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

# <u>Annual</u> <u>Report</u> 1997

for the year ended December 31



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Submitted to Environment and Natural Resources Committees of the Minnesota House and Senate

> This report should be cited as follows: Exotic Species Program. 1998. Harmful Exotic Species of Aquatic Plants and Wild Animals in Minnesota: Annual Report for 1997. Minnesota Department of Natural Resources, St. Paul, MN.

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# **1997 Annual Report Highlights**

#### 1. Monitoring

- <u>Five new lakes with Eurasian watermilfoil were documented</u>, four in the Twin Cities Metro Area and one in Crow Wing County.
- Zebra mussels were found in one sample collected above Taylors Falls, however, intensive monitoring failed to reconfirm this finding and the St. Croix River is still considered uninfested.
- <u>An inventory of curly-leaf pondweed distribution is being developed for</u> <u>Minnesota lakes</u> by surveying the Section of Fisheries' records.

#### 2. Limiting spread and preventing introductions

- <u>Paid television and radio advertising</u> during the Fishing Opener, Memorial Day, Fourth of July, and Labor Day weekends was used as part of a <u>major effort to</u> <u>increase public awareness of exotic species</u> and how watercraft should be "cleaned."
- <u>DNR inspectors</u> working at infested water access points <u>checked over 43,700</u> <u>watercraft</u>, exceeding the required 20,000 hours of inspection effort.
- <u>The DNR proposed new rules</u> that will place additional exotic species in the prohibited, regulated, and unregulated categories. This listing determines how, or if, the DNR will regulate the use of these species. These rules also place limits on the uses and movement of water from lakes or rivers that are designated as *infested* with exotic species.

#### 3. Cooperation

- <u>The DNR provided funding and technical assistance</u> for management of milfoil on 39 lakes.
- <u>The DNR continued to control purple loosestrife</u> using both herbicides and biological control insects. Working cooperatively with County Agricultural Inspectors and DNR and University of MN staff over 1,000,000 leaf-eating beetles were raised and released at 150+ sites throughout the state.

#### 4. New research

• Contracts with the University of MN, the Army Corps of Engineers, and Bemidji State University funded various research efforts.

# **Executive Summary**

This report describes the progress made during 1997 by the Exotic Species Program of the Minnesota Department of Natural Resources (DNR) and its cooperators in Minnesota. The Exotic Species Program is responsible for monitoring and management of harmful exotic aquatic plant and wild animal species. These are species that may harm communities of native plants and animals, limit water recreation, and increase operating costs for industry.

Exotic Species Program funding is derived primarily from a \$5 surcharge on the registration of watercraft. The surcharge generates approximately \$1,100,000 annually and additional funding comes from other sources. Activities documented in this report occurred both in state fiscal year 1997 (FY97) and fiscal year 1998 (FY98). A breakdown of FY97 expenditures by major category, as well as expenditures planned in FY98, are shown in Table 1.

Table 1. Water recreation account spending (in thousands of \$'s) by the exotic species program in fiscal year 1996 (FY96) and fiscal year 1997 (FY97) and projected spending in fiscal year 1998 (FY98).

	FY96	FY97	FY98
Administration	122	123	116
Program Planning/Direction	108	140	94
Public Awareness	147	216	50
Control/Management	198	191	201
Inspections/Enforcement	334	397	393
Research	98	136	212
Totals	\$ 1,007	\$ 1,203	\$ 1,066

The goals of the Exotic Species program are to:

- monitor the distribution of harmful exotic aquatic plants and wild animals in Minnesota.
- limit their spread; contain exotic species to sites where they presently occur in Minnesota and keep new exotic species from entering the state;
- reduce their impact on Minnesota ecosystems and public use of those ecosystems; and
- support the development of better control methods.

#### Harmful Exotic Species in Minnesota

The program's progress in these areas is described in detail for Eurasian watermilfoil, purple loosestrife, zebra mussels, flowering rush, and curly-leaf pondweed. Information on the distribution and management of other exotic species present in Minnesota is also provided.

Inventory efforts in 1997 confirmed new waterbodies infested with exotic species. Eurasian watermilfoil populations were confirmed in five new lakes (including one in Crow Wing County) while 48 new sites with purple loosestrife were identified. In contrast, no change was documented in the distribution of a number of other species. No evidence was found that zebra mussels, ruffe, or round goby have expanded their range in Minnesota. One sample collected in 1997 did suggest that zebra mussels had become established in the St. Croix River above Taylors Falls. Extensive efforts to confirm this finding were negative and the St. Croix River remains in the uninfested category.

The goal of DNR's educational efforts, built around the "Clean Boats: Clean Waters" theme, is to increase the public's awareness of exotic species, the problems they can cause, and to promote the adoption of "Clean Boats" behavior. Major efforts were made in 1997 to use paid TV and radio ads to reach the boating public, improve access to exotic species educational material for elementary schools, and to upgrade educational signs posted at boat landings. Survey results indicate that past educational efforts have been effective at elevating Minnesotan's awareness of exotic species (Minnesota boaters are more aware of exotic species than boaters in neighboring states). However, to be fully effective, awareness of exotic species needs to be coupled with specific actions to keep boats and boating equipment clean of exotics.

The Minnesota Legislature mandated (M.S. 84D.02 Subd 4) that the DNR focus particular attention on watercraft leaving lakes and rivers already *infested* with exotic species (20,000 hours of inspections are to be accomplished annually). This standard was reached in 1997 (20,678 hours of inspections were logged between May 1 and October 15) and over 43,700 trailered watercraft were inspected. Special inspection efforts continue to be focused on events (e.g. fish tournaments, sailing regattas, water ski tournaments, the waterfowl hunting season) that bring many watercraft users to infested waters. The Minnesota Conservation Corps employees who conduct watercraft inspections met thousands of additional Minnesotans during the State Fair at DNR's Exotic Species exhibit.

Enforcement of exotic species law was increased in 1997 to help reinforce the "Clean Boats" theme. Conservation Officers spent about 1000 hours enforcing exotic species laws and rules, the majority of their time was spent enforcing the law which prohibits transporting aquatic vegetation on public roads. Seven road checks were conducted throughout the state to assess compliance with the law and to increase public awareness of it. Aquatic vegetation was found in, or on, 25% of the watercraft inspected, although in most cases only a small amount of vegetation was present. These results indicate that although most Minnesotans are aware of exotic species, the potential for watercraft to accidentally move exotics plants or animals to new waterbodies remains high.

The Exotic Species Program proposed amendments to Minnesota Rules 6216 that govern harmful exotic species (the notice of intent to adopt was published in the State Register on October 27). The proposed amendments designates additional exotic species as prohibited, regulated, or unregulated, describes the process the DNR will use to issue exotic species permits, modifies various restrictions placed on the use of *infested* waters, and makes a number of other changes. Public hearings on the proposed amendments will be held in January, 1998.

The Exotic Species Program, alone or in cooperation with local groups, undertook a wide variety of control actions in 1997. We sponsored or assisted with Eurasian watermilfoil control efforts on 39 lakes, identified 110 high-priority sites where purple loosestrife was sprayed with herbicide, and continued to coordinate flowering rush control activities in the Detroit Lakes area. Significant progress was made to 1997 to implement an integrated control program for purple loosestrife (a program that combines both chemical and biological control approaches). The use of new outdoor rearing techniques and the assistance of new local partners (e.g. County Agricultural Inspectors and DNR Area Wildlife Managers) dramatically increased the number of leafeating beetles that were raised and released on purple loosestrife infestations statewide (total releases were about 1,000,000 insects). The DNR expects the size of this biocontrol effort and the number of local partners to continue to grow.

Research to develop new biological control methods for managing exotic species continued in 1997 and two new research efforts were initiated. Additional funding recommended by the Legislative Commission on Minnesota Resources (LCMR) and appropriated by the Legislature was particularly important. Using funds from LCMR and from the exotics species program budget efforts to develop biological-control methods for purple loosestrife and Eurasian watermilfoil continued under the direction of scientists at the University of Minnesota. New funding was obtained from LCMR to address the importation of exotic species in the ballast water of ships. Commercial ships have been identified as a major pathway for moving exotic species to North America and around this continent. These funds will assist efforts being conducted by other Great Lakes states to develop new ballast water control technologies. The exotic species program also initiated a new research program with the Army Corps of Engineers' Center for Aquatic Plant Research and Technology. This project is focused on improving the efficacy of herbicides to manage curly-leaf pondweed populations.

# 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 Department of Agriculture. The DNR's Exotic Species Program within the Division of Fish and Wildlife is responsible for programs covering exotic aquatic plant and wild animal species. DNR's Division of Forestry, working in cooperation with the Minnesota 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 Minnesota Department of Agriculture is responsible for the state's noxious weed and seed laws which apply primarily to terrestrial plants which harm agricultural crops. Information about control and prevention programs for harmful terrestrial exotic plants may be obtained from the Minnesota 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 under its jurisdiction (see M.S. 84D.02, Subd. 3 in Appendix A). According to statute, this 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.

Additional sections on regulations, enforcement, 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 many years (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. Minnesota was the first state in the country to create a program for purple loosestrife control. In 1989, DNR was officially assigned an additional coordinating role for Eurasian watermilfoil (EVM) 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 the Exotic Species Program is to curb the spread and minimize the current and future harmful effects of exotic species that can naturalize in the state and either:

- cause or may cause displacement of, or otherwise threaten, native species in their natural communities; or
- (2) threaten or may 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 will be 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 that could spread to other waters if lake water use and related activities are not regulated and where the risk of spread to an uninfested waterbody through such activities is high. The current *infested waters* list is included (Appendix C).

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

Prevention activities, such as identifying potentially harmful species in other areas of North America (and the world), predicting pathways of spread, and developing/implementing solutions that reduce introduction and spread, are important. The Exotic Species Program will conduct and participate in a number of prevention efforts in 1998. For example, an assessment is underway of the potential for various non-native aquatic plants to be invasive in Minnesota. This project is being done under contract with the U.S. Army Corps of Engineers' Aquatic Plant Research Program. A second effort is the Great Lakes regional demonostration project to eliminate exotic organisms in the ballast tanks of large ships. A proposal to the Legislative Commission on Minnesota Resources was funded to test filtration as a ballast water control technology.

#### Program staff

Exotic Species Program Coordinator Purple Loosestrife Coordinator\* Eurasian Watermilfoil Coordinator\* General Exotic Species Issues\* General Exotic Species Issues\* Clerical\* Watercraft Inspections\* Zebra Mussels\Exotic Aquatic Invertebrates\* Enforcement Budget Management\* William (Jay) Rendall (612-297-1464) Luke Skinner (612-297-3763) Charles (Chip) Welling (612-297-8021) Donna Perleberg (218-828-6132) Wendy Crowell (612-282-2508) Debbie Hunt (612-296-2835) Michelle Bratager (612-297-4891) Gary Montz (612-297-4888) Tom Kjellberg (320-616-2515) Dave Wright (612-297-4886)

Responsibility for overall coordination of the DNR's Exotic Species Program is assigned to Jay Rendall, within the Division of Fish and Wildlife's Administrative Services Section. Exotic species policy, rulemaking, legislation, state representation on the Great Lakes Panel on Aquatic Nuisance Species, and involvement with federal exotic species issues are coordinated by this position.

Program activities such as species management, watercraft inspections, and research coordination are carried out primarily by the Ecological Services' staff in the Division of Fish and Wildlife. Existing staff (identified with \*) and their primary responsibilities are listed above:

## Other staff support

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

#### Harmful Exotic Species in Minnesota

<u>Division of Fish and Wildlife</u> Supervision of the exotic species staff is carried out by the Supervisor of the Aquatic Plant Management Program, Ecological Services Section. The Monitoring and Control Unit Supervisor (Ecological Services) is responsible for managing the watercraft surcharge budget and other issues related to implementation of exotic species activities. Pesticide Enforcement specialists from Ecological Services and Aquatic Plant Management specialists in the Section of Fisheries are also involved in the management of purple loosestrife, Eurasian watermilfoil, and flowering rush. In addition to these staff, other individuals from the Division of Fish and Wildlife contribute by providing biological expertise, assisting with control efforts, conducting inventory and public awareness activities, and providing additional avenues for public input.

<u>Division of Enforcement</u> Conservation Officers are responsible for enforcing the state regulations regarding harmful exotic species. An exotic species enforcement coordinator within the Division of Enforcement was appointed in November 1996 and assists 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).

<u>Minnesota Conservation Corps (MCC)</u> In 1997, 29 corps members spent over 20,000 hours inspecting boats at public water accesses on lakes and rivers in Minnesota infested with exotic species. Corps members also assist Conservation Officers at road checks. A summary of their efforts is included in this report (see Watercraft Inspections).

<u>Bureau of Information and Education</u> Staff from the Bureau of Information and Education 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 the surcharge on watercraft licenses. The surcharge for a three year license period is \$5, or \$1.67 per year, and generates approximately \$1,100,000 annually. Additional appropriations, primarily for specific research efforts, have come from the Environment and Natural Resources Trust Fund and Minnesota Resources Fund (Table 2).

## Contracts

A large portion of the research and control activity carried out by the exotic species program is done under contract. Research to identify and test organisms capable of biologically controlling harmful exotic species is contracted with various research facilities. In 1997, biological control research for Eurasian watermilfoil and purple loosestrife was done under contract with the University of Minnesota. This research is described in greater detail in the individual management chapters. The majority of control of purple loosestrife and Eurasian watermilfoil conducted by the DNR is carried out by licensed herbicide applicators under state contract. Local lake associations, conservation districts, or local governments share the costs of many of these control efforts (see Eurasian watermilfoil and Purple loosestrife).

#### Federal and Regional Coordination

The DNR Exotic Species Program staff often participate in regional or federal activities regarding harmful exotic species. DNR Exotic Species Program Coordinator, Jay Rendall, is the current Minnesota representative to the Great Lakes Panel on aquatic nuisance species and was its Vice-chair in 1997. Participation on this panel, established by the federal Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 and reauthorized by the National Invasive Species Act of 1996, helps keep Minnesota informed of regional and federal efforts regarding harmful exotic species. Participation on the Great Lakes Panel also provides a voice for Minnesota interests as regional and federal policies and priorities are developed.

Luke Skinner, Purple Loosestrife Coordinator, has been involved in regional and national efforts to use biological controls to manage purple loosestrife. He helped organize meetings with the U.S. Fish and Wildlife Service and 22 other Midwestern states to develop a regional plan for biological control implementation. He is also a member of the National Biological Control Planning Committee established to develop national guidelines for implementation of biological controls for purple loosestrife.

Chip Welling, Eurasian Watermilfoil Program Coordinator, has been working with the U.S. Army Corps of Engineers on cooperative research on biological controls for Eurasian watermilfoil.

Jack Wingate, Fisheries Research Manager, is a member of the federal Ruffe Control Committee, established by the federal Aquatic Nuisance Species Task Force.

Gary Montz, Aquatic Invertebrate Biologist, chairs the multi-agency St. Croix River Zebra Mussel Task Force and directs state efforts against zebra mussels in the river. Gary 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.

# Future Needs for the Exotic Species Program

- Prepare a statewide plan for the management of harmful exotic species (M.S. 84D.02 Subd. 3).
- Identify exotic species which are entering Minnesota and evaluate their potential to cause problems if they become established in the wild.
- Gain information necessary to classify and designate additional exotic species as prohibited, regulated or unregulated in future rulemaking.
- Work with industries which might bring prohibited exotic species into Minnesota to reduce the likelihood of those occurrences.

## **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.

# Regulations

# 1997 Highlights

• Administrative rule changes were drafted by the DNR and a notice of intent to adopt was published in the State Register.

## Background

#### <u>State</u>

Most harmful exotic species were unregulated in Minnesota until the mid-1980's. 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 have been modified almost annually to address the changing threats to the states resources and the need for technical amendments to previous laws. The current state statutes and rules are located in Appendices A and B.

In 1996 Minnesota statutes were revised, expanded, and consolidated into one chapter M.S. 84D - Harmful Exotic Species. The revised statute includes a comprehensive system for classification of exotic species. Under this system, any exotic species would belong to one of the four classes described below.

- Prohibited exotic species are those of the highest concern because they are the most likely to naturalize and be harmful to the state's natural resources or their use. Species designated as *prohibited* species may not be possessed, imported, purchased, sold, propagated, transported, or introduced except as provided in state statutes (see Table 3).
- 2. Species designated as *regulated* exotic species have less of a known or predicted threat to the State's resources and use and may have significant commercial value. *Regulated* exotic species may be possessed, subject to certain conditions, but may not be introduced into a free-living state except as allowed by Minnesota Rules.
- 3. Unlisted exotic species are species that have not been evaluated or listed as one of the other categories of exotic species and are subject to review by the DNR before it may be lawfully introduced into a free-living state (M.S. 84D.04 in Appendix A).
- 4. Exotic species listed as *unregulated* are presumed to be minimal threat to the states resources, or are so widely distributed that regulating them would be pointless. Therefore, species in that category will not be subject to regulation under the harmful exotic species statutes.

When classifying an exotic species into the above categories state statutes directs the DNR to consider: the likelihood of introduction if the species is allowed to enter or exist in the state; the likelihood that the species would naturalize in the state; the potential adverse impacts of the species on native species, outdoor recreation, and other uses of natural resources in the state; the ability to control the spread of the species once it is introduced in the state. The general criteria the DNR will use when classifying exotic species are shown in Table 3. The final classification will reflect a combination of the criteria in each category.

Many, if not most, exotic species will be classified as "unregulated species," primarily because they would not survive if introduced into Minnesota ecosystems or because they have beneficial value. For example, it is presumed that most tropical fish would be unable to survive winter in Minnesota. To date, efforts by the Exotics Species Program have focused on classifying exotics species that would be most likely to survive in Minnesota and cause problems in the state. Species such as these are subject to the maximum level of regulation in an attempt to prevent their introduction into Minnesota ecosystems. Experience in Minnesota and elsewhere has shown that prevention of introductions is usually far more effective than management of an introduced exotic that becomes established.

