Harmful Exotic Species of Aquatic Plants and Wild Animals in Minnesota

Annual Report 1999

for the year ended December 31

Minnesota
DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources

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1999 Annual Report Highlights

Monitoring Populations of Harmful Exotic Species

- Eurasian watermilfoil was discovered in seven additional Minnesota lakes, including Lake McKinney and Ice Lake in Grand Rapids, and Gilbert Pit Lake in Gilbert in northeastern Minnesota.
- Only two boats with attached zebra mussels were discovered on the Minnesota-side of the St. Croix River and no infestations were reported from inland lakes.
- Biological control insects significantly damaged many purple loosestrife infestations throughout Minnesota by totally or partially defoliating all the loosestrife plants at these sites.

Limiting the Spread and Preventing Introductions

- Exotic species awareness events were conducted by DNR watercraft inspectors at popular outstate lakes that are not infested waters.
- Road checks conducted by Conservation Officers continued to find aquatic vegetation in or on about 20% of the trailered boats inspected.
- Whole-lake treatments using a broad spectrum herbicide (Sonar AS) were conducted in Lake McKinney and Ice Lake to reduce the risk that Eurasian watermilfoil will spread to other lakes in the Grand Rapids area.

Cooperation

- The DNR partially funded and helped produce a 30-minute TV special and video about *Aquatic Invaders*.
- The University of Minnesota Sea Grant Program, DNR, and aquaculture and bait fish industry representatives are working together to minimize the potential that aquaculture or bait fish production will spread harmful exotic species or that harmful exotics will adversely impact industry operations.
- A wide variety of partners, including County Agriculture Inspectors, MN Department of Agricultural staff, MN Department of Transportation staff, DNR Wildlife Managers, Nature Centers, and 4-H and garden clubs, raised and distributed more than 1.3 million leaf-eating beetles to help manage purple loosestrife infestations.
- Cooperators on 35 lakes took the lead identifying and implementing Eurasian watermilfoil management efforts.

Research

- The University of Minnesota Sea Grant Program hosted the 9th International Zebra Mussel and Aquatic Nuisance Species Conference in Duluth allowing local resource managers to learn about new research findings.

Emerging Issues

- Three exotic fish species that are already in, or could escape into, the Mississippi River basin are of significant concern: bighead carp, round goby, and black carp.

Executive Summary

This report is required by state statute and describes the progress made during 1999 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 species of 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 generate approximately $1,100,000 annually and additional funding comes from other sources. Activities documented in this report occurred in state fiscal years 1999 (FY99) and 2000 (FY00). A breakdown of FY99 expenditures by major category, as well as expenditures planned in FY00, are shown in Table 1.

Table 1. Water recreation account spending (in thousands of $s) by the exotic species program in fiscal year 1998 (FY98) and fiscal year 1999 (FY99) and projected spending in fiscal year 2000 (FY00).

	FY98	FY99	FY00
Administration	156	135	135
Program Planning Direction	136	126	94
Public Awareness	57	114	105
Control/Management	235	287	256
Inspections/Enforcement	379	358	412
Research	85	127	124
Totals	$ 1,048	$ 1,147	$ 1,126

The three primary goals of the Exotic Species Program are:

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

To accomplish these goals the DNR and its cooperators undertake a wide variety of activities (A program summary is shown on page 5). This report details the program's progress in these areas in 1999 and provides species specific updates for Eurasian watermilfoil, purple loosestrife, zebra mussels, flowering rush, and curly-leaf pondweed, rusty crayfish, ruffe, round goby, mute swan, and Eurasian swine. Information on emerging exotic species issues is also provided.

Inventory efforts conducted in 1999 showed that current efforts to prevent the spread of harmful exotic species within Minnesota have been mostly successful. Eurasian watermilfoil populations were confirmed in seven additional lakes (including three lakes in the Grand Rapids area) and 47 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 flowering rush, spiny waterflea, zebra mussels, ruffe, or round goby have expanded their range in Minnesota. However, in 1999 densities of zebra mussels and round gobys in Duluth Harbor were the highest ever recorded. It is not known why the zebra mussel population in the harbor is increasing now after nearly a decade of little or no reproduction.

The Exotic Species Program continued efforts to keep Minnesotan's well informed about exotic species and the problems they can cause, and to promote the adoption of "Clean Boats" behavior. A well informed public is an important strategy in DNR efforts to prevent the spread of harmful exotic species. In 1999, DNR continued to use paid TV and radio ads and undertook cooperative efforts with the University of Minnesota Sea Grant Program to reach the boating public. Survey results indicate that past educational efforts have been effective at elevating Minnesotan's awareness of exotic species. However, to maintain awareness important messages have to continually repeated and, 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 Exotic Species Program stations water inspectors (Minnesota Conservation Corps employees) at public water access points to make the boating public aware of exotic species and provide advice on how to clean watercraft. The Minnesota Legislature mandated (M.S. 84D.02, Subd. 4) that the DNR annually accomplish 20,000 hours of water access inspection activity on "infested waters". In 1999, for the first time, inspections on "non-infested" waters where allowed to count towards the 20,000 hour requirement. In response, the DNR held two awareness building weekends at popular out-state designations for Metro-area boaters. Seven watercraft inspectors spend one weekend on Pelican and Gull Lakes near Brainerd and another weekend on Leech Lake and Lake Winnebigoshish. In total for 1999, over 20,700 hours of inspection activity was logged and over 41,400 trailered watercraft were inspected (about 3% of this activity occurred on non-infested waters). Special inspection efforts continue to be focused on events (e.g. fish tournaments, sailing regattas, water ski tournaments, and the waterfowl hunting season) that bring many watercraft users to infested waters. The watercraft inspectors also talk with thousands of additional Minnesotans during the State Fair at DNR's Exotic Species exhibit.

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

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

Road checks of trailered boats represent another method to evaluate the success of efforts to prevent the spread of exotic species. Trailered boats represents an important vector to move exotic species between water bodies and the DNR's goal is to increase the percentage of "clean boats". Conservation Officers conducted four major road checks in 1999 where nearly 500 boats were inspected to assess compliance with laws that prohibit transporting aquatic vegetation and zebra mussels on public roads. Aquatic vegetation was found in, or on, about 20% of the watercraft inspected, a rate which is comparable to that observed in 1997 and 1998. Watercraft inspectors also check boats entering and leaving the accesses where they are doing inspections. Their results show a different pattern; on average 26% of boats pulling out of a lake or river had vegetation attached (before cleaning) while vegetation was present on 4 - 8% of the boats coming to the access area. In total, Conservation Officers spent 1,250 hours enforcing exotic species laws and rules during the year.

The Exotic Species Program also attempts, alone or in cooperation with various groups, to reduce the impacts caused by harmful exotic species to Minnesota's ecology, society, and economy. A wide variety of management actions were taken in 1999 with this goal in mind. DNR conducted or assisted with Eurasian watermilfoil control and/or management efforts on 47 lakes, purple loosestrife control and/or management efforts on 332 sites (131 sites were identified to be sprayed with herbicide while biocontrol insects were released at 201 sites), and continued to coordinate flowering rush management activities in the Detroit Lakes and Twin Lakes areas. Local partners are extremely important for the success of these efforts. For example, on a majority of the lakes where Eurasian watermilfoil is managed, a local partner takes the lead while the Exotic Species Program provides technical and financial assistance. Likewise, a broad group of partners assist with the rearing of the leaf-eating beetles that are being introduced to control purple loosestrife infestations. In 1999, groups cooperating with the Exotic Species Program raised and released nearly 1.3 million beetles (about 90% of the total production). The Exotic Species Program will continue to cooperated with various groups to accomplish its public awareness, containment, management, and research goals.

