water. The commissioner may require that the waters be treated to eliminate prohibited or regulated exotic species.

D. Fish raised in artificial water basins that have populations of prohibited or regulated exotic species, or in any facility using infested water as a source, must be sold directly to a wholesale buyer for processing except:

(1) the commissioner may by permit allow the stocking or transport of such fish where the receiving waters contain populations of the same prohibited or regulated exotic species as the source facility's waters; or

(2) the commissioner may by permit allow the stocking or transport of such fish in water bodies that do not contain populations of prohibited or regulated exotic species if the source facility uses adequate treatment to remove the prohibited or regulated exotic species from the facility.

Subp. 6. **Infested waters diversion or transportation permits.** Applications for permits issued pursuant to this part, to divert or transport water from infested waters, shall be made on forms obtained from the commissioner and shall contain information as the commissioner may prescribe. The department shall act upon the application within 90 days of receipt. Failure on the part of the department to act upon the permit within the required time shall not be construed as approval of the application. Permits shall state all the conditions and limitations upon which they are based. A permit may be modified at any time by the department.

**6216.0600 VIOLATIONS; CONFISCATIONS.**

Unless a different penalty is prescribed, a violation of parts 6216.0265, 6216.0280 to 6216.0290, or 6216.0400 to 6216.0500 is a misdemeanor as set forth in Minnesota Statutes, section 84D.13. Where a violation has occurred, the department may confiscate the prohibited, regulated, or unlisted exotic species immediately upon discovery wherever found and, at the department's discretion, destroy it. Where infested water is being appropriated, or diverted or transported without a permit, or otherwise contrary to the provisions of parts 6216.0100 to 6216.0600, the department may order that the activities cease. Any expense or loss in connection with enforcement of the order shall be borne by the permittee or responsible person.

# Appendix C - Proposed Harmful Exotic Species Rule Changes

The underlined portions in the following text are proposed rule changes. The rule making process was started in 2001 and will be ongoing in 2002.

**6216.0250 PROHIBITED EXOTIC SPECIES.**

Subpart 1. **Designation.** The species in subparts 2 to 5 and any hybrids, cultivars, or varieties of the species are designated as prohibited exotic species.

Subp. 2. **Aquatic plants.** The following aquatic plants are designated as prohibited exotic species:

A. African oxygen weed (*Lagarosiphon major*) (Ridley) Moss ex Wagner;
B. aquarium watermoss or giant salvinia (*Salvinia molesta*) Mitchell;
C. Australian stonecrop (*Crassula helmsii*) (Kirk) Cockayne;
D. curly-leaf pondweed (*Potamogeton crispus*) Linnaeus;
E. Eurasian water milfoil (*Myriophyllum spicatum*) Linnaeus;
F. European frog-bit (*Hydrocharis morsus-ranae*) Linnaeus;
G. flowering rush (*Butomus umbellatus*) Linnaeus;
H. hydrilla (*Hydrilla verticillata*) (Carl von Linnaeus) Royle;
I. Indian swampweed (*Hygrophila polysperma*) (Roxburgh) T. Anders;
J. purple loosestrife (*Lythrum salicaria*, *Lythrum virgatum*, or any variety, hybrid, or cultivar thereof) Linnaeus;
K. water aloe or water soldiers (*Stratiotes aloides*) Linnaeus; and
L. water chestnut (*Trapa natans*) Linnaeus.

Subpart 2A. **Federal noxious weed list.** For the purpose of this part, the aquatic plants listed in the Code of Federal Regulations, title 7, section 360.200 are also designated as prohibited exotic species.)

[**Note**:The aquatic plants currently on the federal list are:

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|---|---|
| *Azolla pinnata* R. Brown | (mosquito fern, water velvet) |
| *Eichornia azurea* (Swartz) Kunth | (anchored waterhyacinth, rooted waterhyacinth) |
| *Hydrilla verticillata* (Linnaeus f.) Royle | (hydrilla) |
| *Hygrophila polysperma* T. Anderson | (Miramar weed) |
| *Ipomoea aquatica* Forsskal | (water-spinach, swamp morning-glory) |
| *Lagarosiphon major* (Ridley) Moss | |
| *Limnophila sessiliflora* (Vahl) Blume | (ambulia) |
| *Melaleuca quenquinervia* (Cav.) Blake | (broadleaf paper bark tree). |
| *Monochoria hastata* (Linnaeus) Solms-Laubach | |
| *Monochoria vaginalis* (Burman f.) C. Presl | |
| *Ottelia alismoides* (L.) Pers. | |
| *Sagittaria sagittifolia* Linnaeus | (arrowhead) |
| *Salvinia auriculata* Aublet | (giant salvinia) |
| *Salvinia biloba* Raddi | (giant salvinia) |
| *Salvinia herzogii* de la Sota | (giant salvinia) |
| *Salvinia molesta* D.S. Mitchell | (giant salvinia) |
| *Sparganium erectum* Linnaeus | (exotic bur-reed)] |

**6216.0260 REGULATED EXOTIC SPECIES.**

Subpart 1. **Designation.** The species in subparts 2 to 5 are designated as regulated exotic species.

Subp. 2. **Aquatic plants.** The following aquatic plants are designated as regulated exotic species:

A. Carolina fanwort or fanwort (*Cabomba caroliniana*) A. Gray;

B. parrot's feather (*Myriophyllum aquaticum*) (da Conceicao Vellozo) Verdcourt;

~~and~~

C. nonnative waterlilies (*Nymphaea* spp.) Linnaeus, or any variety, hybrid, or cultivar thereof. Native Minnesota waterlilies are: *Nymphaea odorata* Aiton subsp. *odorata* Aiton, *N. leibergeii* Morong, and *N. Odorata* Aiton subsp. *tuberosa* (Paine) Wiersema & Hellquist; and

D. yellow iris or yellow flag (*Iris pseudacoris*) Linnaeus