The Exotic Species Program recently proposed amendments to Minnesota Rules 6216 that govern harmful exotic species (see Progress in Regulations below). These amendments will classify numerous exotic species in the classes named above. Exotic Species Program staff considered assigning additional species to the unregulated class, but decided against such a designation. The basis for this decision was that the available information was inadequate to enable staff to determine with confidence that a certain exotic species would pose minimal risk to the natural resources of the state. In an effort to gather better information to classify species of exotic aquatic plants, the Exotic Species Program provided support to the Aquatic Plant Control Research Program, Army Corps of Engineers, to conduct a review of available information on a number of exotic aquatic plants. It is important to note that classifications of exotic species may change as more is learned about individual species.

#### 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, 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.

TF 5

# Table 3. Explanation of regulations and criteria associated with Minnesota's exotics species classifications.

		Criteria for Classification*					Regula	ations		
Regulatory Classification	Species Examples	Likelihood of Introduction	Likelihood of naturalization	Magnitude of potential adverse effects	Ability to control	Other criteria	Transportation	Importation, sale, possession, propagation	Introduction	Responses to escapes
Prohibited	Eurasian Watermilfoil	Likely	Most likely	high to medium	moderate to low		Prohibited - except for disposal as part of control activities or when tranporting to DNR to report the presence of a species.	Prohibited - except under permit for disposal, control, research, or education.	Prohibited	For escaped animals, the individual must notify DNR within 48 hours and is responsible for cost of capture.
Regulated	Cabomba	Likely	Possible	medium to low	moderate to low	Commercial use	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	Elephant	Unknown	Unknown	Unknown	Unknown	Not established	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	A. Tropical fish B. Ringnecked pheasant C. Starling		A. Unlikely, or	B. Minimal, or	C. Too wide- spread to manage		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.
Species not subject to harmful exotic species regulations	A. Red deer, llamas, ostrich. B. Cattle, cats					A. Species exempt by statute: birds or mammals defined as livestock B. Domestic animals.	Not prohibited	Not prohibited	Not prohibited	No requirements.

\* Combinations of all criteria will be used to classify each species.

# Progress in Regulations - 1997

#### State Statutes

No changes in state statutes regarding harmful exotic species were sought or made in 1997.

#### Minnesota Rules

The DNR drafted proposed rules and published a notice of intent to adopt in the state register on October 27, 1997.

The Minnesota Legislature gave the Department of Natural Resources the responsibility and authority to adopt rules regarding exotic species and infested waters. The state is proposing to amend its current rules pertaining to harmful exotic species because the current rules are not sufficiently comprehensive. An increasing number of harmful exotic species are being introduced and dispersed in Minnesota and these species present current and potential threats to the state's natural resources and their use. More comprehensive rules are needed to address the variety of sources and pathways that can spread harmful exotic species. The DNR believes that ecosystems, native species, industry, tourism, and recreation will benefit from the adoption and enforcement of these rules.

The proposed revisions include:

- designation of infested waters, prohibited exotic species, regulated exotic species, and unregulated exotic species;
- the conditions and procedures for the issuance of permits for the propagation, possession, importation, purchase, or transport of a prohibited exotic species for the purposes of disposal, control, research or education;
- the conditions and procedures for the issuance of permits for the introduction of a regulated exotic species into a free-living state;
- a process for the commissioner's review of introductions of unlisted exotic species and designation to appropriate classification;
- 5) prohibit harvest of wild animals from infested waters for aquatic farm purposes; and
- the notification requirements for persons that allow or cause the unauthorized introduction of an animal that is prohibited, regulated, or unlisted exotic species.

Copies of the proposed rule and the statement of need and reasonableness are available from the Exotic Species Program, 500 Lafayette Rd, St. Paul, MN 55155-4020, 612-297-1464.

# 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. A 1996 survey of boaters using public accesses (MDNR 1996) supports this view. Most survey respondents indicated that laws would be effective in getting them to change their behavior and take additional steps to prevent further spread of exotics (67.5% indicated that laws would be "very effective" or "moderately effective"). In contrast, only 11.5% of surveyed boaters indicated laws would not be effective.

# **Future Needs For Regulations**

#### **Federal**

 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.

#### <u>State</u>

- 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.
- Obtain information to improve our ability to evaluate the likelihood of introduction, the likelihood of naturalization, the magnitude of potential adverse impacts, and the ability to eradicate or control various exotics species.

## **References Cited**

Exotic Species Program. 1996. Ecologically Harmful Exotic Aquatic Plant and Wild Animal Species in Minnesota. Annual Report for 1996. Minnesota Department of Natural Resources, St. Paul, MN.

Minnesota Department of Natural Resources. December 1996. 1996 Metro Boating Survey. An unpublished survey and report prepared for Minnesota Department of Natural Resources by Thom Tech Design Company.

# Expenditures

# Appropriations and activities

Exotic Species Program funding is derived primarily 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 \$1,100,000 annually and additional program funding comes from other 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). 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 1990 through 1998 (FY90 - FY98) is provided in Table 2 along with projections for FY99.

This report covers activities in calendar year 1997, which includes half of two state fiscal years, (FY97 and FY98) which begin on July 1 and end on June 30. To provide a comprehensive review of expenditures that occurred during 1997, we report both expenditures that were incurred in FY97 and those planned in FY98 (Table 4). The following assumptions and definitions were used to report on expenditures.

#### Administration

Administrative expenditures include clerical staff, telephones, general postage, office rent, and staff time spent on administrative activities. Administrative staff time includes training or professional development activities, assistance with other division or department projects, and personal leave (holiday, sick, and vacation time).

## Program planning/direction

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

*State program coordination*: preparation of state plans and reports, hearings, promulgation of rules, as well as the general oversight and planning of program activities. Expenditures represent staff time spent on these activities and costs associated with rule development.

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, provide relevant testimony for federal legislative development, and participate in regional meetings on exotic species issues.

*Equipment and Chemistry Services:* purchases and repair of boats, trailers, computers, and similar items 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 billboard rental to increase public awareness of exotic species. The cost of developing and producing pamphlets, public service announcements, videos, and similar material is included.

#### Control, Management, and Inventory

Expenditures in this category include staff time, in-state travel expenses, fleet charges, commercial applicator contracts, and supplies to prepare for, conduct, supervise, and evaluate control activities.

#### <u>Research</u>

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 that were established to develop new or improve existing control methods.

#### Fiscal Year 1997 (FY97)

Expenditures on exotic species activities during FY97 (July 1, 1996 - June 30, 1997) totaled \$1,439,000 and are shown in Table 4. Expenditures from watercraft license surcharge revenues in the Water Recreation Account, the primary source of funding, are listed along with spending from other accounts. The Exotics Species Program has related accounts that are also used to support program activities. For examples, revenues from the sale of public awareness material are deposited in a Publications Account and can be used to fund future public awareness efforts. Likewise, reimbursement received from local groups for DNR-funded cooperative control efforts are deposited in a Coop Account and used to find similar control programs. Expenditures from other Department accounts, (e.g., the Game and Fish Account and the General Fund) reflect staff in the Section of Ecological Services who are not hired as exotic species specialists but who ocassionally work on exotic species issues as part of their department positions. This summary does 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, are also shown.

The \$1,203,000 of Water Recreation Account expenditures by the Exotic Species Program during FY97 was more than the \$1,109,000 appropriated (Table 2). The higher expenditures in FY97 reflect the carryover of projects and FY96 funds into the second year of the biennium. Funds appropriated from the Water Recreation Account but not spent during the FY96/97 biennium (\$11,970) were returned to the Water Recreation Account.

#### Harmful Exotic Species in Minnesota

FY97 expenditures by major category differed from those reported in FY96 (Table 1). Year-to-year variations in expenditures are expected and reflect changes in program needs. For example, new televisions spots to aid in public awareness efforts were developed and broadcast in FY97. This expenditure contributed to the sharp increase in "public awareness" spending in FY97. Inspections/Enforcement are another category where program expenses are increasing. This increase reflects the Department's belief that preventing the introduction of new exotic species to Minnesota and containing the spread of species already in Minnesota are two of the most effective strategies available. More money was spent on efforts to inspect watercraft that leave "infested" waters and to enforce Minnesota's exotic laws. Research funding also increased between FY96 and FY97. Additional funding was directed at projects to measure the impact of the expanding zebra mussel population in Lake Pepin and to understand how Eurasian watermilfoil is impacting native plant communities. The following chapters describe in detail the activities that were conducted using FY97 funds.

#### Fiscal Year 1998 (FY98)

Since this report was completed in the middle of FY98, planned expenditures for this year are also reported. Anticipated program spending by category is shown in Tables 1 and 4. Appropriations (\$1,109,000) from the Water Recreation Account to the Exotic Species Program in FY98 were slightly higher than in FY97 (Table 2). The following chapters describe in detail the activities that have been and will be conducted using FY98 funds.

# Table 2. Appropriations (in thousands) for DNR Exotic Species Programs, fiscal years '90-'99.

Funding Source	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99
Water Recreation Account (WRA)	250 (\$1 watercraft surcharge)	250 (\$1 watercraft surcharge)	416 (\$2 watercraft surcharge)	657 (\$3 watercraft surcharge)	1,011 (\$5 watercraft surcharge)	1,112	1,136	1,087	1,109	1,109
Legislative Commission on Minnesota Resources recommendations:										
1) Purple Loosestrife	100 <sup>1</sup>	1001			75²	75²	75²	75²	37.5 <sup>2</sup> (\$37,500 match from WRA funds)	37.5 <sup>2</sup> (\$37,500 match from WRA funds)
2) Eurasian watermilfoil				160 <sup>1</sup>	125 <sup>2</sup> (requires \$100,000 non-state match)	125²	75²	75²	37.5 <sup>2</sup> (\$37,500 match from WRA funds)	37.5 <sup>2</sup> (\$37,500 match from WRA funds)
3) Ballast Water Control									125²	125²
Total	350	350	416	817	1,211	1,312	1,286	1,237	1,309	1,309

Table 3. Exotic species related expenditures in fiscal year 1997 (FY96) and projected expenditures in FY97 (in thousands of dollars)

	Water Recreation Account		Other Acco	Other Exotic Accounts		Other Dept. Accounts		Env. And Natural Resources Trust Fund	
	FY97	FY98	FY97	FY98	FY97	FY98	FY97	FY98	
Administrative/Operations Rent Phones / postage / Misc. Staff Administrative Activities Staff Personal leave (Vacation, Holiday, Sick) Clerical	21 7 10 55 30	20 11 10 36 39	8						
Program Planning/Direction State program coordination Support regional / federal activities Equipment	105 21 14	74 10 10				10			
Public Awareness Communications plan, workshops, presentations, radio spots, billboards	216	50			4	1			
Control, Management, and Inventory Eurasian watermilfoil Purple loosestrife Zebra mussel Curly-leaf pondweed	100 78 13 0	106 68 19 8	59	50 5	1	1			
Inspections/Containment MCC - access inspections Enforcement - road and access checks	319 78	303 90							
Research Purple loosestrife Eurasian watermilfoil Flowering rush Zebra mussels Curly-leaf pondweed Ballast Water Management Prevention	41 69 10 16	68 64 8 4 43 25		•	0 2 0 20	1 1 0 10	75 75	37 38 125	
Total	1,203	1,066	59	55	27	24	150	200	

# Education / Public Awareness Activities

# 1997 Highlights

- The DNR developed two new 30 second television spots dealing with zebra mussels and Eurasian watermilfoil. These spots used humor and animation to communicate messages to boaters about slowing the spread of these exotics. The spots were placed on all in-state television stations as paid advertising and/or public service announcements.
- The Department of Natural Resource's (DNR) "Aquatic Exotics" video, aimed at school age children, was distributed to elementary schools throughout the state.
- The Exotic Species Program helped fund a DNR boater survey (MDNR 1996). Information from the survey was used to determine effective methods of communicating with boaters about harmful exotic species.
- The DNR and Minnesota Sea Grant conducted cooperative educational activities to maintain high levels of public awareness about exotics and exotic issues.
- Four additional Exotic Species Traveling Trunks were purchased for use by DNR staff and for loan to schools and nature centers.
- The exotic species signs ("Exotic Species Alert" and "Help Prevent the Spread") placed at public and private boat accesses were revised, produced, and distributed for posting throughout the state.

# Background

The DNR continues to make substantial efforts to increase and maintain public awareness and understanding about harmful exotic species. Over two hundred thousand dollars were spent on these activities in FY97 (see Table 4). Communication efforts are built around the theme of "Clean boats, Clean waters". This theme captures the desired outcome (clean waters) and the proposed strategy (clean boats) to achieve that result.

Public awareness efforts in Minnesota are designed to:

- 1) make the public aware of the negative environmental impacts caused by some exotics;
- 2) help the public identify specific exotic species;
- 3) outline actions that boaters, anglers, seaplane pilots, waterfowl hunters, and others must do to reduce the spread of these exotics; and
- 4) summarize research and control approaches.

## Progress in public awareness - 1997

Key components of the Exotic Species Program's 1997 communication efforts included:

- Developed and began posting new exotic species awareness signs at public water accesses;
- Put information about harmful exotic species in the fishing and boating regulations;
- Ran radio and television advertisements during Fishing Opener, Memorial Day, Fourth of July, and Labor Day weekends;
- · Posted billboards on key travel routes near zebra mussel infested waters;
- · Staffed displays at various sport shows and the Minnesota State Fair;
- · Prepared and distributed press releases throughout the year;
- Prepared and distributed radio and television public service announcements to all Minnesota stations; and
- Attended meetings of lake associations and other groups concerned about exotic species.

Television was used extensively for the first time in 1997. Utilizing the newly created TV spots, paid placement supplemented the use of public service time from nearly all local broadcast stations.

Radio was used in 1997 to reach boaters and anglers in several ways. Paid advertising was used on larger Twin Cities stations including WCCO-AM, KQRS-FM, KFAN-AM, WKLX-FM, and KTCZ-FM. Ads were also run on the Minnesota News Network (42 stations), and the Minnesota Bound (40 stations) radio network These stations were selected for their listener profile which matched the desired demographics of boat owners. Radio ads were run during high activity weekends including the fishing opener, Memorial Day, Fourth of July, and Labor Day.

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.

Six billboards were posted on major roadways along the Mississippi River in southeastern Minnesota, highlighting the dangers of zebra mussels. The billboards displayed the message, "Don't Spread Zebra Mussels".

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. Information and exotics publications were also distributed at the Minneapolis Boat Show.

DNR Watercraft inspectors made nearly 44,000 personal contacts with boaters launching their boats at public accesses (see Watercraft Inspections Section) providing them with information and tips on ways to reduce the spread of exotic species.

Presentations were given to a variety of audiences, including: university classes, high schools, teacher workshops, the 1997 Fishing Roundtable, 7th International Zebra Mussel and Other Aquatic Nuisance Species Conference (New Orleans, LA), Minnesota Turf and Grounds Foundation Conference, North American Lake Management Society's 16th International Symposium (Bloomington, MN), Midwest Fish and Wildlife Conference (Milwaukee, WI), Midwest Aquatic Plant Management Society Conference (Madison, WI), 2nd Northeast Conference on Nonindigenous Aquatic Species (Burlington, VT), Western Regional Panel on Aquatic Nuisance Species (Portland, OR) [Presented by Doug Jensen, MN Sea Grant], the Great Lakes Panel on Aquatic Nuisance Species (Ann Arbor, MI) and several lake associations.

#### Effectiveness of public awareness efforts

The DNR and Minnesota Sea Grant have conducted 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. Results of the survey suggest that Minnesota's exotic species education and information programs are having an impact on boater awareness and behavior toward the spread of exotic species. According to the survey reports,

"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). The survey indicates that awareness about exotics has continued to increase. Similar results were reported by watercraft inspectors in 1997 (see Watercraft Inspections) who found higher levels of exotic awareness throughout Minnesota. Information from that survey has been and will continue to be used to guide development of annual public awareness efforts and maximize their effectiveness.

## Participation of others in public awareness activities

Other agencies have been cooperatively involved with public awareness activities in the state for several years. Our most widely used public awareness pamphlet, *A Field Guide to Aquatic Exotic Plants and Animals* continues to be distributed by the National Park Service, MN Sea Grant, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers, as well as numerous Midwestern states and Provinces.

#### Minnesota Sea Grant

The University of Minnesota Sea Grant Exotic Species Information Center (hereafter referred to as the Center) works on collaborative initiatives and projects with the DNR's Exotic Species Program. Established in 1991, the Center serves as a primary contact for public information on invasive aquatic nuisance species (ANS) and educates water users on how to prevent and slow the spread of ANS to our water resources. Activities of the Center are funded through competitive grants from the National Sea Grant College Program, the Great Lakes Sea Grant Network, and other grant organizations.

During 1997, the Center developed and disseminated exotic species education and technology to DNR staff and other state agencies, the University of Minnesota Extension Service (UMES), other cooperative extension staff, several ANS task forces, electric power companies, heavy industries, municipalities, the aquaculture industry, and the boating/angling public.

#### 1997 Highlights of Minnsota Sea Grant's education activities in Minnesota.

- Gave the opening presentation at the "1997 DNR Fisheries Round Table" meeting, and another at a Minnesota Conservation Corps training meeting in June.
- As a collaborative effort with the DNR, the "Exotic Aquatics" youth education traveling trunk project was expanded. In addition to the 15 trunks created in 1996 and available from 11 lending centers, a production run of five new trunks was facilitated by Sea Grant. These were distributed to regional lending centers. Trunks available from Sea Grant have been used by over 90 teachers, who have taught 6,000 students (primarily grades 4-7).
- Over 400 leader training packages, titled *"Mussel Menace! Zebra Mussels and You"* were distributed in Minnesota and nationwide.
- Sea Grant continues to provide technical support for the Great Lakes Sea Grant Network sgnis web site (http://www.ansc.purdue.edu/sgnis/). The site contains a comprehensive collection of research publications and education materials on zebra mussels and other ANS produced by Sea Grant programs across the country.
- Minnesota helped sponsor the first "International Symposium on Biology and Management of Ruffe".