Targeted research, to improve existing management approaches, can aid in reducing the impacts caused by harmful exotic species. The Exotic Species Program assisted with and/or funded a variety of research efforts during 1999 focused on improving the management of Eurasian watermilfoil, purple loosestrife, flowering rush, and curly-leaf pondweed, and developing technology to remove exotic organisms from ballast water. Funding recommended by the Legislative Commission on Minnesota Resources (LCMR) and appropriated by the Legislature continued to support a large, on-going, effort to develop biological-control methods for Eurasian watermilfoil and expand biological controls for purple loosestrife. Cooperators play an important in these research effort, including conducting basic research, helping implement field tests, and analyzing study results. During 1999 staff from the University of Minnesota, Cornell University (NY), the Queens University (Ontario), the Army Corps of Engineers Aquatic Plant Research conducted funded research that may improve exotic species management in Minnesota while the City of Eagan and the Lake Benton Area

Association helped the Exotic Species Program conduct field tests.

The Exotic Species Program's efforts in 1999 to prevent the introduction of new harmful exotic species to Minnesota were focused in two areas. Because the source of these species is outside Minnesota, program staff worked with resource agencies in neighboring states and provinces, as well as at the Federal level, to develop complementary management approaches for these harmful exotic species. Management efforts should be far more efficient and cost-effective, if there are common and cooperative actions among groups of states/provinces. The second focus of 1999 prevention efforts was to identify pathways that do, or likely will, bring new harmful exotic species to Minnesota and develop/implement steps to reduce those risks. For example, various retail outlets were offering flowering rush for sale in 1999. This exotic aquatic plant is on Minnesota's prohibited species list and its sale and possession is illegal in Minnesota under most circumstances. The Department contacted the retail outlets who were selling flowering rush and their distributors and the plant was removed.

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 that harm agricultural crops. Information about control, prevention, and regulatory 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 (EWM) control (see M.S. 84D.02, Subd. 2 in Appendix A).

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

Responsibilities assigned to the DNR

The purpose of 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:

(1) 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 is beneficial for coordinating efforts within the state, and establishing priorities for prevention, management, and research activities.

The DNR is assigned responsibility for designating *infested waters* (see M.S. 84D.03 in Appendix A). Water bodies are designated *infested* if they contain certain harmful exotic species 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* lists are included (Appendix B).

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

Prevention activities, such as identifying potentially harmful species in other areas of North America and the world, predicting pathways of spread, and developing and implementing solutions that reduce introduction and spread, are important. The Exotic Species Program continued to participate in prevention efforts in 1999. For example, the program participated in and partially funded the Great Lakes regional demonstration project to test technology that could help eliminate exotic organisms in the ballast tanks of ships.

Program staff

Exotic Species Program Coordinator	Jay Rendall	651-297-1464
Purple Loosestrife Coordinator*	Luke Skinner	651-297-3763
Eurasian Watermilfoil Coordinator (acting)*	Wendy Crowell	651-297-8021
General Exotic Species Issues*	Nicole Hansel-Welch	218-828-6132
	Nick Proulx	651-284-3589
Watercraft Inspections*	Michelle Bratager	612-297-4891
Zebra Mussels \ Exotic Aquatic Invertebrates*	Gary Montz	612-297-4888
Enforcement	Mark Johanson	651-772-7906
Budget Management	Dave Wright	612-297-4886
General Information		651-296-2835

Responsibility for overall coordination of the DNR's Exotic Species Program is assigned to the Exotic Species Program Coordinator (Jay Rendall) within the Division of Fish and Wildlife's Administrative Services Unit. Exotic species policy, rulemaking, legislation, state representation on the Great Lakes Panel on Aquatic Nuisance Species, state participation on the Mississippi Interstate Cooperative Resource Association's (MICRA) Aquatic Nuisance Species committee, 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.

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.

Division of Fish and Wildlife 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.

Division of Enforcement Conservation Officers are responsible for enforcing the state regulations regarding harmful exotic species. A regional Enforcement Supervisor now acts as exotic species enforcement coordinator within the Division of Enforcement to assist in scheduling, conducting, and reporting on enforcement activities related to harmful exotic species. A chapter describing enforcement activities is included in this report (see Enforcement).

Minnesota Conservation Corps (MCC) In 1999, 33 corps members spent over 20,700 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).

Bureau of Information and Education 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 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 Future Resources Fund (Table 2). In 1999, the program received federal funding from the U. S. Fish and Wildlife Service in the amount of $19,000, to implement an interstate management plan that addresses prevention and management of aquatic nuisance species on the St. Croix River.

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 1999, 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. A portion of the 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 milfoil control efforts (see Eurasian Watermilfoil).

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. Participation on this regional panel, established by a federal act, 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. The Mississippi Interstate Cooperative Resources Association (MICRA) has an aquatic nuisance species committee. Jay Rendall represents the state on that committee and was the committee chairperson in 1999.

Luke Skinner, Purple Loosestrife Coordinator, has been involved in regional and national efforts to use biological controls to manage purple loosestrife. He is a member of the National Biological Control Planning Committee established to develop national guidelines for implementation of biological controls for purple loosestrife. Through their efforts in 1999, $300,000 was provided from the USFWS to raise and distribute biological control insects nationwide.

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, chaired the multi-agency St. Croix River Zebra Mussel Task Force during 1996, 1997, and 1998 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

- Continue to identify exotic species which are, or may be likely to, enter 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.
- Continue regional and national coordination to help prevent or minimize potential introductions of harmful exotic species by entities outside the state.

References Cited

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

Emerging Issues

Introduction

It's obvious from what happened in 1999 that new exotic species continue to threaten Minnesota's natural resources and that the state needs to constantly adjust its management and prevention efforts to address these new threats. In the past year, one bird species has invaded the state, exotic aquatic plants were illegally imported for sale, and we have identified other species that are likely to invade Minnesota soon.

While it is impossible to predict with certainty when, where, or how new introductions will occur, they represent a significant threat to the state's ecosystems and related recreation and commerce activities. This chapter highlights a number of these threats, the response by Minnesota and others, and future work that needs to be done to lessen the potential harm from the invaders and reduce the likelihood that others will follow.

Emerging Issues - 1999

- Black carp are already present in, or are proposed for use in, aquaculture ponds in at least three southern states. Their potential escape poses a significant risk to the mollusk and fisheries resources throughout the Mississippi River and its tributaries.

- Bighead carp are in the Mississippi River and its tributaries downstream from Minnesota and are likely to move upstream and threaten fisheries in the Minnesota portion of the basin.

- Eurasian collared-doves were documented in several southern counties of Minnesota and are likely to spread across the state.