- The ruffe fact sheet was revised and published through Ohio Sea Grant's connection with Brunswick Marine.
- A Ruffe Symposium Abstract booklet, and radio public service announcements (PSAs) continue to be distributed across Minnesota and the Great Lakes region.
- The *"Minnesota Volunteer Zebra Mussel Detection Program"* was established through the University of Minnesota Extension Service's Shoreland Volunteer Program. Currently, the zebra mussel program has 32 volunteers.
- The Center continued to present the results of the *1994 "Three-State Exotic Species Boater Survey"* and other boater surveys through presentations in Minnesota, and at regional and national meetings and conferences.
- Placed ANS public service announcements in the Duluth News-Tribune and in Duluth-area movie theaters.
- Hosted ANS information booths at 15 events across Minnesota

# Future needs for public awareness

- Continue to prioritize public awareness of zebra mussels in southeast Minnesota near the Mississippi and St. Croix rivers.
- Develop public awareness efforts cooperatively with specific groups that have not received significant attention in previous years, such as the aquaculture industry, live bait dealers, waterfowl hunters, water garden and horticulture industry, and aquarium trade.
- Enhance interagency communication on the status and progress of exotic species management efforts for resource professionals.
- Seek increased funding for public awareness activities including outreach to lake communities and roving watercraft inspection crews at non-infested waters.
- Increase public awareness efforts with lake communities outside the Metro Area.

## **References Cited**

Minnesota Sea Grant. 1994. Exotic Species and Freshwater Boating Survey. University of Minnesota, Duluth, Minnesota.

Minnesota Department of Natural Resources. December 1996. 1996 Metro Boating Survey. An unpublished survey and report prepared for Minnesota Department of Natural Resources by Thom Tech Design Company.

# Watercraft Inspections

# **1997 Highlights**

- During the 1997 boating season, 43,723 boater contacts were made to educate the public about harmful aquatic exotic species.
- Watercraft inspections were conducted on the St. Croix river to raise awareness
  of the threats of zebra mussels, after the discovery of mussels on a sampling
  plate.
- Public awareness of exotic laws increased in all areas of the state according to survey results.

## 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) calling for 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.

Watercraft Inspectors, employed through the DNR's Minnesota Conservation Corps, conduct inspections at public water access sites on infested waters. (See Appendix C for list of infested waters.) 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. Twenty thousand hours of inspection activities are targeted at high use accesses and during high use periods.

## Progress in Watercraft Inspections - 1997

Inspections begin on May 1 and end on October 15 as prescribed in state statute. In 1997, within this 24 week period, 20,678 inspection hours were logged and 43,723 watercraft/trailer units were inspected.

Accomplishments and responsibilities of MCC Watercraft Inspectors:

- Assisted the Division of Enforcement with seven road checks,
- Answered questions at the Exotic Species display during each day of the 1997 Minnesota State Fair,
- Conducted inspections at 55 different fishing tournaments throughout the state,
- Conducted inspections at three sailing regattas and two water ski tournaments in the metro area,
- Conducted inspections for waterfowl hunters during the first two weekends of the waterfowl hunting season,
- Distributed Exotic Alert Tags on 5,782 vehicles with trailers at access points on infested waters, and
- Cleared aquatic plant fragments from public water accesses as encouraged in M.S. 84D.02, subd. 3, (8) (Appendix A). Removing 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.

A total of 29 inspectors worked through the summer of 1997 providing information to the public on watercraft inspections and exotic species (Table 5 and Figure 1). Inspection effort was distributed across the state in rough proportion to the number of public water accesses (PWA) on infested water bodies. The actual distribution of time for each region reflects both the number of PWAs on infested water bodies and the level of public use at those accesses. For example, as shown in Table 5, the metro area received 64% of the hours but has only 45% of the PWAs. However, the metro area includes some of the most heavily used recreation lakes in the state, thus requiring the additional inspection time.

The number of inspections conducted per day varies due to weather conditions and boater activity. Overall the number of inspections conducted in 1996 and 1997 were very similar (Table 6). The DNR believes that focusing inspection activities during typical high use periods, such as holidays and weekends, contributes to maintaining a large number of boater contacts.

Table	5.	Number o	f public	water	accesses	on	infested	waters	and	inspection
hours	by	region for	1997.					34		

Area	Number of PW (% of total PW	/A's A's)	Hours Accomplished (% of total hours)		
Region I - Northwest	3	(2%)	207	(1%)	
Region II - Duluth/Superior	24	(15%)	828	(4%)	
Region III - Central	21	(13%)	3,740	(18%)	
Region V - Mississippi River	38	(25%)	2,688	(13%)	
Region VI - Metro	71	(45%)	13,215	(64%)	
State-wide Total	157	(100%)	20,678 (	(100%)	



\* Roving inspector spent time in Regions I & III.

Figure 1. 1997 MCC Watercraft Inspections at Public Water Accesses on Infested Waters.

Area	Number of V Inspec	Vatercraft cted	Percentage of All Inspections		
	1996	1997	1996	1997	
Region I - Northwest	21	39	<1%	<1%	
Region II - Duluth/Superior	883	499	2%	1%	
Region III - Central	4,770	4,207	11%	10%	
Region V - Mississippi River	5,070	4,890	12%	11%	
Region VI - Metro	31,843	34,088	75%	78%	
State-wide Total	42,587	43,723	100%	100%	

Table 6. Number of watercraft inspections at infested waters conducted by MCC Watercraft Inspectors in 1996 and 1997.

## Effectiveness

The goal of the 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 carrying vegetation as they enter a water body.

## Public Awareness

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 is very high among Minnesota boaters. State-wide awareness increased from 1996 to 1997 (Table 7). This increase was consistent throughout the state and substantial in the northern parts of the state. The exotic species program continues to use a variety of media (print, radio, and TV) to keep exotic species awareness high, (see Education/Public Awareness Activities).

## Transportation of Vegetation

The percentage of boats/trailers carrying vegetation as they <u>exited</u> an infested water body varied widely by county (Table 8). 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 recreational boating traffic. The results

#### Harmful Exotic Species in Minnesota

summarized in Table 8 show that an average of 30% of the boats exiting infested waters were found with vegetation. This rate demonstrates the clear risk that boaters will transport aquatic vegetation (and exotics) from lake to lake if boats are not properly inspected and cleaned. The percentage of boats and trailers carrying vegetation as they attempt to enter infested waters is 4%. This is a good indication that the vast majority of boaters are inspecting and cleaning their boats and trailers.

The above information was collected from public water accesses on waters infested with Eurasian watermilfoil, zebra mussels, or spiny waterflea. These figures do not represent boaters throughout the state. During the 1997 exotic species roadchecks, the violation rate for transportation of vegetation was 25%. The road checks are more representive of the state as a whole. Enforcement of exotic species law continues in a effort to reduce the transportation of vegetation (see Enforcement section).

Counties with Exotic Species Infestations	Percent of Indi answered "yes' whether they w Exotic Spec	viduals who ' when asked ere aware of ies Laws	Number of In were asked were awar Specie	dividuals who whether they re of Exotic es Laws
	1996	1997	1996	1997
Region I -	57%	95%	21	39
Northwest				
Douglas				
Pope				( <u>*</u> )
Region II -	64%	93%	883	499
Duluth/Superior			(a)	
Carlton			1	
Cook				
Lake				
St. Louis				
Region III -	86%	98%	4,770	4,207
Central				
Chisago			8	
Crow Wing				
Kanabec				
Stearns				
lodd				
VVright	000/	0.00/	5.070	1.000
Region V -	82%	93%	5,070	4,890
Diver	8		12/	
Coodbuo				
Houston				
Mohasha				
Winono				
Pogion VI	85%	08%	31.8/3	34 088
Metro	0070	50 /0	51,045	54,000
Anoka				2
Canver				
Dakota				
Hennenin				
Ramsey				
Scott				
Washington				
State-wide	84%	97%	42 587	43 723
Total	0.70	0.70	12,001	10,120

Table 7. Awareness of exotic species laws in Minnesota in 1996 and 1997.

Table 8. Vegetation found on boats and trailers exiting infested waters in 1997 (these amounts are determined at the access before watercraft have been cleaned).

Counties	Percent of Watercraft & Trailers exiting with Vegetation (%)	Number of Watercraft & Trailers Exiting
Region I - Northwest		
Douglas	1	10
Роре	0	3
Region II -		
Duluth/Superior		
Carlton	0	. 6
Lake	0	2
St. Louis	6	283
<b>Region III - Central</b>		
Chisago	50	719
Crow Wing	28	106
Kanabec	7	97
Stearns	49	322
Wright	30	664
Region V - Mississippi		
River		
Goodhue	6	298
Houston	12	265
Wabasha	5	682
Winona	11	1,460
Region VI - Metro		
Anoka	51	134
Carver	27	1,009
Dakota	16	1,644
Hennepin	41	8,388
Ramsey	33	3,793
Scott	19	1,362
Washington	5	842
State Total	30%	22,089

#### St. Croix River

Following the discovery of small zebra mussels on a sampling plate in the St. Croix River, watercraft inspectors conducted inspections at several public water accesses along the River (see: Management of Zebra Mussels). Increased public awareness and education was necessary due to the increased risk of spreading zebra mussels from the St. Croix River. Watercraft inspectors spent 188 hours on the St. Croix River educating boaters on steps to take to prevent the spread of zebra mussels.
#### Decal Program for trailered watercraft

Over the 1994 boating season, several boaters expressed frustration over being approached by inspectors several times each week throughout the summer. To respond to boater's 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 winch post of their trailer. This allows inspectors to identify the boaters who inspectors have already spoken with during the summer. Return boaters with a decal are given a brief reminder to drain water and remove vegetation from their boats. The decals have been used for three years now and have been well received by the public. The 30,000+ decals distributed during the 1997 boating season also remind boaters to inspect their boat when inspectors are not present.



#### Personal Watercraft

Personal Watercraft (jet skies, water scooters) present a challenge for watercraft inspection efforts. They are the fastest growing segment of the watercraft industry and account for nearly one third of all new boat sales (MDNR 1995); These machines rely on the intake and expulsion of water to propel them. Along with water, they may take in vegetation. The enclosed pump housing of a personal watercraft provides an ideal dark and damp environment to give vegetation a greater chance of surviving until entering another body of water. Personal watercraft owners must take special precautions when inspecting and cleaning their watercraft. To help educate personal watercraft users, a brochure was developed providing information on cleaning and inspection of a personal watercraft users in 1997, a practice the DNR plans to continue. (See Appendix D for brochure.)

### Future needs/recommendations for watercraft inspections:

- Conduct 20,000 hours of inspections during the 1998 boating season.
- Develop a list of uninfested waters that may be at highest risk of infestation based on boater traffic from infested waters. Pending availability of additional funding, schedule access inspections at high risk lakes.
- Conduct additional inspections along the St. Croix River to increase boater awareness and cooperation on preventing the spread of zebra mussels.

### **References Cited**

Minnesota Department of Natural Resources. 1995. Personal Watercraft Laws for Minnesota.

# Enforcement

# **1997 Highlights**

- Seven road checks [up from three in 1996] trailered boats were held. Along with day-to-day enforcement action, roadchecks continue to be used to increase public awareness of exotic species laws and to gather information on violation rates of the new law prohibiting transportation of aquatic vegetation. Aquatic vegetation was found in or on an average of 25% of all watercraft inspected.
- Conservation Officers spent 1000 hours enforcing the exotic species laws and rules. One third of this activity was at infested water accesses.
- Civil citations or warnings were issued to 190 individuals for violations.

#### 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 have been 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). The new law went into effect for the 1996 boating season. This action removed the major enforcement barrier (plant identification difficulties) to effective enforcement of laws banning the transportation of harmful exotic plants (like milfoil) and reduced the chances of zebra mussels being inadvertently spread along with aquatic vegetation. During 1996, road checks were used primarily as an educational tool.

A permanent exotics coordinator position (50% time) was established in the Division of Enforcement in November, 1996. This position was established to increase the quantity and efficiency of exotics enforcement through better communication, coordination, training, and timing of enforcement activities.

#### Progress in Enforcement - 1997

Passage of the 1996 law prohibiting transport of aquatic plants enabled Enforcement to increase efforts during the 1997 boating and waterfowl seasons. The number of road checks was increased from three in 1996 to seven in 1997. New roadchecks conducted in southeastern, southwestern, and northeastern Minnesota raised the visibility of enforcement efforts (see Figure 2). The number of warnings, both verbal and written, increased in 1997 as did the number of citations. A review of the 1997





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road check results suggests that the percentage of watercraft with aquatic vegetation was higher in the Metro Area than in greater Minnesota (see Table 9), the highest rates were observed in Chisago and Hennepin Counties. It is the Department's goal to lower the vegetation transportation rates in the Metro area and throughout greater Minnesota as well. To accomplish this goal, road checks may need to continue to change from an educational activity to one of increased enforcement. In 1997, many more officers became actively involved in exotics enforcement because of increased personnel needs at these additional road checks.

Road checks can be a very effective method of drawing public attention to an issue. Never-the-less, based on recent court decisions, the violation rates observed at the road checks needs to be high enough to justify the public inconvenience and expense of the checks. During the 1996 road checks the Department gathered information on the violation rates for transporting aquatic vegetation. The rates ranged from 8% to 54%. During the 1997 road checks the same information was gathered and the rates ranged from 17% to 44% (mean of 25%). It is important to note that often only a small amount of aquatic vegetation was found in the watercraft or on the trailer. This information will be evaluated and used to justify proceeding with future road checks.

The road check at Orono exhibited the highest percentage of watercraft carrying vegetation (Table 9) and (Figure 2). Over half the vegetation was found inside the boats. The Anoka road check continued to have the highest volume of traffic. Chisago Co. had the second largest volume of traffic. The Hubbard Co. (Park Rapids) road check was held despite cold temperatures and continuous rain. These latter three road checks have been the longest running and will be continued to track boater compliance with exotic species laws.

# Table 9. Summary of the numbers of trailered watercraft inspected by the DNR during the educational road checks conducted in 1997.

Location	Number of watercraft inspected	Number of watercraft with aquatic plants	Number of verbal warnings	Number of written warnings	Number of written citations
Hwy. 8, Chisago Co.	169	62(37%)	55	7	0
U.S. Rt. 10, Anoka Co.	230	41(18%)	38	1	2
Hwy. 71, Hubbard Co.	83	18(22%)	18	0	0
Willmar U.S. 71	47	11(23%)	5	1	0
Grand Rapids Hwy 6	23	4(17%)	2	1	0
Lake City U.S. 61	50	9(18%)	9	3	0
Orono Co. Road 51	36	16(44%)	8	4	0
TOTALS	638	161(25%)	135	17	2

# Public water access and other exotics enforcement activities

#### **Mississippi River**

Conservation Officers conducted other 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 1997 officers spent about 120 hours of enforcement time over the summer along the Mississippi River including accesses near Hastings, Red Wing, Lake City, Kellog, Winona, and La Cresent. Hundreds of contacts were made with some verbal warnings issued for failure to drain water.

#### 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 all vegetation from their boats, decoys, and anchors before leaving the boat access. There is an exception for the transport of shooting blinds, 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 at several lakes frequented by waterfowl hunters.

#### **Fishing Tournaments**

Conservation Officers participated in public education and enforcement efforts at Lake Minnetonka public water accesses during several fishing tournaments. This year no serious violations were observed and cooperation with the tournament groups was excellent. During the actual tournament there was a high level of compliance among all tournament participants. No citations were issued to tournament anglers.

#### St. Croix River

Divers continued to be employed for underwater inspection of both commercial and recreational vessels in the St. Croix River and, in 1997, Conservation Officers ordered the removal and cleaning of six boats found with attached zebra mussels. The discovery of zebra mussels on a sampler collected above Taylors Falls cast doubt on the future of these efforts. However, intensive monitoring did not confirm that zebra mussels have colonized the river and enforcement actions will continue in 1998. Conservation Officers also spent about 25 hours working at accesses along the St. Croix and on the river.

# 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. The number of hours of enforcement effort may have to increase to achieve this goal. The DNR's ability to reduce the transportation of aquatic vegetation on public roads will be evaluated after several more seasons under the new statute structure.

# Future plans and needs regarding enforcement:

- Road checks will continue to be conducted next summer. Our goal is to conduct 7-10 major road checks between June and August. The three traditional road checks (Anoka, Hubbard, & Chisago Counties) will continue to be used to track boater compliance. Timing and locations of some of the other road checks may be altered.
- Focus additional enforcement activity near lakes with Eurasian watermilfoil infestations.
- Exotics information will continue to be included in "Resort Packets" that Conservation Officers deliver to Minnesota resorts.
- Conduct inspections, public education, and enforcement efforts at public accesses (including fishing tournaments, sailing regattas, and other special events) throughout the summer.
- Survey the minnow industry statewide, in coordination with the Section of Fisheries, to determine the abundance of exotic fish species in commercially available bait. A similar survey of the aquatic nursery industry needs to be implemented.

# Management of Eurasian Watermilfoil

# **1997 Highlights**

- Eurasian watermilfoil was discovered in five new Minnesota lakes during 1997. There now are 84 Minnesota lakes, rivers, and streams with milfoil.
- The DNR Exotic Species and Aquatic Plant Management programs worked with cooperators on 39 Minnesota lakes during 1997 to manage Eurasian watermilfoil.
- 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 plant that was inadvertently introduced to Minnesota. Milfoil was first discovered in Lake Minnetonka during the fall of 1987. The 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 1997 to manage this exotic plant and limit its spread in Minnesota.

# Progress in management of Eurasian watermilfoil

#### Spread of Eurasian watermilfoil in Minnesota

Outside the Twin Cities area, Eurasian watermilfoil was documented in only one new lake, Ruth Lake, Crow Wing County, during 1997 (Figure 3). In the Twin Cities area, the presence of Eurasian watermilfoil in four lakes was confirmed by the Exotic Species Program reports during 1997. The total of five lakes discovered to have milfoil in 1997 was within the range discovered annually since 1993, but still lower than the number found in any of the four years from 1989 to 1992 (Table 10). Eurasian watermilfoil is now known to occur in 84 bodies of water in Minnesota (Table 10 and Figure 3).

There may well be additional Minnesota lakes with milfoil that have not yet been discovered. The participation of the public in reporting new occurrences of milfoil remains critical. As in previous years, most reports received in 1997 of suspected occurrences of milfoil turned out to be another plant species. The Exotic Species Program continues to investigate likely reports as soon as possible because early detection and treatment of milfoil is the key to limiting the spread of milfoil to other bodies of water.

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

Efforts to limit the spread of milfoil in Minnesota appear to be succeeding. The total of five lakes discovered to have milfoil in 1997 continues the pattern observed since 1993 of discovery of a low number of new infestations annually. We attribute the apparent slow rate of spread to efforts to educate users of Minnesota's lakes and rivers about milfoil, along with other exotics, and actions that people can take to prevent the spread

of exotics (see sections on Regulations, Public Awareness, Watercraft Inspections, and Enforcement).

# Table 10. Numbers of lakes or rivers and creeks in which Eurasian watermilfoil was discovered in Minnesota.

Year	Number of Lakes in which milfoil was discovered	Number of Creeks and Rivers in which milfoil was discovered	Cumulative number of water bodies of milfoil
1987	. 1	0 .	1
1988	6	0	7
1989	14	1	22
1990	. 11	1	34
1991	14	0	48
1992	10	2	60
1993	5	0	65
1994	2	0	67
1995	7	0	74
1996	5	0	79
1997	5	0	84



Figure 3. Distribution in Minnesota of water bodies infested with Eurasian watermilfoil in 1997.

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# 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 is begun by classification of water-bodies known to have the exotic. In the spring of 1997, the Exotic Species Program classified the 79 bodies of water known to have milfoil on the basis of surveys done in 1996. Sixty-two lakes were determined to be eligible for management with State funds (Table 11). Another 13 lakes were determined to be ineligible for management with State funds because they do not have public water accesses. Lastly, four bodies of water with milfoil are flowing waters (water courses) where management of this exotic is not usually attempted. The five lakes that were discovered during 1997 to have milfoil included one designated for high-intensity management, three designated for maintenance management, and one determined to be ineligible for management with state funds.

Table 11.	Classification	of bodies	of water in	Minnesota	with	Eurasian	watermilfoil	during
1997.								

Classification	Spring	New in Summer	Fall
Eligible for management with State funds			
High-intensity management	13	1	14
Maintenance management	47	3	50
Fluridone herbicide study (reference)	2		2
<u>Ineligible for management with State</u> <u>funds</u> Public water but no public access	9	1	10
Not public water	4		4
<u>Other</u>			
Flowing water (water courses)	4		4
Total	79	5	84

#### High-intensity management of Eurasian watermilfoil

The goals of high-intensity management are to reduce the abundance of a milfoil within a lake and slow the spread of the exotic to other lakes. Based on our past experiences attempting to eradicate Eurasian watermilfoil, the Exotic Species Program believes that eradication of the exotic from Minnesota lakes is not a realistic goal.

During 1997 the Exotic Species Program conducted high-intensity management on 14 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. The four lakes that were not treated by the DNR are: Little Long Lake, Hennepin County, which was not treated because milfoil plants were found late in season; Sauk Lake, Todd County, which was not treated because no plants were found; Knife Lake, Kanabec County, which was not treated because past treatments appear to have limited effects on milfoil, which appears likely to be limited by low water clarity; and Zumbra Lake, Carver County, which was found to have extensive milfoil and so reclassified as a 'maintenance management' lake (see below). The fifth lake that was not treated by the DNR was treated by a local cooperator who may apply for reimbursement at a later date.

#### 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 slow the spread of the exotic to other lakes. Maintenance management done with State funds usually involves control of milfoil in areas which are located either off-shore or near public water accesses. These areas are commonly used by the general public, as opposed to nearshore areas adjacent to privately owned property, which are used primarily, if not exclusively, by owners of that property. Control of milfoil in nearshore areas adjacent to privately owned property, if any is done, is usually undertaken by the owners of the property.

During 1997 the Exotic Species Program offered State funding and technical assistance to cooperators on all 50 lakes with Eurasian watermilfoil in the maintenance management classification. This offer of assistance is described in document that is mailed to potential cooperators (DNR 1997).

We either have reimbursed or expect to reimburse cooperators on at least 30 of these lakes for costs of management of milfoil (Table 12). These efforts ranged from a survey of milfoil at a cost of \$500 to a mechanical harvesting program on Lake Minnetonka for which the DNR made \$24,500 available. 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. In addition, the Exotic Species Program initiated treatment of milfoil in the immediate vicinity of public water accesses operated by the DNR on three lakes in the maintenance management class.

Before discussing the amount of State funds spent on maintenance management of milfoil during 1997, it is helpful to review levels of spending in previous years (Table 12). The amount of funds spent during 1996 was higher than that spent in either of the preceding two years for the following reason. The maintenance management program began in 1994 and it took time for potential cooperators to become familiar with it. In some cases, cooperators learned about the availability of funds late in the season when it often is preferable to defer management such as treatment with herbicide or harvesting until the following spring. Before 1996, the Exotic Species Program allowed potential cooperators to defer spending of funds allocated for management during one year to a following year or years. This resulted in large accumulations of available funds for a number of lakes. In 1996 the Exotic Species Program informed potential cooperators that accumulated funds would not be carried beyond 1996. Consequently, during 1996 a number of cooperators spent accumulated funds, which were substantially greater than the allocation for a single year.

The amount of State funds spent on maintenance management of milfoil in Minnesota lakes during 1997 was less than the amounts spent annually between 1994 and 1995 (Tables 12). During 1996 and 1997 the majority of cooperators chose to spend State funds on treatment of milfoil with herbicide (Table 13). It is important to note that the numbers of lakes treated with herbicide and the amount of area treated, as reflected in the cost of the work done, were much less in 1997 than in 1996. The amount of management by mechanical harvesting of milfoil was essentially the same in the two years. Beginning in 1996, cooperators were offered the opportunity to spend State funds on development by contractors of plans for management of milfoil on individual lakes. Cooperators on ten lakes chose this approach in 1996, but none chose it in 1997. In 1997, cooperators on five lakes chose to have contractors survey milfoil, though none chose this option in 1996.

# Table 12. Summary of the numbers of Minnesota lakes with Eurasian watermilfoil where management of this exotic species was done with State funds provided through the Minnesota Department of Natural Resources.

Year	Year Maintenance Management		Hig	gh Intensity Ma	Total		
	Number of lakes	Funds from MNDNR (\$)	Number of lakes	Funds from MNDNR (\$)	Additional funds from cooperators (\$)	Number of lakes	Funds from MNDNR (\$)
1988						0	0
1989						4	32,000
1990						20	49,000
1991						22	77,000
1992			23	64,000	62,000	23	64,000
1993			23	95,000	62,000	23	95,000
1994 <sup>1</sup>	13	76,000	14	42,000	37,000	27	118,000
1995	24	76,000	11	33,000	15,000	35	109,000
1996	39	120,000	9	26,000	2,000	48	146,000
1997	30	61,000 <sup>2</sup>	9	28,000	6,000	39	89,000

<sup>1</sup> The maintenance management program began in 1994.

<sup>2</sup> This is is an estimate of the amount of DNR funds that will be spent because some of the projects eligible for reimbursement have not been completed. In addition to funding offered to potential cooperators, it includes \$2,000 spent by the DNR for control of milfoil near public water accesses operated by the DNR.

# Table 13. Numbers of lakes and amounts of state funds used for various management activities on lakes with Eurasian watermilfoil in the Maintenance Management class during 1996 and 1997.

Year	Number o funds s manag	f lakes and spent on gement	Application of herbicide	Mechanical harvesting	Survey by contractors of milfoil	Development by contractors of plans for management
1996	41 (46) <sup>1</sup>	\$122,000	21 - \$ 60,000	8 - \$ 30,000	0- \$0	9 - \$ 32,000
1997	29 (50) <sup>1</sup>	\$61,000	15 - \$ 25,000	8 - \$ 26,000	5 - \$ 10,000	0- \$0

<sup>1</sup> Total number lakes in the Maintenance Management class during each year.

# Effectiveness of management of Eurasian watermilfoil in Minnesota lakes

The decrease from 1996 to 1997 in the amount of State funds spent on maintenance management by use of herbicide suggests that the extent and severity of problems caused by milfoil in some Minnesota lakes were less in 1997 than in previous years. We suspect that this is due, at least in part, to the weather in 1997. In the Twin Cities area during spring and early summer of 1997, the weather was relatively dry (Table 14) and we expected to have moderate to high levels of nuisances caused by milfoil. In July, rains were heavy in the Twin Cities and raised lake levels. The rains also likely promoted algal blooms due to influxes of nutrients in run-off, which in turn reduced water clarity. These conditions are believed to have limited growth of milfoil in at least some lakes. Consequently, the extent and severity of problems caused by milfoil reported by users of Minnesota's lakes after June were lower than we expected early in the season.

It is likely that in the future we will experience years when the amount of spring runoff will be low and spring and summer weather will be hot and sunny, that is, drought conditions. Under such conditions, the growth of milfoil and the costs of management are likely to be greater than they were during recent years.

Table 14.	Levels of precipitation at the Minneapolis Airport during spring, 1997
(Source:	The Minnesota Climatology Working Group Home Page -
www.soil	s.agri.umn.edu/research/climatology).

Month	Precipitation for the month [inches]	Departure from the long- term average for the month [inches]
March	1.22	-0.72
April	1.01	- 1.41
Мау	1.70	- 1.69
June	3.70	-0.35
July	12.56	9.03

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

The continued 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, hereafter called cooperators. The Exotic Species Program also received valuable assistance in management of Eurasian watermilfoil from staff of the DNR's Aquatic Plant Management Program in the sections of Fisheries and Ecological Services, particularly the Brainerd, Glenwood, and Metro offices.

The DNR also benefitted from participation by representatives of various outside organizations in an evaluation of the potential to use fluridone herbicide for selective control of Eurasian watermilfoil. These organizations included the Minnesota Sportfishing Congress, the Minnesota Lakes Association, the Minnesota Aquatic Management Society, and a number of local units of government.

#### Research on Eurasian watermilfoil in Minnesota

The Exotic Species Program either supports or conducts a number of research projects designed to improve management of Eurasian watermilfoil. Each of these projects has produced one or more detailed reports. In this section, we will briefly summarize the most important or interesting results of recent efforts by researchers. The continued progress in research designed to improve management of milfoil depends on the efforts of organizations outside the DNR including the University of Minnesota, the Aquatic Plant Control Research Program (APCRP) of the Army Corps of Engineers, and the Suburban Hennepin Regional Park District which are strongly supported by the Exotic Species Program.

#### Potential for biological control of Eurasian watermilfoil

 Evidence of possible declines in milfoil in Minnesota study sites was collected and is being evaluated.

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. Researchers sampled nine sites known to have weevils. In two of four sites intensively followed for four years and in one site followed for two years, significant and persistent declines in milfoil were documented. Two of these declines appear to be associated with weevils. In one of these cases, researchers found an aquatic moth (*Acentria epehemerella*), another potential control agent, at densities that were high for Minnesota, but less than those reported from New York lakes where the moth is believed to have contributed to declines in milfoil (Johnson 1995 a and 1995b). The third decline was tentatively attributed to winter-kill.

In three sites that were less intensively followed for three years, researchers also documented declines in milfoil. Nevertheless, the association of weevils with these declines is unclear. In a ninth site milfoil experienced a decline in which weevils are

implicated. The decline was followed by return to pre-decline levels over a seven year period.

Increases in abundance of native plants following declines in milfoil appear to be important in preventing the exotic from returning to high levels of abundance. Responses of natives to declines in milfoil appear to be affected by clarity of water and concentration of nutrients in sediments.

Release of weevils by researchers into study plots neither produced high densities of weevils nor did it reduce the density of milfoil. Factors affecting populations of weevils during summer appear to be more important than those affecting over-winter survival of weevils in determining densities of weevils observed during summer, which in turn appears to be related to affects on milfoil plants. Researchers also completed studies of over-wintering in weevils, dispersal of adult weevils, development of weevils in relation to temperature, predation on weevils by fish, and genetic variation in weevils in relation to host plant.

Future research (M.L. 1997 Chapter 216, Sec. 15, Subd. 20(b)) will address two key objectives: 1. attempt to reduce milfoil biomass in lakes by introduction of weevils to plots as was done under controlled conditions in tanks (Newman et al. 1996), and 2. attempt to document declines in milfoil and relationships between these declines and weevils or other organisms by continued surveys of milfoil and potential biological control agents in lakes.

Minnesota researchers conducting the weevil studies are making good progress, including publication of results in peer-reviewed journals. Two papers were published this year (Sutter and Newman 1997, Newman et. al. 1997) and a third manuscript on this research was accepted for publication in a book (Newman et al. In Press).

Experience has shown that development of biological controls, if an effective agent(s) can be found, 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 MNDNR with appropriations made in 1992, 1993, 1995, and 1997 by the Minnesota Legislature as recommended by the Legislative Commission on Minnesota Resources (LCMR). The MNDNR plans to apply to the LCMR for continued funding for research on the potential for biological control of milfoil and loosestrife during the next biennium (FY 2000-2001).

The appropriation made in 1993 required a match of \$200,000. The Minnesota Lakes Association provided \$8,000 of the match and the balance was provided as 'in-kind' services by APCRP. The research by APCRP included three projects. (1.) A project done by Middlebury College under contract to APCRP indicated that the weevil

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*Euhrychiopsis lecontei* had no significant negative effect on five native milfoil species (Sheldon 1996). (2.) APCRP attempted to isolate pathogenic fungi from milfoil collected in Minnesota and other northern states, but found no particularly promising control agents (Shearer 1996). (3.) APCRP conducted studies to predict the possible spread of milfoil in Minnesota and the susceptibility of different classes of lakes to dominance by this exotic. This effort will likely help predict the effectiveness of potential biological control agents and understanding where and why future declines of milfoil occur. A brief report on this study by APCRP (Madsen 1997) has been received and a complete report is expected to be received in 1998.

# Evaluation of herbicides for control of Eurasian watermilfoil Evaluation of fluridone herbicide

Most problems caused by milfoil or other aquatic plants in Minnesota are currently managed with methods such as use of herbicides or mechanical harvesting, which control plants in limited, specific parts of bays or lakes where nuisances occur. 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. Unnecessary destruction of vegetation in Minnesota waters is not permitted because plants provide many benefits to lake ecosystems.

Fluridone herbicide, which is formulated as Sonar®, is usually applied to whole bays or lakes to control submersed aquatic plants, including the exotic Eurasian watermilfoil. The DNR initiated this study to determine whether application of fluridone to whole bays or lakes can control Eurasian watermilfoil and have minimal effects on native vegetation. The results of this study (Welling et al 1997) and other available information indicate that application of fluridone to whole lakes or bays causes high levels of unavoidable damage to native vegetation and has the potential to affect other aspects of lake ecosystems.

The DNR's assessment of the potential to selectively control milfoil with fluridone was reviewed with a number of interested parties at a meeting held in St. Paul on 20 February 1997. Several people suggested that the DNR allow application of fluridone to whole lakes because the effects on a lake of Eurasian watermilfoil are worse than the effects of this herbicide on a lake. Though there is no doubt that milfoil is a problem in Minnesota lakes, there is little reliable, objective documentation of the effects of milfoil on lakes in either Minnesota specifically or the upper midwest generally. The DNR will review available information in an attempt to improve our understanding of the effects of Lurasian watermilfoil on native plants and, if data become available, other elements of lake ecosystems.

On 16-18 March 1997, staff of the DNR attended the annual meeting of the Midwest Aquatic Plant Management Society in Madison, Wisconsin. Ms. Wendy Crowell of the Exotic Species Program presented results of the agency's evaluation fluridone to the Midwest Aquatic Plant Management Society. During this meeting, staff of the DNR met with representatives of SePRO; the Center for Aquatic Plant Research and Technology, U.S. Army Corps of Engineers; the University of Florida, and the Wisconsin DNR. This group briefly reviewed the status of the DNR's assessment of the potential to selectively control Eurasian watermilfoil with fluridone and potential future investigations.

#### Future use of fluridone to control Eurasian watermilfoil in Minnesota

Due to the high level of unavoidable damage to non-target plants and the potential to affect other aspects of lake ecosystems, the DNR can not envision a situation where application of fluridone to a whole lake to reduce milfoil, but not reasonably eliminate it, would be permitted. This assessment applies to public bodies of water that are larger than small ponds or stormwater-retention basins. A proposed application of fluridone to a whole lake that has high potential to eliminate milfoil and thereby limit the spread of this exotic might justify a variance from Minnesota Rules in a very few, unique cases.

The factors that the DNR would consider in determining whether to issue a variance to allow whole-lake treatment with fluridone would include:

- 1. high potential to eliminate milfoil from a lake due to limited movement of water through the lake,
- 2. the potential to limit damage to native plants,
- 3. high potential for the lake to become a source of spread of milfoil to an area of the state without milfoil, and
- 4. low potential for reintroduction of milfoil into a lake.

A hypothetical example of a situation where the DNR might issue a variance to allow whole-lake treatment with fluridone would be a lake that 1. has no inlet or outlet, 2. is small (less than 100 acres), and 3. is located in an area with no other milfoil lakes.

Because every lake is unique, the DNR plans to make decisions about variances that are requested for whole-lake treatment with fluridone on a case by case basis, as the Section of Fisheries does for proposals to apply rotenone, a piscicide which usually is applied to whole lakes. The DNR is not currently considering the initiation of future treatments for research. None of the public bodies of water in Minnesota that were known to have milfoil at the end of 1997 is considered at the present time to be a reasonable candidate for whole-lake treatment with fluridone.

#### Management of Eurasian watermilfoil in other states

During 1996, the Iowa legislature passed a law to prohibit the transport of Eurasian watermilfoil and allocated \$100,000 to initiate a program to attempt to limit further spread of the exotic in that state (IaDNR 1997a). This program is located at the Iowa Lakes Community College in Estherville. It is a cooperative effort that includes participation by the Iowa Department of Natural Resources and a number of lake associations, which are located primarily in the Spirit-Okoboji and Clear lakes areas in the northern part of the state. The program completed it first year of operation in 1997. Activities included promotion of public awareness, monitoring at water accesses on lakes, and monitoring of aquatic vegetation to determine the distribution and abundance of milfoil. In addition, a management plan for milfoil was written and approved by the Iowa Natural Resources Commission (IaDNR 1997b). Plans for the future include

submission of a proposal to the Iowa legislature to establish a \$2 surcharge on boat licenses to fund an exotic species program. A plan for aquatic nuisance species is also under development. It will be submitted to the national aquatic nuisance species task force in an effort to obtain federal funding to address problems in Iowa.