Mississippi River basin

Black Carp

Black carp (*Mylopharyngodon piceus*) do not currently occur in the Mississippi River or tributaries, but they pose a significant threat to native mollusks and other fisheries in the basin. The federal Aquatic Nuisance Species Task Force conducted a risk assessment on black carp and concluded that the risk potential of the black carp to native U.S. fish and shellfish species is HIGH. In Minnesota, it has been designated as a *prohibited* exotic species.

At least three states currently have black carp, or have approved the importation of black carp, for use in aquaculture ponds. The State of Mississippi Department of Agriculture and Commerce recently approved the importation of black carp for snail control in catfish ponds. In Arkansas, diploid (fertile) black carp exist in captivity for the purpose of breeding triploid (sterile) black carp. Black carp were present in captivity in Missouri, in aquaculture ponds. Missouri state officials were successful eliminating

black carp from one large aquaculture operation. Black carp are also reported to be in ponds in Louisiana. The potential escape of black carp from these states, into the Mississippi River basin, is a concern to Minnesota and basin-wide. The Mississippi Interstate Cooperative Resources Association (MICRA), with members in 28 states, wrote the governors of Mississippi and Arkansas to request their help eliminating black carp from their states. Other entities in the Mississippi basin have written or are preparing to send letters to Mississippi and Arkansas with similar messages.

Bighead carp

The bighead carp (*Hypophthalmichthys nobilis*) was initially introduced into several southern Mississippi River basin states in the 1960's. Its distribution in the basin has expanded and, in recent years, populations of this fish in states such as Indiana, Iowa, and Missouri have dramatically increased. For example, near Cape Girardeau, Missouri three length groups are apparent: young of the year; hundreds of 15- to 20-inch bighead; and increasing numbers of 20- to 30-inch fish (UMRCC 1999). There are even reports of large bighead carp jumping into boats as they idle along in the river. Iowa DNR reports that bighead carp are found in large numbers in the Mississippi River below Lock and Dam 19. They are less common in Mississippi River Pools 17 and 18 (the southernmost Mississippi River pool in Minnesota is Pool 9).

Based on reports of increasing populations of bighead carp in many areas of the upper Mississippi basin, it is likely that this exotic will soon invade the Mississippi River and its tributaries in southern Minnesota. It is not clear how this introduction will affect native fish, such as paddlefish and bigmouth buffalo, or the basin's zooplankton and phytoplankton populations. It could mean significant changes to those parts of the river's ecosystem.

Illinois waterways

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

The National Invasive Species Act of 1996 called for the U.S. Army Corps of Engineers (USACOE) to install a demonstration dispersal barrier to prevent the spread of aquatic nuisance species through the Chicago Sanitary and Ship Canal portion of the Illinois waterways. While this barrier was not solely intended to halt the downstream spread of round gobies, Mississippi River basin states advocated that the barrier should be installed before round gobies spread through the Illinois waterways. Unfortunately, the barrier hasn't yet been built and round gobies are now confirmed to be past the proposed barrier site and have been documented just upstream of the Des Plaines River, a tributary that leads to the Mississippi River (see Round Goby).

Because adequate federal funding is not currently available, the barrier may not be constructed before October 2000.

Mute swans for goose control

Minnesota has regulated mute swans for several years because of their potential to establish large flocks and cause problems for native waterbirds (see Mute Swan). Recently, there have been several discoveries of illegally possessed mute swans in the state as well as escaped pairs of mute swans. Most of the birds have been purchased with the intent of keeping Canada geese from locations such as sod farms, golf courses, and apartment complexes. This strategy does not work, however, and it is illegal for the swans to not be confined.

Eurasian collared-dove

The Eurasian collared-dove (*Streptopelia decaocto*) is a new exotic bird species present in the wild in the state. During the past year, they have been seen in Brown, Carver, Dakota, Freeborn, Martin, and Pipestone counties and are likely to be in others.

Eurasian collared-doves are native to the Indian subcontinent and Turkey and invaded most of Europe between the 1930s and 1980s. An unplanned introduction into the wild occurred in the Bahamas in 1974, after a pet shop owner attempted to import ring turtle doves from Europe and mistakenly ended up with Eurasian collared-doves. Collared-doves emigrated from the Bahamas and began nesting in Florida in the early 1980s. From there they have dispersed to many other states. Releases have also occurred in the United States. The collared-dove's arrival in Minnesota is part of its slow spread across North America.

According to biologists, collared-doves thrive well with people, but they are not particularly fond of cities. They prefer savanna and open woodlands, such as suburbs, farms, orchards, and other settled places. The dove's diet reportedly includes corn, wheat, millet, sunflower seeds, weed seeds, and some berries.

Similar to many other invasive species, collared-doves' spread is related to their high reproductive success. They are able to breed by the time they are one year old, they raise multiple broods, and many young survive. Young collared-doves disperse long distances in the spring.

Despite their history of spread in Europe and their reproductive potential, surprisingly little is known about the effect of these exotics in North America. The DNR, which is trying to learn more about their potential harm to farmers, hunters, native birds, and ecosystems, currently has no plans to limit the spread of Eurasian collared-doves. DNR biologists don't believe it would be possible to prevent their continued expansion from adjoining states, in part because there are no regional or national control efforts planned or in place.

Other species reported in Minnesota

During 1999, the DNR received reports of several other harmful (or potentially harmful) species of exotic wild animals or aquatic plants that had escaped from captivity or have become established in Minnesota. These included red deer, grass carp, yellow iris, pink water-lilies, and giant salvinia.

Red deer

In February, four red deer were discovered in the wild near Marshall. They were not reported as missing, so the source was unknown. All four of these animals were located and dispatched by DNR conservation officers to remove them from the wild.

In August, three red deer were reported as escaped near Floodwood. The owner called the central DNR office to report the escape. The owner did not have a game farm license and was not a registered cervidae farmer. Two of these escaped red deer were dispatched and the status of the third is unknown.

Grass carp

About six large grass carp were caught by commercial fishermen in Okamanpeedan Lake on the border of Minnesota and Iowa. The lake has a barrier at the outlet. However, during 1993 the grass carp may have entered the lake from Iowa when the barrier was breached by floodwaters. According to the commercial fishing license, the grass carp caught in the commercial nets may not be returned to the water.

Giant salvinia

Giant salvinia (*Salvinia molesta*) was found in a horticultural pond and greenhouse at the University of Minnesota-St. Paul during April. Three ponds in the greenhouse contained giant salvinia. U of M staff removed the plants from the ponds and destroyed them.

Yellow iris

Many naturalized yellow iris plants were reported in a wetland area adjacent to White Bear Lake in Ramsey County. These plants were also noted in 1998 and appear to have expanded their area of infestation.

Pink waterlilies

Pink waterlilies, including 10 lily pads and two flowers, were discovered at Sunset Lake, near Hugo in August.

References

UMRCC. 1999. The UMRCC Newsletter. Bighead Carp Making their Presence Known. September/October 1999.

Regulations

1999 Highlights

- Statutory changes were made during the 1999 Legislative session. The changes allowed the harvest of bait from some infested waters, eliminated the "limited infestation of Eurasian watermilfoil" classification and related requirements, modified the requirement to conduct 20,000 hours of watercraft inspections, and made some technical amendments.