In Wisconsin, Eurasian watermilfoil continues to spread. Sandy Engel, Wisconsin Department of Natural Resources (WiDNR) estimates that approximately 260 bodies of water now have documented populations of milfoil. The exotic has been found in 43 of the 72 counties in Wisconsin.

In Wisconsin, a cooperative study of the potential to manage Eurasian watermilfoil with weevils, *Euhrychiopsis lecontei*, is being conducted by the Biological Fishery Research Unit (BFRU) and the WiDNR. The BFRU is part of the U.S. Geological Survey and is located at the University of Wisconsin at Stevens Point. During 1997, Wisconsin researchers released weevils in twelve lakes. This effort and other milfoil research projects conducted by the WiDNR are being followed closely by the Exotic Species Program of the DNR.

During the fall of 1996, Eurasian watermilfoil was first discovered in North Dakota. Students from the Valley City State University (VCSU) found the exotic in an impoundment on the Sheyenne River, approximately 60 miles west of Moorhead, Minnesota. According to Ms. Bonnie Alexander of VCSU, this portion of the river was subsequently drawn down and the bottom or substrate was frozen. Inspection of the site in the summer of 1997 found much sago pondweed, a native submersed plant, but no Eurasian watermilfoil. Ms. Alexander also reported that a search of the Sheyenne River for a distance of one mile below the dam turned up no milfoil.

In Michigan during 1997, the Department of Environmental Quality continued its evaluation of the potential to selectively control Eurasian watermilfoil with fluridone herbicide. This evaluation now includes involvement of researchers from APCRP.

# Future plans and needs of the Eurasian watermilfoil program:

The Eurasian Watermilfoil Program is now well established and has adequate funds. Priorities for the Eurasian Watermilfoil Program include:

- Keep the public informed about Eurasian watermilfoil and the problems that it can cause,
- Contain the plant's spread by targeting access inspection and enforcement efforts in areas of the state where infestations currently occur,
- Monitor the distribution of milfoil in the state with emphasis on verification of reports of new occurrences of milfoil,
- Control milfoil in Minnesota lakes, especially new populations in areas outside Minneapolis and St. Paul metropolitan area,
- Support research on the potential for biological control of milfoil, including support of the proposal submitted to the LCMR for continued funding, as well as research on the biology of this species,
- Revise the DNR's plan for management of milfoil.

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# **Management of Purple Loosestrife**

# 1997 Highlights

- 110 high priority purple loosestrife infestations were treated with herbicide.
- No purple loosestrife was found at seven sites where purple loosestrife plants were treated with herbicide in 1996. This control success was limited to small infestations that were treated soon after loosestrife invaded an area.
- Ten sites that were treated with herbicide in 1996 had a 75% reduction in the quantity of herbicide needed to control those infestations in 1997. This is likely due to reductions in infestation size from previous treatments.
- Approximately one million purple loosestrife leaf-eating beetles were released at more than 150 sites statewide. This brings the total number of release sites to 200. Insects now occur in 45 of Minnesota's 87 counties with purple loosestrife.
- Over 80 percent of insect releases made for biological control of purple loosestrife between 1992 and 1996 have become established.
- The Department of Natural Resources (DNR) hosted a national workshop on biological control of purple loosestrife attended by resource managers from 17 state and 5 federal agencies.
- MN County Agricultural Inspectors and other cooperators helped the DNR establish a large outdoor rearing effort.

# Background

Purple loosestrife (*Lythrum salicaria*) 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. 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 4).

In 1997, 48 new purple loosestrife infestations were identified in Minnesota. There are now 1,841 purple loosestrife infestations recorded statewide (Table 15). Of those sites, the majority (68%) are lakes, rivers, or wetlands. Inventory totals indicate that Minnesota presently has over 40,000 acres that are infested with purple loosestrife. These infestations range in size from a few to thousands of plants, and vary greatly in plant density.





Site Type	Total sites -1996	New sites - 1997	Total sites 1997
Lake	547	12	559
River	149	3	152
Wetland	561	22	583
Roadsides and Ditches	393	6	399
Other <sup>1</sup>	143	5	148
Total	1793	48	1841

 Table 15. Purple Loosestrife infestations recorded by the Minnesota Department

 of Natural Resources in 1996 and 1997.

<sup>1</sup> Includes gardens and other misc. sites.

### **Progress in Management of Purple Loosestrife - 1997**

#### Chemical control of purple loosestrife

Attempts by the DNR to control purple loosestrife have relied mainly on the use of herbicides. The most effective herbicide is Rodeo, or 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, (2,4-dichlorophenoxyacetic acid), is less rarely used. Although the use of 2,4-D has some advantages, (it is more selective than Rodeo because it affects primarily broad-leaved or dicotyledonous plants) it is less effective than Rodeo. A third herbicide, Garlon 3A, or triclopyr, has been applied to purple loosestrife on a trial basis to test its effectiveness and selectivity. If Garlon 3A is registered for aquatic use in the U.S., it will be the herbicide of choice for loosestrife control. Garlon 3A has proven to be very effective and is more selective than Rodeo (i.e., it is less harmful to non-target plants). Garlon 3A is also less expensive than Rodeo.

Beginning in 1991, a prioritization plan was developed for selecting control sites in public waters and wetlands. This was done because there are insufficient resources to apply herbicides to all 1,841 known purple loosestrife sites in Minnesota. In addition, DNR personnel observed that herbicides 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 to the plant's ability to reestablish through recruitment of seedlings from the 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. 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 (Table 16).

Between 1990 and 1997, herbicides were applied to an average of 161 sites per year (Table 16). 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 1997 the DNR or contractors visited 137 purple loosestrife stands for herbicide control work. At 22 sites workers found no loosestrife plants to treat. Three sites had loosestrife plants which were hand pulled. One site was too wet to treat and at one site a landowner denied workers access to the site. A total of 110 sites were treated with herbicides. Most of the sites treated by for the DNR were very small, 55% had less than 100 plants (Table 16). In total, these applications used seven gallons of herbicide, took 965 worker hours, and cost \$36,264 (Table 17).

Year	<20 plants	20 -99 plants	100-1000 plants	> 1000 plants	Total number of sites treated	Number of sites visited where no herbicide was used because no plants were found
1990	29	45	48	72	194	0
1991	64	45	50	8	167	33
1992	. 67	43	56	21	187	40
1993	49	47	52	27	175	19
1994	41	40	49	32	162	26
1995	55	47	38	25	165	38
1996	38	36	36	20	130	23
1997	30	25	36	19	110	22

Table 16. Number of purple loosestrife infestations treated in 1997 by the Purple Loosestrife Program classified by infestation size.

Table 17. Summary of herbicide applications to purple loosestrife infestations in1997 by the Purple Loosestrife Program, Minnesota Department of NaturalResources.

DNR Region	Number of sites treated with Rodeo	Hours of Labor	Total Cost
I- Northwest	24	175	\$9,181
II- Northeast	40	172	\$7,378
III - North Central	29	438	\$13,420
IV- Southwest	12	137	\$5,000
V-Southeast	5	43	\$1,285
VI-Metro	0	0	0
Total	110	965	\$36,264

#### **Biological control of purple loosestrife**

Insects for biological control of purple loosestrife were first released at one research site in MN by DNR staff in 1992. This initial release occurred after years of testing and review by the United States Department of Agriculture to make sure the insects were purple loosestrife specific and would not damage other native plants or agricultural crops. Minnesota cooperated with Cornell University to obtain insects for this initial release. This research was expanded in 1993 and 1995 through funding appropriated by the Legislature as recommended by the Legislative Commission on Minnesota Resources. 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*, are now being released as potential biological controls for loosestrife in Minnesota.

Biocontrol insects released between 1992 and 1997 have established at more than 80 percent of the sites. Insect populations increased significantly at a several locations and damage to loosestrife plants is pronounced in several areas. It is still too early to tell how effective the biocontrol agents will be. Early indications here and in other states and provinces, however, show promise.

During 1997, rearing efforts were dramatically increased through large outdoor cage rearing and by providing insect rearing kits to counties and DNR field staff statewide. Large cages were set up at University of Minnesota and at a DNR field site near Brainerd. These large cages produced 200,000 leaf-beetles for release. The use of insect rearing "starter kits" also provided dramatic increases in insect numbers. (A starter kit is comprised of pots, potting soil, insect cages, leaf eating beetles. and other materials necessary to rear 20,000 to 40,000 leaf-eating beetles).

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Kits were provided to County Agricultural Inspectors and DNR Area Wildlife Managers for rearing and release on their high priority areas. These local partners reared and release more than 600,000 leaf-eating beetles. All insect rearing was completed outdoors to reduce rearing costs associated with a laboratory and produce hardier insects. Leaf-eating beetles were also provided to the U.S. Fish and Wildlife Service (USFWS) at Sherburne National Wildlife Refuge for large-scale outdoor rearing. Approximately 1 million leaf-eating beetles were produced and released at 150 sites statewide. As of December 1997, insects have been released at more than 200 sites around the state (see Figure 5).



Figure 5. Leaf-eating beetle, *Galerucella* spp. releases in Minnesota as of December, 1997.

Because there are only a small number of root-boring weevils brought to Minnesota, the adult weevils were kept in a University of Minnesota lab to maximize egg production. Nearly one thousand eggs were produced from these adults in 1994 and were relocated to seven different field sites around the metro area. Adult root-boring weevils were found in 1995 at all seven release sites. Although their populations are still low, the root-boring weevils survived the winter and are reproducing. In 1995, more root-boring weevils eggs were received from Cornell University for release into loosestrife infested Minnesota wetlands.

Distribution of the root-boring weevil continued in 1997. Cornell University provided 3,850 root-boring weevil eggs during the summer. These eggs were inoculated into loosestrife plants in the field at one location. Because of the weevils slow growth, it will take many years to build up populations in Minnesota wetlands. Cornell University is developing new rearing methods for the weevils which may significantly speed up the production efforts. The new techniques will be implemented in Minnesota as soon as they are available.

#### Research

#### Insects as biological control agents

Research on rearing methods continued during 1997 to increase production of the leafeating beetles. New outdoor rearing methods are now being used statewide. Prior to 1996, all insects were reared in the lab. Outdoor rearing was first tested by Cornell University in 1994. More insects were produced and insect fitness was increased. DNR and University of Minnesota research efforts found that outdoor rearing required less effort, was less costly and produced as many if not more leaf-eating beetles.

Monitoring efforts of insect release sites was expanded in 1997 with a new monitoring protocol developed by Cornell University. This protocol is being adopted nationwide to intensively monitor changes to the insect and loosestrife populations and changes to native plant populations. Monitoring in Minnesota will continue in 1998 and beyond.

#### Fungal Pathogens as biological control agents

In 1991 and 1992, the DNR funded research to isolate fungal pathogens that can cause damage to purple loosestrife plants. This research is continuing with funding appropriated by the Legislature as recommended by the Legislative Commission on Minnesota Resources (LCMR). Several pathogens have been isolated that show promise as fungal herbicides. However, field testing of the fungal pathogens in 1995 was unsuccessful at controlling purple loosestrife. A new pathogen was isolated and tested in 1996 with some success. The new pathogen was tested at one field site in 1997. The results showed that this new pathogen has the potential to kill loosestrife plants and will be tested more in 1998.

# Management of purple loosestrife in other states

The DNR has received two federal grants to rear and distribute insects for purple loosestrife control nationwide. A total of \$312,000 was received from two USFWS programs (Federal Aid program-\$212,000; North American Wetlands Conservation Act-

\$100,000). The Minnesota DNR contracted with Cornell University to rear and distribute the insects to states and federal agencies involved with loosestrife control. To date, over 500,000 leaf-eating beetles and 30,000 root-boring weevil eggs were reared and distributed to 30 states and 4 Federal agencies (States include: AL, CA, CT, DE, IA, ID, IL, IN, MD, MA, MI, MN, MT, NE, NH, NJ, NY, OH, OR, PA, RI, SD, TN, UT, VT, WA, WI). Among the recipients were Universities; State Departments of Natural Resources, Environmental Conservation, Fish and Game or Agriculture; National Wildlife Refuges; Bureau of Reclamation; USDA-APHIS; and the Tennessee Valley Authority.

A national two day field workshop to teach resource managers how to implement a biological control program was held in June, 1997. This workshop was hosted by the DNR. Over 70 people participated from 17 States and 5 Federal agencies. This workshop discussed how to rear and release the biocontrol agents, and how to monitor changes in insect and plant populations once biocontrol insects are introduced.

#### 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 (nine in 1996) 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 loosestrife infestations within wetlands statewide. Biological controls, if effective, will reduce the impact loosestrife has on wetland flora and fauna communities. DNR's goal is to reduce loosestrife populations in Minnesota by at least 70% within 15-20 years. Purple loosestrife likely will 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.

### Participation of others in purple loosestrife control efforts

In 1997, the DNR worked with a variety of local governments and other organizations to control purple loosestrife in Minnesota (Table 18). Control information and technical assistance was provided to landowners and local units of government.

The DNR initiated a insect rearing program providing county agricultural inspectors and MDA field staff with a starter for rearing their own leaf-eating beetles (described above in the biological control section). Twenty four counties participated in the effort rearing over 600,000 leaf beetles for release in participating counties (Table 18).

# Table 16. List of cooperators 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 Ojibwe, Natural Resource Department	Partner with DNR in biological control efforts, including rearing, releasing and monitoring of insects on the Reservation
USFWS, Sherburne NWR	DNR provided biocontrol insects, large cages and expertise for rearing and distribution
Ramsey County	Cooperative agreement to allow Ramsey Co. to utilize state contract to hire commercial applicators. Start new effort for biocontrol.
City of Sunfish Lake	DNR provided equipment and herbicide
Birch Lake Association, Ramsey Co.	DNR provided equipment and herbicide
Cornell University, Ithaca NY	Provided purple loosestrife biological control insects for release in Minnesota
MN Department of Agriculture	Partner with DNR in statewide biological control efforts including releasing and monitoring insects.
Becker, Beltrami, Carlton, Carver, Crow Wing, Dakota, Freeborn, Hennepin, Hubbard, Itasca, Kandiyohi, Mcleod, Mille Lacs, Mower, Ottertail, Pope, Ramsey, Rice, Stearns, Stevens, Swift, Wadena, Washington, Watonwan	Counties where insects were reared and released by County Agricultural Inspectors, MDA field staff and DNR Area Wildlife Managers.
Paul Bunyan Nature Center, Brainerd Hennepin Parks	Partner with DNR in rearing, release, and monitoring of insects and in public awareness of visitors to Nature Centers.

# Future needs for managing purple loosestrife

- Continue research on biological controls of purple loosestrife. This includes the development of insect rearing and release strategies. Implementation strategies will be needed for actual distribution in the field and subsequent monitoring of the insects.
- · Continue funding herbicide control efforts on small infestations of loosestrife.
- Increased coordination to control loosestrife on other state agency managed areas.
- Continue to develop new in-state partners (e.g., County Agricultural Inspectors) to expand scale of rearing efforts.

# Management of Flowering Rush

(Butomus umbellatus)

# 1997 Highlights

- Flowering rush was discovered in the Sauk River, north of Sauk Lake, in Todd County. This is the fifth county in Minnesota where flowering rush has been reported.
- Bemidji State University researchers investigated the viability of flowering rush seeds and rhizomes. Their research confirmed that this exotic is likely spread primarily by rhizomes.
- The MDNR continued control activities in Becker County through a cooperative project with Becker County Sentence to Service (STS) program and the Pelican River Watershed District.

# Background

#### **Species Description**

Flowering rush (*Butomus umbellatus* L.) is a perennial aquatic herb. Along lake and river shores, flowering rush grows as an emergent plant and resembles bulrush (*Scirpus* spp.) but has three-angled fleshy leaves with twisted ends. Emergent flowering rush plants may produce a single flowering stem with a distinct umbel-shaped cluster of pinkish-white flowers. Submersed flowering rush plants have limp leaves and do not produce flowers.

Flowering rush can form dense colonies by vegetative spread of thick rhizomes. It can also disperse by tubers that break off the rhizome and by small bulblets than may form in the inflorescence. Water currents can easily move these reproductive structures to new locations within a waterbody or downstream to new waterbodies. Ice movement (Haber 1997) and muskrats (Gaiser 1949) also act to disperse flowering rush to new locations.

Growth and vigor of flowering rush populations may depend on the ploidy level (chromosome number). Populations of flowering rush may contain diploid (2n=26) and/or triploid (2n=39) clones. Diploid clones are fertile and self-compatible. Triploid clones are self-incompatible and usually sterile, but are more robust, producing more rhizome buds and more above and below ground biomass (Hroudova and Zakravsky 1993).

#### **Distribution**

Flowering rush is a native of Europe and temperate Asia. It was likely brought to North America in the late 1800's in ship ballast and has also been repeatedly introduced as an ornamental plant. Major areas of introduction in North America include the St.

Lawrence River and the lower Great Lakes region. Flowering rush occurs in every U.S. state bordering Canada from Vermont to Idaho (Haber 1997).

#### Environmental and ecological impacts of flowering rush

Rousseau (1968), quoting Marie-Victorin, stated that flowering rush is much more aggressive in North America than in its native Europe. In 1935 Marie-Victorin noted that the submersed form of flowering rush was abundant enough to create a nuisance for small boat traffic in the Montreal region (Core 1941). Haber (1997) remarked that the invasiveness of flowering rush may not be as evident today as it was earlier in the century when it spread rapidly along the St. Lawrence River and aggressively displaced native vegetation. In areas west of Lake Michigan, the distribution of flowering rush west is sporadic and its occurrence is likely due to horticultural plantings (Haber 1997). However, resource managers and researchers have expressed concern that this exotic is, or may become, an aggressive competitor with native wetland vegetation (Anderson 1974, Staniforth and Frego 1980).

#### Flowering rush in Minnesota

Flowering rush was first recorded in Minnesota in 1968 (Moyle 1968) and has since been found in twelve water bodies (Table 19).

County	Water body	DOW #	Year identified	Source
Anoka	Amelia Lake		1968	MDNR survey
	Bass Lake		1968	MDNR survey
	Reshanau Lake	02-0009	1970	MDNR survey
Becker	Detroit Lakes	03-0381	1976	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
Itasca	Twin Lakes	31-0191	1995	MDNR survey
Rice	Cannon Lake	66-0008	1972	herbarium collection
	Cannon River (City Park in Morristown)		1977	herbarium collection
Todd	Sauk River (north of Sauk Lake)		1997	MDNR survey

#### Table 19. Recorded locations of flowering rush in Minnesota.

In Minnesota flowering rush varies in abundance but can form dense, nearly monotypic stands. Emergent flowering rush is often found in shoreline areas where native vegetation appears naturally sparse or where vegetation has been previously removed. Flowering rush can be found within openings of native bulrush (*Scirpus* spp.), but bulrush remains the dominant species in these sties. In some sites, flowering rush co-occurs with other emergent exotics including purple loosestrife and reed canary grass.

The largest known population of flowering rush in Minnesota occurs in the Pelican River watershed, Becker County. In the Detroit Lakes area of the watershed, flowering rush forms dense stands along some shorelines and commonly occurs as a submersed plant.

#### Declines in flowering rush populations

The MDNR has looked for and not found four populations of flowering rush (Table 19) though the populations were originally reported by reputable sources. These populations may have declined due to water level changes of the water bodies. Haber (1997) also describes three sites in Canada where flowering rush was introduced, survived for several years and then died. Hroudova and Zakravsky (1993) noted limited growth and mortality in flowering rush plants when high levels of nutrients were applied.

#### Management of Flowering Rush

Flowering rush is a prohibited exotic plant in Minnesota because the most likely means of introduction into a new area is through horticultural sales. It is unlawful to possess, purchase, or sell this exotic in Minnesota.

Flowering rush often grows in stands with native vegetation, making it difficult to control this exotic without harming the native plants. Small stands can be dug or cut by hand and removed from the water. 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 washed from the plant before it kills the plant.

The DNR's goals for flowering rush management include:

- 1) Stop the sale of flowering rush in Minnesota
- 2) Maintain an inventory of known infestations and monitor sites to assess changes in populations
- 3) Conduct / support research to develop and implement better management methods

#### Progress - 1997

The DNR conducted a preliminary investigation to determine possible sources for the sale of flowering rush. Several outstate nurseries advertise this exotic for sale on the INTERNET. The DNR intends to send letters to these businesses notifying them that it is illegal to buy or sell flowering rush in Minnesota.
Mechanical control of flowering rush in the Pelican River Watershed continued in 1997. The Pelican River Watershed District continued to operate mechanical harvesters to reduce the abundance of flowering rush and native submersed plants in some water bodies. The MDNR Exotic Species Program again coordinated a flowering rush handcutting project at several sites in Detroit Lakes in 1997.

The DNR funded a project in 1997 conducted by Bemidji State University (BSU) to evaluate the viability of flowering rush seeds in Minnesota. Researchers from BSU concluded that flowering rush seed collected from Twin Lakes and Detroit Lakes had very low viability; less than four percent of over 2,700 seeds tested were viable (Koford 1997). Eckert (pers. comm. 1997) cautioned that sterile plants often produce enlarged ovules that lack embryos but resemble mature seeds and BSU researchers may not have actually tested seeds. In any case, it appears that the Minnesota populations tested have a low ability of producing mature or viable seeds.

The DNR also funded a project conducted by BSU to evaluate the viability of flowering rush rhizomes. After 30 days of storage in lake water at room temperature, over 70 percent of the rhizomes were viable (Koford 1997).

#### Effectiveness of flowering rush management

Although Minnesota has designated flowering rush as prohibited, the DNR has not effectively stopped the sale of flowering rush in Minnesota. Flowering rush continues to be sold as an ornamental plant and is now widely advertised through the INTERNET as a desirable, hardy plant for water gardens.

Hand-cutting appears successful at seasonally reducing dense stands of emergent flowering rush. Sites in Detroit Lakes that have been repeatedly cut for three years have fewer stems per square meter than uncut sites. In 1996, the MDNR hand pulled an isolated site in Lake Melissa and could not relocate the site in 1997.

Research conducted in 1997 will be beneficial to the management of flowering rush. The DNR will no longer place a high priority on clipping flowering stalks to prevent seed set, since seed production and viability appears very low. The DNR will continue to caution against disturbing the rhizome during control activities because the rhizome does remain viable once removed from the parent plant.

### Management in other countries and states

There are no known control projects for flowering rush in areas outside Minnesota. Canada has prepared a nine-page fact sheet that gives detailed information on the history of spread, biology, and impacts of this exotic (Haber 1997). Researchers at Queen's University, Canada are investigating the reproductive ecology of flowering rush populations in eastern Canada and expect to publish their results next year (Eckert, pers. comm. 1997).

Flowering rush continues to be sold through foreign and United States nurseries as an ornamental plant. It has recently become available in Minnesota through the INTERNET from nurseries in Australia, England, Canada, Texas, Maryland, Ohio, and Wisconsin. In some states flowering rush is promoted as a desirable plant for landscaping wet sites and for wetland restoration (Ranney et al 1994, Feeback 1997).

## Participation by other groups

Major groups involved in flowering rush management in Minnesota in 1997 include: MDNR Exotic Species Program, MDNR Fisheries, Becker County Sentence to Service Program (STS), Pelican River Watershed District and Bemidji State University.

# Future needs for flowering rush management

- Continue efforts to limit introductions of flowering rush in Minnesota. Inform the public and the nursery industry 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 MDNR will continue to encourage research in these areas.

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# Management of Curly-Leaf Pondweed

# **1997 Highlights**

- Information about curly-leaf pondweed and its management was provided to the public through literature, public presentations, public meetings, and watercraft inspections.
- A private consultant hired by the DNR Exotic Species Program completed a review of the available literature on curly-leaf pondweed control.
- Funding was provided to the Army Corps of Engineers to study the effectiveness
  of the contact herbicides diquat and endothall against curly-leaf pondweed as a
  function of water temperature.
- DNR Exotic Species Program staff initiated a review of all DNR Fisheries survey records to determine which lakes in Minnesota have at least one Fisheries record of curly-leaf pondweed.

# Background

Curly-leaf pondweed (*Potamogeton crispus* L) is an exotic 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) (Catling and Dobson, 1985). These turions disperse throughout a water body by water movement. Turions lay dormant during the summer when native plants are growing, and germinate in the fall when most native vegetation has senesced. Thus curly-leaf pondweed is able to use turions to invade new areas of a water body.

Lake associations and DNR Fisheries staff have been managing curly-leaf problems in Minnesota lakes for many years using both mechanical harvesting and contact herbicides such as diquat and endothall. Curly-leaf pondweed is a monocot, biologically very similar to numerous valuable and common native aquatic plants, such as all of the native pondweeds (*Potamogeton* spp.), wild celery (*Vallisneria americana*), and duckweeds (*Lemnaceae*). Thus, selective chemical control of curly-leaf pondweed

is not possible (i.e., killing curly-leaf without harming adjacent native vegetation) unless it is the only aquatic plant species growing in a treated area. Relief from curly-leaf pondweed nuisances can be achieved with both herbicides and by mechanical harvesting. The herbicides used are of the non-selective, contact type, usually diquat formulations such as Reward or endothall formulations such as Aquathol or Hydrothol 191. It is not possible to eradicate curly-leaf pondweed turions with herbicides. Because curly-leaf pondweed produces turions which can remain viable in lake sediments for years (like a seed bank), eradication of curly-leaf pondweed from a water body is unlikely given current control technology. Lake associations and DNR Fisheries staff have expressed interest in improving current management approaches. They are particularly interested in management strategies which could interrupt turion production.

## Progress in Management of Curly-leaf pondweed in 1997 Inventory of curly-leaf pondweed

 In 1995, the DNR Exotic Species Program estimated the general distribution of curly-leaf pondweed in Minnesota. This species has been reported in 65 of the 87 Minnesota counties. A map of curly-leaf pondweed distribution by county can be found in the 1996 annual report (Exotic Species Programs 1996:65). In 1997 the Exotic Species Program began a review of every lake file in the DNR Fisheries lake database. Approximately 3,000 lakes have been visited by DNR Fisheries staff and are included in database. The purpose of this review is to determine which lakes in Minnesota have at least one report of curly-leaf pondweed from DNR Fisheries staff, and will probably underestimate the number of lakes with curly-leaf pondweed in the state. Because curly-leaf pondweed dies back by mid summer it may be missed and go unreported if a lake survey is done in late summer. Currently the lake files from 68 Minnesota counties have been reviewed. This review should be completed by March, 1998.

#### Control of curly-leaf pondweed

- In 1996 the DNR issued 116 aquatic plant control permits to control curly-leaf pondweed. Under those permits herbicide was applied to 639 acres and 289 acres were mechanically harvested. Most of the permits to control curly-leaf pondweed issued in 1996 were in the Twin Cities metropolitan area (46%), with an additional 37% issued in north central Minnesota, and 10% issued in southwest Minnesota. This information comes from aquatic plant management permittee reports and may underestimate the actual amount of curly-leaf pondweed control conducted. These figures are not yet available for 1997.
- DNR Exotic Species Program staff gave presentations to several lake associations about their options for curly-leaf pondweed control. Several lake associations have begun the process of writing lake vegetation management plans in cooperation with DNR Fisheries staff. These plans will be used to help guide the management of curly-leaf pondweed.
- As described in the 1996 annual report (Exotic Species Programs 1996:64) Barr Engineering, with some technical assistance from both the DNR Exotic Species Program and the DNR Fisheries Program, is evaluating the effectiveness of early use of contact herbicides to control turion production in curly-leaf pondweed.

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Early results are promising. Visual observations of the two bays of Lake Marion (Dakota county) treated in early June of 1997 indicated that curly-leaf pondweed was abundant before treatment and scattered after treatment. Only scattered curly-leaf plants were found on subsequent surveys of the treated areas. Barr engineering staff will survey the treated areas next summer.

Blue Water Science is continuing its research to determine if a properly timed mechanical harvesting effort can reduce curly-leaf pondweed abundance for more than one year. DNR Exotic Species Program staff surveyed the aquatic plants in French Lake (Rice County) and Weaver Lake (Hennepin County) during the summer of 1997 where experimental cutting of curly-leaf pondweed was conducted, and will be assisting Steve McComas of Blue Water Science to sample curly-leaf pondweed turions from French Lake this winter. Staff also assisted in the design of a sampling protocol which will allow for statistical analysis of the results from the experimental cutting. Further sampling next summer will be needed in order to determine the effectiveness of the cutting. More detailed information about this project can be found in the 1996 annual report and in status reports from Blue Water Science (Exotic Species Programs 1996:64, McComas and Stuckert 1996a, McComas and Stuckert 1996b).

#### **Research on curly-leaf pondweed**

- John Foley, a graduate student in environmental biology at South Dakota State University, completed a literature review of curly-leaf pondweed management techniques funded by the DNR Exotic Species Program. The report is 30 pages in length and reviews 117 papers (Foley 1997). The papers come from both peer-reviewed journals and grey literature (e.g. proceedings of scientific meetings and agency reports). His review includes some general information about the life history of curly-leaf, but is mostly concerned with the advantages and disadvantages of various methods of curly-leaf control. Contact the Exotic Species Program for a copy of this report.
- Because the efficacy of the herbicides used to control curly-leaf at water temperatures below 70 F has not been documented the Army Corps of Engineer Waterways Experiment Station (WES) was contracted by the Exotic Species Program to evaluate the ability of herbicides to control curly-leaf pondweed at low water temperatures. The study examined the efficacy of endothall and diquat herbicides to control curly-leaf and to reduce turion formation. The total cost of the project was \$75,000. The DNR Exotic Species Program gave \$37,500 towards the project and WES obtained matching funds from the manufacturers of the tested herbicides. The DNR chose WES to conduct this research project because the Aquatic Plant Control Research Program at WES has more than 35 years of experience conducting research on management of aquatic plants.

Preliminary analysis of biomass data at two weeks after treatment indicates that there are no significant differences between treatments done in 59 degree F water and treatments done in 68 degree F water with either endothall or diquat. In contrast the treatments done in 50 F water did not provide the same level of

biomass reduction as the 59 F and 68 F treatments. All treatments at all temperature ranges significantly reduced curly-leaf pondweed biomass compared to the untreated control plants. A final report from this study will be available in March of 1998.

## Effectiveness

The DNR Exotic Species Program has three main goals for curly-leaf pondweed management: 1) to inventory the 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 new water bodies in Minnesota. During 1997 we have initiated a survey of the DNR Fisheries records for known curly-leaf pondweed infestations and 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 DNR 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 through our watercraft inspection program, literature, and public speaking engagements.
- Prepare a report on the current state of curly-leaf pondweed in Minnesota and existing management technology, and summarize this information in a fact sheet.
- 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 the possibility of cooperative research on curly-leaf pondweed management with Universities and other government agencies.

# **Management of Zebra Mussels**

# **1997 Highlights**

- Zebra mussels were found attached to a sampler in the St. Croix River in the impoundment above the dam at St. Croix Falls. Water levels in the reservoir were intentionally lowered six feet to allow a shoreline search of the impoundment. No other zebra mussels were found. Other monitor efforts above and below St. Croix Falls also failed to find zebra mussels.
- Divers discovered six boats with attached zebra mussels in the St. Croix River and Conservation Officers ordered the boats removed and cleaned.
- No infestations of zebra mussel were recorded from inland waters in Minnesota.
- Watercraft inspections and public awareness efforts continued and increased in areas near zebra mussel infested waters (see Education & Watercraft Inspections).
- The Minnesota Department of Natural Resources (MDNR) continued to work with the Wisconsin Department of Natural Resources (WDNR), National Park Service (NPS) and U.S. Fish & Wildlife Service (USFWS) on efforts aimed against this exotic in the St. Croix River.
- Three commercial barges that entered the St. Croix River from the Mississippi River were inspected by divers, and no zebra mussels were found attached.

# 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 1980's. 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 the zebra mussel allows rapid dispersal of this exotic within a water body. Despite having been present in North America for about a decade, it has established populations throughout most of the eastern United States and its eventual distribution is projected to include most of the U.S. and southern Canada.

# Progress on management of zebra mussels - 1997

Progress was made in the following areas that were identified as future needs for 1997:

- Veliger sampling was continued in Lake Pepin, documenting the presence of the larval zebra mussel stage from early June through October.
- Exotic Species Program staff attended the 1997 International Zebra Mussel Research Conference.

## Current distribution/inventory of zebra mussels

Zebra mussel population levels in the Mississippi River continued to increase in 1997 and native mussels in Lake Pepin and elsewhere in the river show increases in infestation by zebra mussels. The DNR and the Army Corps of Engineers are conducting a study looking at zebra mussel infestation and impacts on native unionids. Zebra mussels have not yet been documented above Lock and Dam 1 on the Mississippi River (Figure 6). Zebra mussels continue to be found in the Duluth Harbor, but no evidence has been found that these mussels are reproducing. Their continued presence suggests that they are being reintroduced by Great Lake shipping traffic.

The discovery of approximately 50 tiny zebra mussels on a plate sampler in St. Croix River impoundment above the dam at St. Croix Falls raised questions whether the zebra mussel had established a population upstream. A drawdown of the impoundment in early October followed by a shoreline search of over 20 miles of exposed shore found no other zebra mussels. Additionally, numerous plankton tows, plate samplers, and dives in various areas of the impoundment also failed to turn up any other zebra mussels. Because the initial finding could not be confirmed, the St. Croix will remain in the uninfested classification.

The DNR provided financial assistance for dive searches for zebra mussels on the St. Croix River in cooperation with other resource agencies and provided technical advice and laboratory expertise for monitoring activities. The DNR contracted with commercial divers to inspect commercial barges that entered the St. Croix River. The DNR also required six boats found during dive inspections with attached zebra mussels in the St. Croix River to be removed, cleaned and reinspected as required under current Minnesota law.

#### **Public Awareness**

DNR staff produced a new waterproof poster informing boaters of the laws relating to the St. Croix River and distributed these along both the Minnesota and Wisconsin sides of the Mississippi River

Watercraft access inspectors also conducted over 180 hours of access inspections at public access sites north of Stillwater from July through September as a result of the discovery of the zebra mussels in the impoundment at St. Croix Falls. DNR staff also produced temporary warning signs which were posted at public access sites in the

# **Figure 6. Confirmed Zebra Mussel Sightings as of December, 1997.** (Source: U.S. Geological Survey - Biological Resources Division)



impoundment area discussing the drawdown of the water levels and participated in searching exposed shorelines for zebra mussels during the drawdown.

## Control of zebra mussels

There was no control of zebra mussels within natural ecosystems conducted in 1997 and the DNR does not anticipate undertaking control activities at any time in the near future. There are still no 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 (see Education and Watercraft Inspections sections).

#### Research on zebra mussels

The DNR continued research to document increasing levels of zebra mussel infestation on native unionids in Lake Pepin on the Mississippi River. DNR Biologists also collected and analyzed plankton tows from Lake Pepin to examine veliger densities in the Mississippi River. Results indicate very high densities of veligers in the southern end of Lake Pepin from early July through mid-September. While this period represents the highest risk for zebra mussel attachment, veligers were found in the lake as early as June and continue to be present in low numbers through early October. Staff biologists also examined plankton tows collected by NPS and USFWS personnel from the St. Croix River, as well as slides set out on settling plate samplers. All lab samples from the St. Croix River were negative. DNR staff also attended the Seventh International Zebra Mussel Research Conference to gather current information on research being conducted in the United States and Canada.

## Management of zebra mussels in other states

Management efforts in other states are very similar to efforts in Minnesota. With no control options available, management focuses mainly on public awareness to prevent or slow the spread of the zebra mussel. The phrase "management of zebra mussels" must be viewed realistically. Because this organism can withstand a lack of water or oxygen for extended periods, has no environmentally acceptable control options for natural waters, spreads rapidly once established in a lake or river, and has 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

No inland lakes in Minnesota are known to be infested with zebra mussels. 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. Targeted public awareness and enforcement activities will be used to reduce the rate of movement of zebra mussels by trailered watercraft.