- The DNR adopted emergency rules and proposed permanent rules that designate additional infested waters. Additional amendments to permanent administrative rules are proposed by the DNR (see Appendix C).

Background

State

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 were modified several times 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 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.

- 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).

- 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 statute 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 2. The final classification will reflect a combination of the criteria in each category.

Many exotic species would likely be classified as "unregulated species," primarily because they would not survive if introduced into Minnesota ecosystems. 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.

In 1998, the Exotic Species Program adopted amendments to Minnesota Rules 6216 that govern harmful exotic species (see Progress in Regulations in Exotic Species Program 1999). These amendments classified numerous exotic species in the classes named above. It is important to note that classifications and designations 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.

Table 2. Explanation of regulations and criteria associated with Minnesota's exotics species classifications.

		Criteria for Classification*					Regulations			
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 transporting 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. Ring-necked 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.)	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 - 1999

During 1999, progress was made in the following areas that were identified as future needs in the 1998 report.

- 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.

- 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, and the magnitude of potential adverse impacts needed to regulate pathways and classify species.

Federal Executive Order

On February 3, 1999 President Clinton signed an executive order that mobilizes the federal government to defend against harmful exotic species. The Departments of the Interior, Agriculture, and Commerce, will take the lead in to encourage federal agencies to work together to prevent the introduction of non-native species and control those already here. Under the executive order, a new Invasive Species Council is formed to, amongst other activities, provide national leadership regarding invasive species, and see that the Federal agency activities concerning invasive species are coordinated, complementary, cost-efficient, and effective, relying to the extent feasible and appropriate on existing organizations addressing invasive species, such as the Aquatic Nuisance Species Task Force, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds, and the Committee on Environment and Natural Resources.

Minnesota Statutes

Several statutory changes were made during the 1999 Legislative session. These changes were proposed by DNR's Exotic Species Program and most were related to *infested waters*. The changes allowed the harvest of bait from some infested waters, eliminated the "limited infestation of Eurasian watermilfoil" classification and related requirements, modified the requirement to conduct 20,000 hours of watercraft inspections, and made some technical amendments.

When Lake Mille Lacs was found to have Eurasian watermilfoil, the harvest of bait from infested waters was prohibited. Because Mille Lacs is a major source of spot-tail shiners and other minnows, several businesses would be severely harmed if no harvest was allowed from Mille Lacs. After discussions with live bait industry representatives, the department proposed to allow bait harvest from Eurasian watermilfoil infested waters by permit and after the individuals receive training on harmful exotic species (e.g., identification of harmful exotic species and prevention procedures for bait dealers to follow). This change was made during 1999.

Another change to statute was related to the DNR's responsibility to conduct watercraft inspections at infested waters. The watercraft inspection mandate was broadened from "infested waters" to "waters of the state," to allow the Exotic Species Program to be more proactive and inform boaters throughout the state about precautions that boaters should take to comply with laws prohibiting the transport of aquatic plants and harmful species. The priority for inspections remains with infested waters, but about 10% of the effort will be directed to noninfested waters. This change will help reduce the increasing number of repeat inspections of the same boaters at infested waters. The time frame during which inspections could be conducted was also broadened to encompass the whole boating season.

The "limited infestations of Eurasian watermilfoil" classification was eliminated from statutes because the regulations were difficult to enforce and have been confusing to boaters and lake residents, as well as of questionable value to prevent the spread of milfoil.

Several technical changes were identified and made to statutes in 1999. It became clear, during public hearings about exotic species rules, that the definition of infested waters could be improved to clarify the department's intent and authority in this area. The change addressed the concern expressed at the public hearings that waters with broadly distributed species, such as carp and curly-leaf pondweed, not be designated as infested waters. The definition of aquatic macrophytes (plants) was amended to avoid confusion about which plant species are regulated under M.S. 84D.09. The new language improves the distinction between the regulated and unregulated types of aquatic plants.

Minnesota Rules

The DNR adopted emergency rules and proposed permanent rules that designate additional infested waters (The current infested waters list is shown in Appendix B). Several other changes to the permanent rules related to harmful exotic species are being proposed by the DNR. Public notice that rule changes were proposed was published in the State Register on April 12, 1999 and letters were mailed to many who might be affected. The current draft of proposed rule changes are shown in Appendix C.

Obtain Information regarding introduction, naturalization, and adverse impacts

Two new projects were arranged in 1999 to help assess the potential for harmful exotic aquatic plant species to be shipped to Minnesota and whether they may survive and cause adverse impacts. These projects will be conducted in 2000 and 2001. One project is funded by Sea Grant and will evaluate vendors who ship aquatic plants to Minnesota to determine if they purposely or accidentally are shipping "prohibited species." A second related project, to be funded by the DNR Exotic Species Program, will look at the cold tolerance for exotic aquatic plants and develop techniques to study effects of temperature on over winter survival. This will help to determine the potential for species to naturalize in the state and to be invasive. Both projects will be conducted under the direction of Sue Galatowitch at the University of Minnesota.

Effectiveness of Regulations

The DNR believes that regulations are an important component of an effective strategy to help prevent the spread of harmful exotic species. Three surveys of boaters, including a 1998 survey from the Brainerd area (MDNR 1998), indicate that boaters support 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 69% indicated that laws would be "very effective" or "moderately effective"). In contrast, only 9% 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. Specifically, seek a more comprehensive federal law prohibiting transport and possession of invasive wildlife such as black carp, goby, and ruffe.

State

- 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.

- To aid in classifying species, 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

Minnesota Department of Natural Resources. September 1999. *Boating in North Central Minnesota: Status in 1998 and trends since 1985.* An unpublished survey and report prepared by the Office of Management and Budget Services.

Exotic Species Program. 1999. Harmful Exotic Species of Aquatic Plants and Wild Animals in Minnesota: Annual Report for 1998. Department of Natural Resources, St. Paul, MN.

Expenditures

Appropriations and activities

Base funding for the Exotic Species Program is derived from a $5 surcharge on the registration of watercraft. Surcharge receipts are deposited in the Water Recreation Account and appropriated by the Legislature. The surcharge generates approximately $1,100,000 annually and additional program funding comes from other state and federal sources. Significant support for exotic species research efforts has been appropriated from the Environment and Natural Resources Trust Fund and the Minnesota Resources Fund (as recommended by the Legislative Commission on Minnesota Resources). Federal funds also support a range of program activities, including the development and implementation of new management methods, public awareness efforts, and inspection activities. State funding for Department of Natural Resources' efforts to control exotic species was first appropriated in 1988 and has gradually increased. A summary of appropriations to the program for fiscal years 1991 through 2000 (FY91 - FY00) is provided in Table 3 along with projections for FY01.

This report covers activities in calendar year 1999, which includes half of two state fiscal years, (FY99 and FY00) that begin on July 1 and end on June 30. To provide a comprehensive review of expenditures that occurred during 1999, we report both expenditures that were incurred in FY99 and those planned in FY00 (Table 4). The following assumptions and definitions were used to report on expenditures.

Administration

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

Program planning/direction

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

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

Coordination with regional and federal activities: staff time and out-of-state travel to represent the state at meetings of the Great Lakes Panel on Aquatic Nuisance Species, provide relevant testimony for federal legislative development, and participate in regional meetings on harmful exotic species issues.