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## Participation with other groups

An interagency workgroup for the St. Croix River Zebra Mussel Response Plan continues to meet and coordinate efforts to try and prevent the zebra mussel from spreading into the St. Croix River. Wisconsin has a law similar to that in Minnesota prohibiting boats from having attached zebra mussels in the St. Croix River, making enforcement similar for the entire boating community of the St. Croix River. Both states required boat owners on the St. Croix River to remove and clean their boats this year when zebra mussels were found attached during routine monitoring dives.

The Minnesota DNR coordinated with the Wisconsin DNR is drafting a management plan to be submitted to the Federal agencies involved in exotics efforts. The plan requests funding assistance for zebra mussel activities on the St. Croix River.

Public awareness and education efforts have benefitted from cooperation from the many groups involved in the zebra mussel issue: federal and state agencies, National Sea Grant program and private industry. These efforts are covered more fully in the Education section.

# Future needs for management of zebra mussels

- Continue veliger sampling in Lake Pepin and attempt to document the occurrence and density of veligers from areas nearer to the Twin Cities in the Mississippi River.
- Continue coordinated monitoring efforts on the St. Croix River with other resource agencies.
- Monitor findings of international research efforts including the 1998 International Zebra Mussel Conference.

# 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 thirty 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 widely distributed in Minnesota. The rusty crayfish lives in permanent water bodies and grows slightly larger than Minnesota's native cravifsh 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. While its activities may also reduce diversity and abundance of native vegetation when rusty crayfish occurs at high densities, this reduction has also been seen 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 in some lakes were reported to feed heavily on rusty crayfish.

## Progress in management of rusty crayfish - 1997

The Minnesota Department of Natural Resources (DNR) Exotic Species Program does not currently conduct management of rusty crayfish and the Department is not aware of any other management activities within the state. A proposed reclassification of rusty crayfish would place it in the regulated category (currently it is designated a prohibited exotic species). This change is being proposed because pre-existing regulations conflict with the prohibited status and evidence suggests native species can cause harm similar to this exotic. Minnesota Rules prohibit the live sale of crayfish as bait, but allows their use for bait in the body of water where they are captured. Individuals can take and possess up to 25 pounds of crayfish for personal use. DNR Fisheries also requires a permit for importing live crayfish or eggs, transfer between water bodies or commercial harvest. A brief summary paper on the ecology and biology of this crayfish was distributed to fisheries and exotics staff.

#### Current distribution of rusty crayfish

In 1990, the rusty crayfish was reported from 16 water bodies in 12 counties scattered widely throughout the state from the northeast to the southwest (see Figure 7). Specimens collected by the DNR prior to this year placed it in two more waters, both border rivers (St. Croix River in Pine County and Rainy River in Koochiching County). Fisheries staff collected rusty crayfish from two more lakes this year: Spring Lake, in St. Louis County and Little Carnelian Lake, in Washington County. The proximity of these lakes to other recorded occurrences suggests that these locations are not new movements, but were simply not collected in the initial surveys. Judging from this widespread distribution, rusty crayfish are likely present in more Minnesota waters.

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Figure 7. Rusty crayfish distribution in Minnesota (Reproduced from Helgen, 1990, with DNR collections added).



#### 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 no effect on population density. A study of trapping in small ponds by the U. S. Fish and Wildlife Service (USFWS) 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 setting, trapping is not likely to succeed in reducing the population or problem.

#### Research on rusty crayfish

The Exotic Species Program is not currently conducting research on rusty crayfish. Researchers in Wisconsin have conducted studies on biology, ecology and impacts in northern Wisconsin lakes.

## Management of rusty crayfish in other states

There are no states that have 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 ever initiated from this management plan, with the exception of annual trapping at set sites to monitor population levels. Recent 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 of the lake, and a thriving fisheries is present.

# Future needs for management of rusty crayfish

 Survey crayfish through a variety of methods throughout Minnesota waters to better establish extent of rusty crayfish distribution.

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# Management of Ruffe

# **1997 Highlights**

- No ruffe have been discovered in inland waters of Minnesota.
- A Nonindigenous Fish Response Plan has been developed for the state.

## 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 - 1997**

Many of the activities conducted by the DNR and other cooperating agencies in past years to prevent the spread of ruffe were continued in 1997. 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. "Ruffe Watch" identification cards for anglers were reprinted in 1997 by MN Sea Grant in cooperation with the Great Lakes Sea Grant Network, the USFWS, and several state resource agencies. The Exotic Species Program and DNR fisheries biologists have developed a management plan for ruffe, round goby and other exotic species of fish. The plan will be sent out for review by organizations such as the Minnesota Sea Grant, University of Minnesota, and the USFWS.

#### Current distribution and inventory of ruffe

The USGS-BRD, Lake Superior Biological Station (previously the National Biological Service) has taken the lead role in ruffe population investigations in the Great Lakes and their tributaries. According to their surveys, the population of ruffe in the St. Louis River estuary remained consistent in 1997 and is currently estimated at about six million fish.

The USFWS Fishery Resources Offices will 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 will conduct surveillance in Canadian waters of Lake Superior and other Great Lakes. Ruffe have continued to expand their range

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since the original discovery of the St. Louis River estuary population. They have been found in Lake Superior as far east as Ontonagan, Michigan, a reproducing population was discovered in Thunder Bay, Ontario in 1994, and ruffe were discovered in Lake Huron for the first time in 1995 (Figure 8).



Figure 8. Confirmed Ruffe Sightings as of December 1997. (Source: U.S. Geological Survey - Biological Resources Division)

No ruffe were confirmed in Minnesota inland waters in 1997. The DNR is conducting no special surveillance surveys for ruffe in Minnesota inland waters. Section of Fisheries' lake surveys and angler reports will be the primary method of detecting movement of ruffe populations to inland waters. During routine fish population assessment netting, DNR's Section of Fisheries sets nets in inshore areas of Lake Superior. DNR Fisheries staff documented ruffe in Taconite Harbor for the first time in 1997.

## Control of ruffe

The Minnesota and Wisconsin DNR attempted to control ruffe in the Duluth area of Lake Superior and the St. Louis River beginning in 1988 using restrictive angling regulations and stocking of predator fish was to increase predation on ruffe by native fish. This tactic has not checked the ruffe population size or ruffe expansion.

In response to the discovery of ruffe in Lake Huron, and after consultation with the Council of Lake Committees of the Great Lakes Fishery Commission in November 1995 and a July 1996 meeting of the Ruffe control Committee, the Federal Ruffe Control Program was revised and submitted to the federal ANS Task Force. The current goal and objectives are available at http://www.fws/~r3poa/ashland/ruffe/index html.

The USFWS and the U.S. Geological Survey, Biological Resources Division (USGS-BRD) are conducting research on ruffe. Their current research topics include: monitoring ruffe in the St. Louis River estuary, monitoring areas of future expansion, monitoring native populations after ruffe invade, and predator food habits on ruffe. The use of stationary nets to remove ruffe was determined to be ineffective as a control tool.

Minnesota Sea Grant received \$2 million in funding from the National Sea Grant Program to be used on ruffe research and education efforts. They funded research projects focused on describing the impacts of ruffe and their colonization and reproduction patterns in the Great Lakes. Researchers at the University of Minnesota found the pheromones trigger sexual attraction and alarm response in ruffe. These chemicals may have potential in future management efforts.

An International Symposium on Biology and Management of Ruffe took place March 21-23, 1997 in Ann Arbor, Michigan. It was jointly sponsored by Minnesota and Michigan Sea Grant programs. The symposium featured Eurasian and North American ruffe experts.

Minnesota Sea Grant's Exotic Species Information Center has developed a searchable "Ruffe Database" located on Minnesota Sea Grant's Web Site (http://www.d.umn.edu/ ~seagr/). Over 75 research references can be searched by author, title, or year.

## Effectiveness of ruffe management

The state's predator stocking and restrictive angler regulations 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 and 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 (WDNR) 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. WDNR 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 entity, or the Indian tribes have 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 control efforts

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.

# 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 efforts to address the future potential for ruffe to enter the Mississippi River via outlets from Lake Michigan.
- Invest in and/or support research to develop environmentally sound control methods.
- Support continued biological assessment efforts by the DNR Section of Fisheries, 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.
- Finalize and circulate Minnesota's Nonindigenous Fish Plan that includes ruffe.
- Expand efforts to increase public awareness of ruffe in areas of Minnesota where introduction of ruffe may occur.

# Management of Round Goby

# 1997 Highlights

- A Nonindigenous Fish Response Plan which will guide future round goby management efforts in inland waters has been developed for the state.
- The U.S. Fish and Wildlife Service (USFWS) surveyed the Chicago waterways in the summer of 1997 to determine the distribution of round gobies in the waterways.
- Reseach was initiated to investigate potential management techniques that could be used to keep the round goby from entering the Mississippi River from the Illinois waterways. Funding was appropriated by the U.S. Army Corps of Engineers to test a barrier proposal.

## 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 (Jude et. al. 1992). 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 (Marsen, et. al. 1996). Populations of other species such as logperch and lake sturgeon may be harmed as well. If round gobies enter the Mississippi River basin, there is concern about their impacts on darters, several of which are federally listed threatened and endangered species (Busiahn personal communication). Because round gobies eat zebra mussels, there is also concern about the potential for round gobies to pass contaminates from zebra mussels to game fish such as smallmouth bass.

The round goby was designated a prohibited exotic species in the Department's permanent rules (see Appendix B). By placing round goby in this regulatory classification, transportation of the species will be prohibited on public roads (under Minnesota Statutes 84D.05 and 84D.13 in Appendix A), and the risk that it will be dispersed to inland waters of the state can be reduced.

#### Progress in management of round goby - 1997

An excellent review of literature has been compiled (Charlebois, et. al. 1996) is available.

Round goby identification cards 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, or when, round gobies are discovered in inland waters they will be reported to the DNR.

#### 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, the Lake Erie basin, Lake Michigan basin, the Chicago waterways, and now to the Lake Superior watershed (see Figure 9). The first two specimens of the round goby were discovered in the Duluth-Superior harbor (St. Louis River estuary) during 1995 and another was found in 1996. Round goby have not been identified in any inland waters in the state. The presence of round gobies in Lake Michigan and the Chicago waterways poses risk of introduction of round gobies into the Mississippi River watershed through the connected waters. A survey conducted by the USFWS in 1997 found gobies located in the Little Calumet River portion of the Chicago waterways, within 12 river miles downstream of Lake Michigan.





#### Research on round goby

Several research efforts regarding round goby began in the Great Lakes region before gobies were found in Minnesota. The primary research work has been done at the University of Michigan (Jude 1992 and 1995) and Illinois Natural History Survey. A Round Goby Conference was be held in Chicago on February 21-22, 1996 to review the latest information on the biology, spread, population dynamics, and impacts of the round goby. A conference summary "The Round Goby Neogobius melanostromus: A Review of European and North American Literature" was prepared (Charlebois, et al. 1997) and includes research priorities established during a roundtable discussion.

## Participation of others

Two other agencies have played a role in the discovery of round goby and subsequent education efforts to alert the public of the round goby's presence in the Duluth/Superior harbor. The USGS-Biological Resources Division discovered the species during its work in the Duluth area in 1995. Minnesota Sea Grant has been developing informational materials such as an identification card and issued press releases about the discovery in 1995.

Within the Great Lakes region, Illinois Natural History Survey and Illinois/Indiana Sea Grant have been active in conducting research and preparing informational materials. Illinois/Indiana Sea Grant developed a round goby fact sheet titled *Round Gobies Invade North America*. The fact sheet is being distributed throughout the Great Lakes region.

The Army Corp of Engineers and the U.S. Fish and Wildlife Service are trying to block to movement of round gobies into the Illinois River (Mississippi River drainage). Various types of barrier devices are being considered for testing including electrical barriers on the channel bottom.

# Future needs for round goby management

State

- Distribute round goby identification cards and fact sheets as part of the ongoing exotic species public awareness activities in the state.
- Finalize and circulate Minnesota's Nonindigenous Fish Plan that includes round goby.

#### Regional/National

- Support management actions that can be taken in the Illinois waterways to limit round goby spread to 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.

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## **References Cited**

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# Management of Eurasian Swine

# **1997 Highlights**

- No wild herds of Eurasian Swine are known to exist in Minnesota.
- DNR designated Eurasian Swine as a prohibited exotic species in proposed amendments to Minnesota Rules 6216.

# Background

The Minnesota Department of Agriculture (MDA) is responsible for regulating Eurasian Swine in Minnesota. Information of this species is included in this report because of the potential harm these animals could cause to terrestrial ecosystems. Eurasian swine (*Sus scofa* subspecies) and feral swine have escaped from captivity in a number of states and are causing significant problems. Until 1993, Eurasian swine were unregulated in Minnesota, except for testing for disease by the State Board of Animal Health. Many organizations in Minnesota called for Eurasian swine to be prohibited or closely regulated because of the potential ecological harm they could cause if wild populations became established. A Wild Hog Task Force, chaired by MDA conducted a survey of wildlife officials and chief veterinarians in other states to determine the degree of harm caused by wild hogs (Minnesota Department of Agriculture 1993). Many states indicated that free roaming swine damage streams, woodlands, croplands, and wildlife. According to the survey, 32 states consider free roaming wild hogs a liability.

Legislation in 1993 (see M.S. 17.457 in Appendix A) designated Eurasian swine as a restricted species. This designation was intended to keep Eurasian swine from escaping and becoming naturalized in the state. The restricted species legislation did the following:

- created a task force to conduct a study of Eurasian swine in the state and report to the legislature by January 1, 1995;
- made importation, possession, propagation, transportation and release of Eurasian swine unlawful in the state; except for herds that were in existence in the state on March 1, 1993;
- requires animals to be marked to identify ownership;
- requires that escaped animals must be reported to a DNR conservation officer within 24 hours of the escape.
- prescribes the penalty for violating the law as a misdemeanor;
- requires owners to file a bond with the state.

## Progress in 1997

Staff from MDA and DNR inspected two of the known Eurasian Swine herds in the state. MDA will issue permits for the inspected herds and send a letter to all owners of captive herds advising them of the requirements outlined in state statute.

The DNR also proposed amendments to Minnesota Rules 6216 that would designate Eurasian Swine as a prohibited exotic species. This designation would be consistent with state statutes for Eurasian Swine.

# **Current distribution of Eurasian swine**

No wild populations of Eurasian swine are known to exist in the state. There are five known herds of Eurasian swine held in captivity in Minnesota and registered with the Board of Animal Health as required by 1993 legislation. There may be additional herds in captivity that have not been registered. Quick and inexpensive methods are not available to determine the genetics of swine, making it difficult to determine if swine herds in Minnesota are Eurasian or domestic (*Sus scofa domesticus*).

## Management in other states

A survey conducted in 1993 by MDA revealed that:

- 12 states have organized control efforts to reduce the number of wild hogs
- 19 states allow hunting of wild hogs, many with year round hunting and no limits

# Participation of others

The MDA is responsible for regulating Eurasian swine in the state. DNR offers its assistance to MDA for control of this species and encourages MDA to fully implement the items identified in the Wild Hog Report (Wild Hog Task Force 1994).

# Future needs for Eurasian swine management

- The DNR will support efforts by MDA to identify non-registered herds.
- The DNR will support efforts by MDA to inspect facilities holding registered herds and issue permits when appropriate.
- The DNR will support efforts by MDA to develop methods to differentiate between domestic and Eurasian swine herds.

# **References Cited**

Minnesota Department of Agriculture. 1993. Summary of a Survey on the Status of Wild Hogs in the United States. Unpublished Report.

Wild Hog Task Force. February 1994. Wild Hog Report. Prepared for the 1994 Legislative Session, Minnesota Department of Agriculture.

# **Management of Mute Swan**

# **1997 Highlights**

- DNR developed a database of mute swan occurances in the state.
- The DNR proposed to designate the mute swan as a regulated exotic species in Minnesota Rules 6216.
- Mute swans succesfully nested and produced two young in the state.

## Background

Mute swans (*Cygnus olor*) are native to Europe and Asia and were introduced into the United States from the mid 1800s through the early 1900s (Lever 1987, Ciaranca et al 1997). Mute swans have escaped or been released from golf courses, avicultural and park settings occasionally 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 Hubbard County. Ciaranca et al (1997:1) reports that all North American populations of mute swans originated from release or escape of individuals from captive flocks.

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 is unlikely 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 (Johnson, pers. comm. 1991); 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."

Mute swans are currently regulated in part by the state game farm statues in M.S. 97A.105 (see Appendix A). It is illegal to release mute swans into the wild under those statutes.

# Progress in Management in 1997

The DNR developed a database of mute swan sitings and capitive flocks to monitor their distribution in the state. The DNR proposed to designate mute swans as a regulated exotic species in Minnesota Rules 6216 because it is desirable to prevent the establishment of a naturalized population of mute swans (Temple 1992). This proposed designation mirrors the Minnesota Statute, section 97A.105 which prohibits the introduction of mute swans into the wild without a permit. The proposed designation will classify the mute swan into a class consistent with statutory restrictions on the species. Also, designation as a "regulated exotic species" would require reports of escaped mute swans which would help prevent the establishment of naturalized populations in the state.

## Management in other States

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 1997:1). Lever (1987:26) reports that at Chesapeake Bay where one or two pairs escaped or were released in 1962, they have multiplied to 500 individuals which may be competing with other water birds. Recent articles from The Maryland Sun quote a state biologist reporting "there are 2700 of the birds in Maryland ... they've been increasing at 15% a year." The same individual reports harmful impacts to reproduction of native waterbirds.

## Future Management Needs

- Verify occurances of mute swans in the state and take appropriate actions to have the birds confined under game farm licenses or capture the naturalized birds.
- 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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# Update on Exotic Water Lilies

# Background

At least three species of waterlily are native to Minnesota (*Nymphaea odorata, N. tuberosa, N. leibergii*), are considered valuable to Minnesota water bodies and are protected by the MDNR. At least 46 species of the waterlily genus, *Nymphaea*, (Jones and Luchsinger 1986) and more than 100 *Nymphaea* cultivars are not considered native to Minnesota. Many of these non-native waterlilies have colorful and showy flowers that make them a popular choice for water gardeners.

The DNR is concerned that exotic water lilies may be introduced into Minnesota water bodies where they may become overabundant and/or may crossbreed with native species. Exotic waterlilies have caused problems in Washington State lakes (Anon. No date) and have overwintered and spread in New England (Hellquist, pers. comm). Many exotic waterlilies that are available through the horticultural trade are advertised as hardy in Minnesota. Both hardy and tropical exotic waterlilies shipped to Minnesota may contain other exotic species such as zebra mussels or exotic submersed plants.

In 1997, the MDNR documented non-native waterlily populations in three water bodies (Table 20). At the Portage River site in Hubbard County, these exotic lilies have survived for at least ten years and have spread along several hundred feet of lakeshore.

County	Water body	DOW #	Year reported
Crow Wing	Bay Lake	18-0034	1995
Hubbard	Portage Lake	29-0250	1997
	Portage River (between Portage & Fish Hook Lakes)	n/a	1987

#### Table 20. Locations of exotic waterlilies in Minnesota.

## **References Cited**

Anonymous. No date. Lily: written findings of the Washington State Noxious Weed Control Board. 4 pp. (On web site: http://www.wa.gov/ecology/

wq/plants/aqua005.html).

Hellquist, B. 1997. personal communication. (Email message to C. Welling 31 Oct. 1997).

Jones, S.B., Jr. and A.E. Luchsinger. 1986. Plant Systematics. 2nd Ed. McGraw-Hill Book Co. New York. pp 305-6. M.S. 84D.01

# Appendix A - Minnesota Statutes Regarding Exotic Species CONTENTS

#### MINNESOTA STATUTES - HARMFUL EXOTIC SPECIES

**DEFINITIONS.** 

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- M.S. 84D.04 CLASSIFICATION OF EXOTIC SPECIES. (Classes; Criteria)
- M.S. 84D.05 PROHIBITED EXOTIC SPECIES. (Prohibited activities; Seizure)
- M.S. 84D.06 UNLISTED EXOTIC SPECIES. (Process; Classification)
- M.S. 84D.07 REGULATED EXOTIC SPECIES.
- M.S. 84D.08 ESCAPE OF EXOTIC SPECIES.
- M.S. 84D.09 AQUATIC MACROPHYTES. (Transportation prohibited; Exceptions)
- M.S. 84D.10 PROHIBITED ACT; WATERCRAFT.
- M.S. 84D.11 PERMITS. (Prohibited exotic species; Regulated exotic species, Standard)
- M.S. 84D.12 RULES. (Required rules; Authorized rules; Expedited rules)
- M.S. 84D.13 ENFORCEMENT; PENALTIES. (Criminal Penalties; Civil penalties)
- M.S. 84D.14 CERTAIN SPECIES NOT SUBJECT TO CHAPTER.

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

M.S. 84.027	POWERS AND DUTIES. (Game and fish rules)
M.S. 86B.415	LICENSE FEES. (Watercraft surcharge)
M.S. 97A.105	GAME AND FUR FARMS. (License requirements - mute swan)
M.S. 97A.205	ENFORCEMENT OFFICER POWERS.

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

#### SELECTED MINNESOTA STATUTES - NOXIOUS WEEDS

- M.S. 18.75 PURPOSE
- M.S. 18.76 CITATION
- M.S. 18.77 DEFINITIONS. (Noxious weed)
- M.S. 18.78 CONTROL OR ERADICATION OF NOXIOUS WEEDS. (Purple loosestrife)
- M.S. 18.79 DUTIES OF THE COMMISSIONER (OF AGRICULTURE).

(Enforcement; Rules; Order For Control Or Eradication Of Noxious Weeds)

#### SELECTED MINNESOTA STATUTES - RESTRICTED SPECIES, EXOTIC SPECIES

M.S. 17.457 RESTRICTED SPECIES. (Eurasian wild pigs; Importation; Permits)

#### MINNESOTA STATUTES - HARMFUL EXOTIC SPECIES

(Note: Minnesota Statutes, chapter 84D became effective May 1, 1996 and replaced several statutes that pertained to Eurasian water milfoil, ecologically harmful exotic species, and purple loosestrife.)

#### 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 nonwoody plant, either a submerged, floating leafed, floating, or emergent plant that naturally grows in water or hydric soils.

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 watermilfoil. "Eurasian watermilfoil" 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 freeliving state.

Subd. 10. Limited infestation of Eurasian watermilfoil. "Limited infestation of Eurasian watermilfoil" means a body of water designated by the commissioner under sections 84D.03, subdivision 2, and 84D.12.

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 watermilfoil 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 watermilfoil. These programs must include: (1) compiling inventories and monitoring the growth of purple loosestrife and Eurasian watermilfoil 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 watermilfoil 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, between May 1 and October 15 for a minimum of 20,000 hours, watercraft and associated equipment, including weed harvesters, that leave or are removed from infested waters.

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; LIMITED INFESTATIONS OF EURASIAN WATERMILFOIL.

Subdivision 1. Infested waters. 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.

Subd. 2. Limited infestations of Eurasian watermilfoil.

(a) The commissioner shall designate a water of the state as a limited infestation of Eurasian watermilfoil if:

 the commissioner determines that Eurasian watermilfoil occupies less than 20 percent of the littoral area of the water, up to a maximum of ten acres;

(2) mechanical harvesting is not used to manage Eurasian watermilfoil in the water; and

(3) Eurasian watermilfoil control is planned for the water.

(b) The commissioner shall mark limited infestations of Eurasian watermilfoil in accordance with rules adopted by the commissioner under section 84D.12.

(c) Except as provided in rules adopted under section 84D.12, a person may not enter a marked area of a limited infestation of Eurasian watermilfoil.

#### 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;

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.

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#### 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;
#### Harmful Exotic Species in Minnesota

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

(5) when harvested for personal 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.

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. A conservation officer or other licensed peace officer may order:

 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. 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 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;

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

(4) designating, and governing the marking and use of, limited infestations of Eurasian watermilfoil.

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;

(4) limited infestations of Eurasian watermilfoil; and

(5) 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 watermilfoil limited infestation; or

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

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 watermilfoil 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 watermilfoil, \$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, limited infestations of Eurasian watermilfoil, 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 watermilfoil 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.

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 18.88 contain procedures for controlling and eradicating noxious 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, EXOTIC 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.

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.

#### Appendix B - Minnesota Rules Regarding Harmful Exotic Species

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#### WATERWAY MARKERS

**M.R. Chapter 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 - HARMFUL EXOTIC SPECIES

(Effective April 29, 1996)

#### M.R. 6216.0100 PURPOSE.

The purpose of parts 6216.0100 to 6216.0600 is to prevent the spread of harmful exotic species, and prohibited exotic aquatic plants and wild animals, into and within the state as authorized by Minnesota Statutes, sections 17.457, 18.317, and 84.967 to 84.9692 [Note: New rulemaking authority is in Minnesota Statutes, sections 84D.12].

#### M.R. 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, sections 17.457, 17.4984; 174985, 18.317, 84.967 to 84.9692, and 97A.015, unless otherwise noted in this part.

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. 4. **Infested waters.** "Infested waters" means water and water bodies identified by the commissioner as having populations of select harmful exotic species such as zebra mussel, Eurasian watermilfoil, ruffe, spiny waterflea, or white perch.

Subp. 5. Littoral area. "Littoral area" means those areas of a water body 15 feet or less in depth.

#### M.R. 6216.0250 PROHIBITED EXOTIC SPECIES.

Subpart 1. **Designation.** The species in subparts 2 to 5 are prohibited exotic species because they pose a substantial threat to native species in the state.

#### Subpart. 2. Aquatic Plants.

- A. Eurasian watermilfoil (Myriophyllum spicatum);
- B. hydrilla (Hydrilla verticillata);
- C. European frog-bit (Hydrocharis morsus-ranae);
- D. flowering rush (*Butomus umbellatus*)
- E. any variety, hybrid, or cultivar of purple loosestrife (*Lythrum salicaria, Lythrum virgatum*, or combinations thereof); and
- F. water chestnut (Trapa natans).

#### Subp. 3. Fish.

- A. grass carp (Ctenopharyngodon idella);
- B. rudd (Scardinius erythrophthalmus);
- C. round goby (Neogobius melanostomus);
- D. ruffe (Gymnocephalus cernuus);
- E. sea lamprey (*Petromyzon marinus*); and
- F. white perch (Morone americana).

#### Subp. 4. Invertebrates.

- A. rusty crayfish (Orconectes rusticus); and
- B. zebra mussel species (all species of the genus Dreissena).

#### Subp. 5. Mammals.

- A. Asian raccoon dog, also known as finnraccoon (*Nyctereutes procyonoides*);
- B. European rabbit (Oryctolagus cuniculus); and
- C. any strain of nutria (Mycocastor coypu).

# M.R. 6216.0300 IDENTIFICATION, NOTICE, AND MARKING OF INFESTED WATERS AND LIMITED INFESTATIONS OF EURASIAN WATERMILFOIL.

Subpart 1. **Identification of infested waters and notice.** The commissioner shall identify infested waters. The commissioner shall publish the names of identified water bodies in the State Register before May 1 of each year and provide notice though other available means where practical. The department shall post signs describing such infestation at all public accesses to identified water bodies. At any time the commissioner may identify additional water bodies or identify those water bodies which no longer are infested waters.

Subpart 2. Identification of limited infestations of Eurasian watermilfoil and notice. The commissioner shall identify water bodies having limited infestations of Eurasian watermilfoil as defined in Minnesota Statutes, section 84.967, subdivision 3. The commissioner shall publish the names of identified water bodies in the State Register before May 1 of each year and provide notice though other available means where practical. The department shall post signs describing the infestation at all public accesses to identified water bodies. At any time the commissioner may identify additional water bodies or identify those water bodies which no longer have limited infestations.

Subp. 3. **Delineation and markers for limited infestations of Eurasian watermilfoil.** Areas of infestation of Eurasian watermilfoil where control is planned in water bodies identified as having limited infestations shall be marked by the commissioner, or other persons authorized by the commissioner, using buoys or signs as specified in part 6110.1500, subpart 7. A minimum of three buoys or signs must be used to delineate an infested area, and placed at intervals of not more than 300 feet apart. In addition, at least two buoys or signs shall be placed at or near the shoreline to delineate an infested area if adjacent to shore. Buoys or signs shall be removed after control actions are completed.

# M.R. 6216.0400 RESTRICTED ACTIVITIES ON INFESTED WATERS AND WATERS WITH LIMITED INFESTATIONS OF EURASIAN WATERMILFOIL.

Subp. 1. Prohibition of taking bait from infested waters. The taking of wild animals from infested waters for bait purposes is prohibited.

Subp. 2. Prohibition of sport gill netting for whitefish and ciscoe in infested waters. If the commissioner identifies waters that are open to sport gill netting for whitefish and ciscoe in infested waters, the commissioner may close the gill netting season for the identified water body or require that gill nets used in the infested waters not be used in other water bodies. The commissioner shall publish the names of identified 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 identified water bodies.

Subp. 3. **Commercial fishing restrictions in infested waters.** Nets, traps, buoys, anchors, stakes, and lines used for commercial fishing 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 from infested waters and before resetting those nets in noninfested waters.

Subp. 4. Prohibition on entry into delineated areas marked for limited infestation of Eurasian watermilfoil.

A. Entry by boaters, anglers, or other water users and their equipment into marked areas of a water body where limited infestations of Eurasian watermilfoil have been delineated in accordance with part 6216.0300 is prohibited, except in emergency situations where property or human life is endangered.

B. Enforcement, emergency, resource management, and other government personnel or their agents may enter into waters where limited infestations of Eurasian watermilfoil have been delineated in accordance with part 6216.0300 when performing official duties. Owners or lessees of land adjacent to delineated areas who do not have water access to their land other than through the delineated area may use the shortest and most direct route through the delineated area for such access.

# M.R. 6216.0500 TRANSPORTATION AND APPROPRIATION OF WATER FROM INFESTED WATERS.

Subpart 1. **Transporting water and live fish from infested waters.** Water from infested waters may not be used to transport fish. Live fish taken under a commercial fishing license may be transported from infested waters to other waters or holding facilities from May 1 through 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 fish from infested waters.** Water used to transport live fish 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 identified as having populations of zebra mussel or spiny water flea including, but not limited to, Minnesota waters of the Mississippi River downstream of St. Anthony Falls; Minnesota waters of Lake Superior including waters of the St. Louis River downstream of the mouth of the Cloquet River; waters of the Minnesota River downstream of Shakopee; Island Lake Reservoir in St. Louis County; and the Cloquet River downstream from Island Lake Reservoir, must drain bait containers, other boating-related equipment holding water, 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.

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#### Harmful Exotic Species in Minnesota

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 identified 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 exotic species may be used for aquatic farm or private hatcheries under license by the department. 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 the 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 exotic species.

D. Fish raised in artificial water basins that have populations of populations of prohibited exotic species, or in any facility using infested water as a source, must be sold directly to a wholesale buyer for processing, or for stocking in other waters containing populations of prohibited exotic species, provided it contains the same prohibited exotic species as the source waters.

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.

#### M.R. 6216.0600 VIOLATIONS; CONFISCATIONS.

Unless a different penalty is prescribed, a violation of parts 6216.0100 through 6216.0500 is a misdemeanor as set forth in Minnesota Statutes, sections 18.317 and 84.9691. Where a violation has occurred, the department may confiscate the exotic species immediately upon discovery wherever found and, at the departments' discretion, destroy it. Where infested water is being appropriated, or diverted or transported without a permit, or otherwise contrary to the provisions of parts 6216.100 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 - Infested Waters in Minnesota

#### Waters infested with Eurasian watermilfoil

The following water bodies are infested with Eurasian watermilfoil (*Myriophyllum spicatum*).

County	Water body
Anoka:	Cenaiko, Crooked, Otter, Unnamed (in Springbrook Nature Center)
Carver:	Ann, Auburn, Bavaria, Fireman's, Lotus, Minnewashta, Pierson, Riley, Schutz, Stone, Virginia, Waconia, Zumbra
Chisago:	Green Lake, Rush
Crow Wing:	Bay, Ruth
Dakota:	Crystal, Lac Lavon, Twin Lakes
Douglas:	Oscar
Hennepin:	Arrowhead, Brownie, Bryant, Bush, Calhoun, Cedar, Christmas, Dutch, Eagle, Fish, Forest, Harriet, Hiawatha, Independence, Lake of the Isles, Libbs, Little Long, Long, Medicine, Minnehaha Cr., Minnetonka, Niccum's Pond, Nokomis, Parker's, Rebecca, Rice, Round, Sarah, Schmidt, Swan, Whaletail, Wirth
Kanabec:	Knife
Olmsted:	George
Pope:	Gilchrist
Ramsey:	Bald Eagle, Gervais, Island, Keller, Phalen, Round, Silver, Sucker, Vadnais, Wabasso
Scott:	Lower Prior
Todd:	Sauk Lake
Washington:	White Bear, St. Croix R.
Wright:	Augusta, Beebe, Clearwater, Little Waverly, Mary, Pulaski, Rock, Sugar, Waverly
Multiple:	Mississippi River: downstream of St. Anthony Falls

#### Waters infested with round goby

The following water bodies are infested with round goby (Neogobius melanostromus).

#### <u>County</u> <u>Water body</u>

Multiple: Lake Superior, St. Louis River: downstream of the Fond du Lac dam

#### Waters infested with ruffe

The following water bodies are infested with ruffe (Gymnocephalus cernuus).

CountyWater bodyMultiple:Lake Superior, St. Louis River: downstream of the Fond du Lac dam

#### Waters infested with spiny water flea

The following water bodies are infested with spiny waterflea (*Bythotrephes* cederstroemi).

- <u>County</u> <u>Water body</u> St. Louis: Fish Lake, Island Lake
- Multiple: Lake Superior, Cloquet River from Island Lake to the St. Louis River, St. Louis River: downstream of the Cloquet River

#### Waters infested with white perch

The following water bodies are infested with white perch (Morone americana).

<u>County</u> <u>Water body</u> Multiple: Lake Superior, St. Louis River: downstream of the Fond du Lac dam

#### Waters infested with zebra mussels

The following water bodies are infested with zebra mussel (Dreissena sp.).

<u>County</u> <u>Water body</u>

Multiple: Lake Superior, Mississippi River: downstream of St. Anthony Falls, St. Louis River: downstream of the Fond du Lac dam

### Unlawful under Minnesota laws to:

- Transport aquatic plants or prohibited exotic species (e.g., milfoil, zebra mussels) on public roads.
- Place a boat or trailer with attached aquatic plants or prohibited exotic species into Minnesota water.
- Transport water from infested waters.

#### (Fines up to \$1000)



For information on Personal Watercraft laws, contact DNR-Boat and Water Safety 612-296-3336 or 800-766-6000

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Inside are 6 tips to help you keep exotics off your personal watercraft and from spreading to other Minnesota waters.

# APPENDIX D Personal Watercraft Exotics Brochure

# **Remember: Clean Boats, Clean Waters**

Personal watercraft have a jet drive system which requires some extra precautions to avoid spreading harmful aquatic exotic species. A

pump pulls water in through an opening under the craft, and the impeller (an internal propeller) forces water out, moving the craft forward. Exotic species can easily get lodged in the jet drive system and get transported if the watercraft is taken from one water body



to another. A small piece of Eurasian watermilfoil, or other harmful exotic species, caught on the impeller can infest a new lake or river. Zebra mussels could live in excess water in the jet drive and spread to another water body.



Here are some tips for ensuring a clean, exotics-free watercraft before you leave a water access area.

# In The Water:

Avoid running the engine through aquatic plants near the boat access.

After the engine has stopped, turn the watercraft over while still in the water and pull plants from the water-intake area (this may be easier than crawling under the watercraft while trailered to check for plants). Check the edges of the grate over the water-intake area.

Push or winch the watercraft up on the trailer without running the engine.

# **After Trailering :**

After you have pulled the watercraft out of the water, start and run the engine for 5 to 10 seconds, to blow out any excess water and vegetation. (The dark, damp enclosed area of the impeller provides an ideal environment for exotic plants to survive.)

**5** After the engine has stopped, pull plants out of the steering nozzle.

O Inspect your trailer and any other sporting equipment for aquatic plant fragments, and remove them before you leave the access.

Harmful Exotic Species in Minnesota