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

Public awareness

Expenditures in this category include staff time, in-state travel expenses, fleet charges, mailings, supplies, printing and advertising costs, and 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, as is the cost of developing and maintaining exotic species information on the DNR's website.

Control, Management, and Inventory

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

Research

Expenditures in this category include staff time, in-state travel expenses, fleet charges, supplies, and contracts with the University of Minnesota and other research organizations that were established to develop new or improve existing control methods. Activities which are specifically focused on the prevention of new exotic species introductions into Minnesota are also included in this category.

Fiscal Year 1999 (FY99)

Expenditures on exotic species activities during FY99 (July 1, 1998 - June 30, 1999) totaled $1,382,000 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 also provide funds 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 control efforts are deposited in a Coop Account and used to fund 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 occasionally 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 $1,147,000 of Water Recreation Account expenditures by the Exotic Species Program during FY99 exceeded the $1,126,000 appropriated (Table 3). Water Recreation Account funds that were not spent during the previous year (FY98) provided the additional revenue. All funds appropriated during the FY98/99 biennium were spent.

FY99 expenditures by major category differed from those reported in FY98 (Table 1). Year-to-year variations in expenditures are expected and reflect changes in program needs and the level of assistance provided by various partners. For example, the Exotic Species Program invested a significant amount of time in FY98 meeting with constituent groups and holding pubic hearings to develop new rules. Expenditures in the program planning/direction category increased because of this effort. Of particular concern to the Exotic Species Program was the sharp decline in FY98 in "public awareness" spending. We believe that the public's help in reducing the spread of exotic species is essential. It is our belief that higher levels of spending on public awareness efforts are desirable to keep the public informed and enlist their help in our prevention efforts. Increased funding of public awareness efforts was achieved in FY99 (see Table 1). Administrative and Inspection/Enforcement costs declined in FY99. The reductions in Inspection/Enforcement spending do not represent a decrease in program focus on these activities, rather the costs of coordinating our program activities with the Division of Enforcement were reduced. The following chapters describe in detail the activities that were conducted using FY99 funds.

Fiscal Year 2000 (FY00)

Since this report was completed in the middle of FY00, planned expenditures for this year are also reported. Expenditures in most categories are expected to remain relatively constant between FY99 and FY00. The Exotic Species Program is believes that current distribution of funding among major program categories represents an appropriate allocation strategy - significant investments are being made in each of the four primary focus areas (public awareness, control/management, inspections/ containment, and targeted research to improve management and prevention) as well as to efforts to maintain a coordinated statewide and regional response to the threats posed by exotic species. These anticipated spending levels would change if a significant event (e.g. the discovery of a new harmful exotic species in Minnesota, the availability of a new management method) altered exotic species management needs and options.

The Exotic Species Program anticipates that expenditures in the Prevention/Risk Assessment Category will continue to grow. These expenditures reflect efforts undertaken to keep harmful exotic species which are not yet found in Minnesota (or in neighboring states) from reaching the Upper Midwest and expenditures related to evaluating the risk of species which have reached/may reach Minnesota where the level of harm they will/may cause is unknown. These increases reflect the Program's belief that preventing the introduction of new harmful exotic species to Minnesota and containing the spread of species already present are two of the most effective strategies available.

The following chapters describe in detail the activities that have been and will be conducted using FY00 funds.

Table 3. Appropriations (in thousands) for DNR Exotic Species Programs, fiscal years 1991 - 2001.

Funding Source	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01
Water Recreation Account (WRA)	250 ($1 watercraft surcharge)	416 ($2 watercraft surcharge)	657 ($3 watercraft surcharge)	1,011 ($5 watercraft surcharge)	1,112	1,136	1,087	1,092	1,106	1,126	1,125
Legislative Commission on Minnesota Resources recommendations:											
1) Purple Loosestrife	100[1]			75[2]	75[2]	75[2]	75[2]	37.5[2] ($37,500 match from WRA funds)	37.5[2] ($37,500 match from WRA funds)	37.5[2] ($37,500 match from WRA funds)	37.5[2] ($37,500 match from WRA funds)
2) Eurasian watermilfoil			160[1]	125[2] (requires $100,000 non-state match)	125[2]	75[2]	75[2]	37.5[2] ($37,500 match from WRA funds)	37.5[2] ($37,500 match from WRA funds)	37.5[2] ($37,500 match from WRA funds)	37.5[2] ($37,500 match from WRA funds)
3) Ballast Water Control								125[1]	125[1]		
Total	350	416	817	1,211	1,312	1,286	1,237	1,292	1,306	1,201	1,200

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

Table 4. Exotic species related expenditures in fiscal year 1999 (FY99) and projected expenditures in FY00 (in thousands of dollars).

	Water Recreation Account		Other Exotic Accounts		Other Dept. Accounts		Env. and Natural Resources Trust Fund*	
	FY99	FY00	FY99	FY00	FY99	FY00	FY99	FY00
Administrative/Operations								
Rent, Phones, Postage, Misc.	21	24						
Staff Administrative Activities	33	17						
Staff Personal leave (Vacation, Holiday, Sick)	43	38						
Clerical	6	15						
Div/Dept Administrative Support	32	41						
Program Planning/Direction								
State program coordination	104	69			12	12		
Support regional / federal activities	7	7						
Equipment and services	15	18						
Public Awareness								
Communications plan, workshops, presentations, radio spots, billboards, TV, website development	114	105		10	<1	4		
Control, Management, and Inventory								
Eurasian watermilfoil	176	150		30	1			
Purple loosestrife	91	74			<1			
Zebra mussel	7	20						
Curly-leaf pondweed	11	6						
Flowering Rush	2	6						
Inspections/Containment								
MCC - access inspections	304	355			12			
Enforcement - road and access checks	54	57						
Research								
Purple loosestrife	56	54					60	37
Eurasian watermilfoil	59	61					47	38
Flowering rush	3	2						
Zebra mussels	1							
Ballast Water Management							102	104
Prevention	8	7						
Total	1,147	1,126	0	40	26	16	209	179

* and Minnesota Future Resources Fund

Education / Public Awareness Activities

1999 Highlights

- The DNR partially funded and helped produce a 30 minute television special and video about *Aquatic Invaders*.
- Television spots were placed on all in-state television stations as paid advertising and/or public service announcements.
- The DNR and Minnesota Sea Grant conducted cooperative educational activities to maintain high levels of public awareness about exotics and exotic issues.

Background

Since 1992, the DNR's Exotic Species Program has made substantial efforts to maintain high public awareness and understanding about harmful exotic species. Communication efforts are built around the theme of "Clean boats, Clean waters". This theme captures the desired outcome (clean waters) and 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 - 1999

Key components of the Exotic Species Program's 1999 communication efforts included:

- exotic species awareness signs at public water accesses;
- information about harmful exotic species in the fishing and boating regulations;
- radio and television advertisements during Fishing Opener, Memorial Day, Fourth of July, and Labor Day weekends;
- a series of press releases and media contacts were made throughout the year to keep current information before the public;

- staffing displays at various sport shows and the Minnesota State Fair;
- preparing and distributing radio and television public service announcements to all Minnesota stations; and
- attending meetings of lake associations and other groups concerned about exotic species.

Television was utilized again in 1999 with paid placement supplementing the use of public service time from nearly all local broadcast stations.

Radio was used in 1999 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. 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, and Fourth of July. A special effort was made in the Duluth market, using both radio and television, this past year, triggered by the discovery of Eurasian watermilfoil in the Grand Rapids areas and the presence of ruffe, round goby, and zebra mussels in the Duluth Harbor.

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.

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 41,444 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, Sherburne, Wright and Stearns Co. shoreland volunteers, Pine River Watershed Protection Foundation, Minnesota Turf and Grounds Foundation Conference, Minnesota Nursery and Landscape Association, Interagency Water Resources Workshop (Brainerd), Midwest Aquatic Plant Management Society Conference (Ashville, NC), 100th Meridian Initiative (Nebraska and Oklahoma), annual meeting of the Minnesota Agricultural Inspectors (Bemidji), regional MnDOT meetings, 9th International Zebra Mussel and Aquatic Nuisance Species Conference (Duluth), 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 suggested 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). Also in 1999, a survey of boaters in the Brainerd area was conducted. Both these surveys indicate that awareness about exotics has continued to increase. Watercraft inspectors (see Watercraft Inspections) also continue to find high levels of public awareness of exotics throughout Minnesota. Information from surveys and a new Sea Grant funded survey planned for the fall in 2000 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.

The Lake Minnetonka Conservation District (LMCD) initiated public awareness efforts to help keep zebra mussels from being introduced to Lake Minnetonka. In 1999, they funded the posting of signs and billboards in the vicinity of Lake Minnetonka.

The Exotic Species Information Center at the University of Minnesota - Sea Grant Program works on collaborative initiatives and projects with the DNR's Exotic Species Program. The Center serves as an important contact for information on invasive aquatic nuisance species (ANS) and educates the public to prevent and slow the spread.

During 1999, Center staff regularly attended DNR Exotic Species Program meetings to coordinate activities, and share information and new publications. The Center also hosted a half-day strategic planning retreat for Sea Grant and DNR exotic species project staff in September.

1999 Highlights of Minnesota Sea Grant's Education Activities in Minnesota:

- Sea Grant hosted the *9th International Zebra Mussel and Aquatic Nuisance Species Conference*, April 26-30, 1999, in Duluth. Considered to be the most comprehensive forum on ANS issues, the conference was in part sponsored by the DNR and attended by nearly 400 participants from twelve countries. Over 190 presentations were given on ANS research, policy, control, management and education, including several by DNR staff. The conference featured a youth leadership workshop and poster contest, a one-day exotic species workshop for Minnesota lake associations, and special sessions on ballast water control, Eurasian ruffe, and round goby. A media briefing held the first day of the conference generated stories appearing in major regional and national outlets. Congressman James Oberstar (D-MN) and DNR Deputy Commissioner Steve Morse welcomed conference participants.

- Sea Grant is producing a national education videotape for recreational boaters, sailors, and personal watercraft operators to teach them how to prevent the spread of exotic species, like Eurasian watermilfoil, zebra mussels, and hydrilla. Sponsored in part by the DNR, U.S. Coast Guard, U.S. Fish and Wildlife Service, and others, the videotape features actor John Ratzenberger (a.k.a. Cliffy from the TV show *Cheers*). The 10-minute videotape, to be released in early 2000, will be used in boater workshops, outdoor shows, and at retail outlets in Minnesota and nationally.

- The *Minnesota Volunteer Zebra Mussel Detection Program,* originally established through the University of Minnesota Extension Service's Shoreland Volunteer Program, was expanded in 1999. In partnership with the Minnesota Lakes Association, over 350 shoreland property owners received sets of preserved specimens of zebra mussels, ruffe, Eurasian watermilfoil, and spiny waterflea to aid them in identification and to raise exotics awareness.

- Sea Grant discovered the first sighting of the invasive rusty crayfish in the Duluth-Superior harbor last summer during a zebra mussel inspection of a power plant on the waterfront. Center staff are tracking the extent of this infestation, as well as tracking the growth and range expansion of zebra mussels, round goby, Eurasian ruffe, and three spine stickleback in the harbor and Lake Superior.

- Center staff provided ANS awareness presentations at 18 conferences, workshops, meetings and festivals to Minnesotans, including the DNR's training meeting for watercraft inspectors in June.

- Center and DNR staff partnered with the Minnesota-Wisconsin Boundary Area Commission to provide presentations on zebra mussels and other exotics at two public workshops along the St. Croix River last winter.

- During a Legislative Commission on Minnesota Resources (LCMR) visit to the Duluth-Superior harbor in August, Center staff joined DNR and USFWS staff to brief LCMR members and staff about threats posed to fisheries by invasive fish, like Eurasian ruffe, round goby, and three spine stickleback.

- Sea Grant is working to mitigate exotic species impacts on industry. Center staff provided an update on zebra mussel control and mitigation at the American Water Works Association's Minnesota Chapter Annual Conference in Duluth last fall. Sea Grant, DNR, aquaculture and bait fish industries representatives are working together to help ensure that industry operators reduce the risk for ANS spread, protect against impact on operations, and are in compliance with recent state laws governing exotics and harvest.

- Center staff compiled two research bibliographies on Eurasian ruffe and round goby. Based on an original work by Charlebois et al. 1997, the *Round Goby Bibliography* is an update that contains nearly 125 research entries which is posted on the *Sea Grant Nonindigenous Species (sgnis)* Web site at www.sgnis.org. The second, the *Eurasian Ruffe Bibliography*, contains 844 entries that will be posted on the National Aquatic Nuisance Species Clearinghouse Web site at www.entryway.com/seagrant/ and as a printed booklet in early 2000.

In 1999-2000, Sea Grant will bring five new research and outreach projects to Minnesota based on a national competition for aquatic nuisance species (ANS) funding. Four projects will specifically involve DNR staff to assist development of programming. The first project will look at reducing the risk of ANS spread and impacts by educating bait fish harvesters. The second project will evaluate the effectiveness of ANS boater education using a survey of Minnesota boaters that will help provide results necessary to provide more effective programming. Other projects will focus on invasive aquatic plants outreach and research, purple loosestrife biological control 4-H curricula development, and workshops for teachers seeking information on ANS to integrate into their geography and social studies lessons.

Future needs for public awareness

- Continue existing public awareness efforts at comparable levels to maintain high awareness of exotic species by watercraft users.
- Continue to make public awareness of zebra mussels in southeast Minnesota near the Mississippi and St. Croix rivers a priority.
- 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, water garden and horticulture industry, and aquarium trade.
- Enhance interagency communication on the status and progress of exotic species management efforts for resource professionals.
- Increase public awareness efforts with lake communities outside the Metro Area.
- Increase the information about harmful exotic species available through the DNR web site.

Reference 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.

MCC Watercraft Inspections

1999 Highlights

- During the 1999 boating season, 41,444 boater contacts were made to educate the public about harmful aquatic exotic species.

- Watercraft inspectors conducted inspections in outstate Minnesota at many "uninfested" waterbodies with high boater activity to build awareness of exotics. A change in statute language now allows watercraft inspections on these "uninfested" waters to count towards the Department's 20,000 hour inspection requirement.

Background

The potential for boaters to accidentally move aquatic exotic species from one lake to another is a clear threat to Minnesota's aquatic ecosystems. For this reason, the 1991 Minnesota Legislature mandated that DNR conservation officers conduct inspections of trailered boats on Minnesota highways. The purpose of these inspections was to look for Eurasian watermilfoil, issue citations to violators, and to inform the public about the potential spread of harmful aquatic exotic species. In 1992, the DNR, the Minnesota Lakes Association and angling groups proposed and supported legislation (adopted as M.S. 18.317, Subd. 3a, and recodified as 84D.02 subd. 4, see Appendix A) requiring 10,000 hours of inspections of watercraft leaving "infested" water bodies containing harmful aquatic exotic species such as Eurasian watermilfoil, spiny water flea, and zebra mussels. Subsequently, a watercraft inspection program was established by the DNR in 1992 to accomplish this mandate. In 1993, legislation was passed increasing the number of inspection hours to 20,000 starting with the 1994 boating season. In 1999 this statute was amended to allow inspections on both infested and uninfested waterbodies to count towards the 20,000 hour requirement.

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

Progress in Watercraft Inspections - 1999

Inspections begin in May and continue through the end of October. In 1999, within this 26 week period, 20,738 inspection hours were logged and 41,444 watercraft/trailer units were inspected.

Accomplishments and responsibilities of MCC Watercraft Inspectors:

- Assisted the Division of Enforcement with four road checks,
- Answered questions at the Exotic Species display during each day of the 1999 Minnesota State Fair,
- Conducted inspections at 50 different fishing tournaments throughout the state,
- Conducted inspections for sailing regattas at the Aquatennial festival in Minneapolis,
- Conducted inspections for waterfowl hunters during the opener and throughout the month of October,
- Distributed Exotic Alert Tags on 6,820 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 33 inspectors worked through the summer of 1999 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. This year the program was broadened to include many uninfested waterbodies in an effort to reach more boaters in non-metro locations.

The number of inspections conducted per day varies due to weather conditions and boater activity. Overall the number of inspections conducted in 1999 exceeded the 1998 numbers in non-metro locations (Table 6). Additional staff were placed in non-metro locations to reach boaters in areas that we have not focused on in the past.

Table 5. Number of public water accesses on infested and uninfested waters and inspection hours by region for 1999.

Area	Number of PWA's (% of total PWA's)	Hours Accomplished (% of total hours)
Region I - Northwest	43 (17%)	945 (5%)
Region II - Duluth/Superior	23 (9%)	1,478 (7%)
Region III - Central	47 (19%)	4,742 (23%)
Region IV - Southwest	4 (2%)	122 (1%)
Region V - Mississippi River	46 (19%)	3,419 (15%)
Region VI - Metro	83 (34%)	10,032 (49%)
State-wide Total	246 (100%)	20,738 (100%)

Table 6. Number of watercraft inspections at infested and uninfested waters conducted by MCC Watercraft Inspectors in 1998 and 1999.

Area	Number of Watercraft Inspected		Percentage of All Inspections	
1998	1998	1999	1998	1999
Region I - Northwest	201	1,584	1%	4%
Region II - Duluth/Superior	1,332	1,729	3%	4%
Region III - Central	4,476	7,360	12%	18%
Region IV - Southwest	0	138	0%	<1%
Region V - Mississippi River	3,953	5,748	10%	14%
Region VI - Metro	28,457	24,885	74%	60%
State-wide Total	38,419	41,444	100%	100%

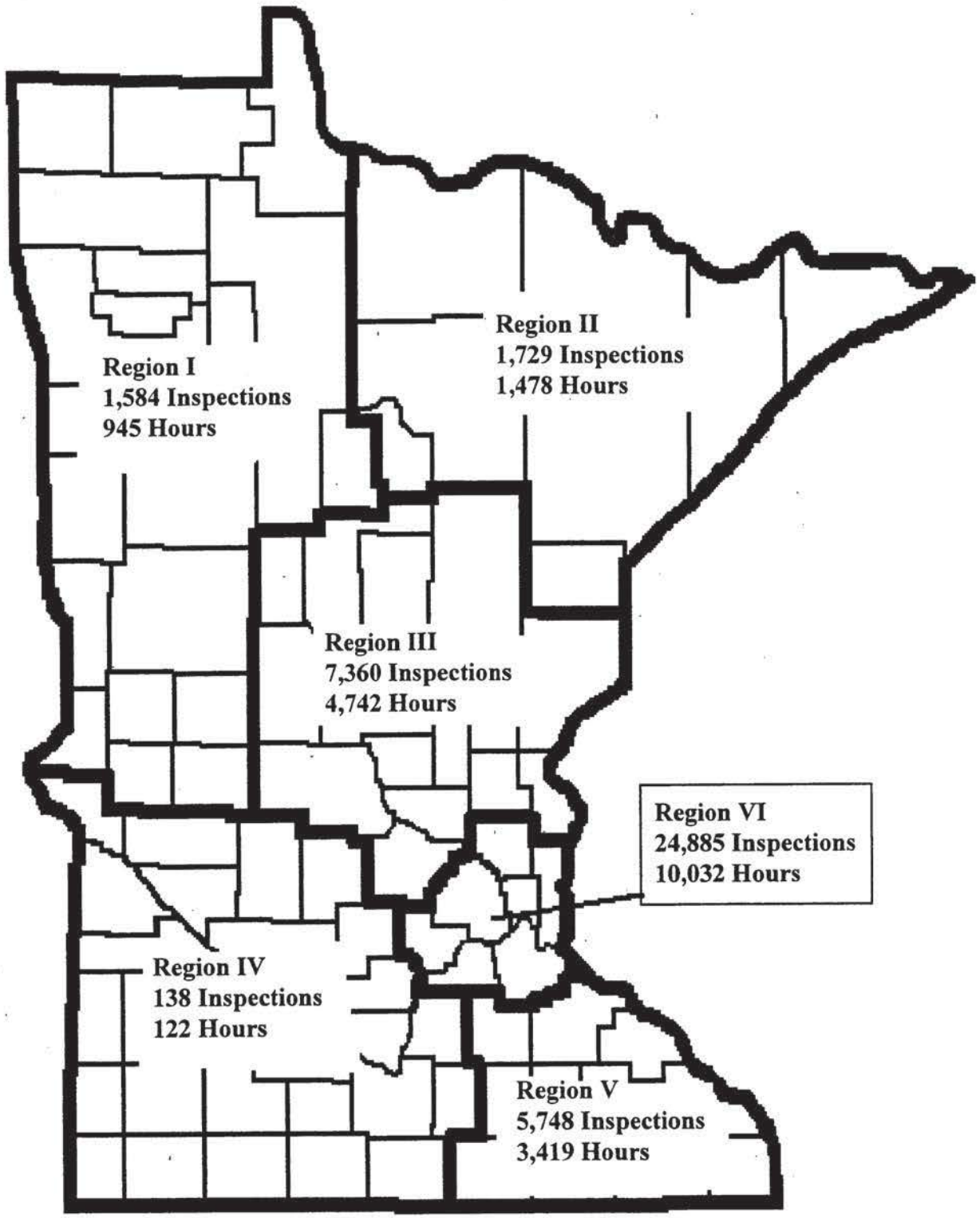


Figure 1. 1999 MCC Watercraft Inspections at Public Water Accesses.

Effectiveness

The goal of the watercraft inspection program is to promote actions by boaters that will reduce the risk of transporting harmful aquatic exotic species. The objectives are to increase awareness of aquatic exotic species issues and laws, and to reduce the number of boats and trailers carrying vegetation or harmful exotic species as they enter a water body.

Surveys conducted by Watercraft Inspectors provide important information on the public's awareness of exotic species laws and help identify high risk areas, i.e. accesses where many watercraft pick up plant fragments. According to survey information collected by Watercraft Inspectors, awareness of exotic species laws remains very high among Minnesota boaters, (Table 7). 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 exit a 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 summarized in Table 8 show that an average of 26% 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 enter public accesses on infested waters is 4%. This is a good indication that the majority of boaters using infested waters are inspecting and cleaning their boats and trailers. The percentage of boats and trailers carrying vegetation as they enter public accesses on uninfested waters is slightly higher, 8%. This difference may be due to the fact that more time and educational efforts have been directed at boaters using accesses on infested waters encouraging them to clean their boats and trailers.

During the 1999 exotic species road checks, the violation rate for transportation of vegetation was 21%. The road checks are more representative of the state as a whole. Enforcement of exotic species law continues in an effort to reduce the transportation of vegetation and harmful exotics (see Enforcement section).

When comparing the rate of vegetation transportation between boaters using infested waters (4%) and boaters from the road checks (21%), it is clear that those using infested waters, and perhaps those who have spoken to watercraft inspectors, are making a better effort to clean off their boats and trailers.

Inspections at Uninfested Waters

The watercraft inspection program has primarily focused on water bodies with infestations of harmful exotic species. The purpose of spending time on infested water bodies is to reduce the transportation of exotics out of those lakes or rivers. Although it is important to contact boaters leaving water bodies infested with harmful exotic

species, we feel that it is also important to inform boaters on other popular recreation lakes in Minnesota. To allow more flexibility in the program, the statute was amended to include watercraft inspections on uninfested waterbodies in the Department's 20,000 hour mandate. During 1999, inspections on uninfested waters represented about 3% of the total inspection effort.

To determine where to spend time conducting watercraft inspections on noninfested waters we looked at three criteria; lakes or areas with a high level of boater activity, lakes in which program surveys identify as frequent destinations for boaters leaving infested water bodies, and lakes with lake associations who desire to hold "Exotic Awareness Events". Inspections were conducted at high boater activity lakes in the Alexandria area, Brainerd area, and Cass County. These areas have several high activity lakes and are popular destination areas for Metro boaters leaving infested waters. We conducted two awareness building weekends, one in July on Pelican and Gull Lakes near Brainerd, and one in August on Leech Lake and Lake Winnibigoshish. Seven watercraft inspectors spent a weekend at these lakes showing boaters how to inspect and clean aquatic plants and harmful exotic species from their boats and trailers. These four lakes show up frequently as destination lakes for metro boaters. Assistance was provided for lake associations holding awareness events as well.

Table 7. Awareness of exotic species laws in Minnesota in 1998 and 1999.

Counties with Exotic Species Infestations	Percent of Individuals who answered "yes" when asked whether they were aware of Exotic Species Laws		Number of Individuals who were asked whether they were aware of Exotic Species Laws	
	1998	1999	1998	1999
Region I - Northwest Douglas Pope	97%	99%	201	1,584
Region II - Duluth/Superior Carlton Cook Lake St. Louis	83%	98%	1,332	1,729
Region III - Central Chisago Crow Wing Kanabec Mille Lacs Stearns Todd Wright	95%	98%	4,476	7,360
Region IV - Southwest Meeker	NA	90%	NA	138
Region V - Mississippi River Goodhue Houston Wabasha Winona	92%	93%	3,953	5,748
Region VI - Metro Anoka Carver Dakota Hennepin Ramsey Scott Washington	97%	96%	28,457	24,885
State-wide Total	96%	96%	38,419	41,444

Table 8. Vegetation found on boats and trailers exiting waters in 1999 (these amounts are determined at the access before watercraft have been cleaned).

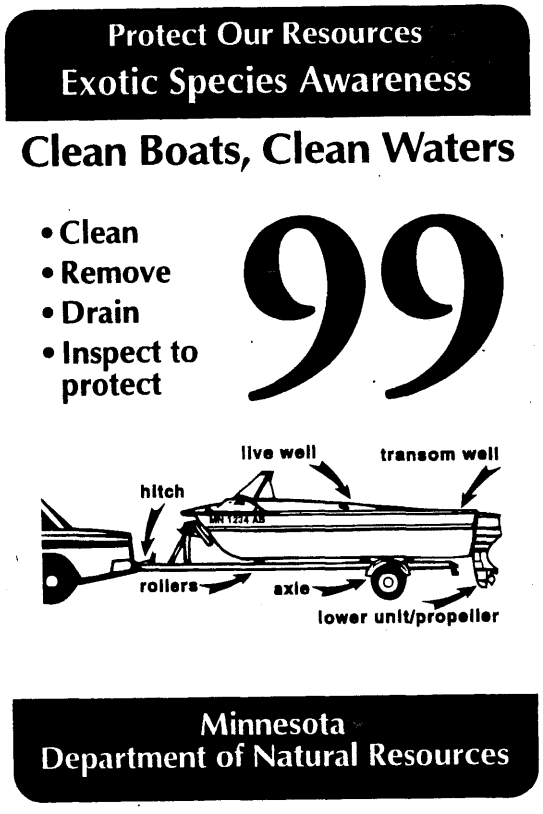
Counties	Percent of Watercraft & Trailers exiting with Vegetation (%)	Number of Watercraft & Trailers Exiting
Region I - Northwest		
Beltrami	5%	19
Cass	18%	365
Douglas	46%	35
Hubbard	25%	4
Pope	16%	250
Region II - Duluth/Superior		
Carlton	0%	2
Cook	0%	18
Itasca	16%	19
Lake	0%	12
St. Louis	5%	793
Region III - Central		
Chisago	63%	317
Crow Wing	23%	151
Kanabec	16%	222
Mille Lacs	20%	1,863
Stearns	41%	511
Wright	34%	417
Region IV - Southwest		
Meeker	21%	70
Region V - Mississippi River		
Goodhue	4%	688
Houston	8%	183
Wabasha	5%	1,594
Winona	24%	844
Region VI - Metro		
Anoka	42%	231
Carver	36%	735
Dakota	17%	1,742
Hennepin	40%	3,557
Ramsey	41%	3,072
Scott	26%	645
Washington	2%	1,574
State Total	26%	19,933

St. Croix River

Watercraft inspectors continued to conduct inspections at several public water accesses along the St. Croix River (see: Management of Zebra Mussels). Increased public awareness and education is necessary due to the increased risk of zebra mussel infestation for the St. Croix River. Over 3,700 watercraft were inspected and boaters were educated on steps to take to prevent the spread of zebra mussels.

Decal Program for trailered watercraft

During the 1994 boating season, several boaters expressed frustration over being approached by inspectors several times each week throughout the summer. To respond to 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 four years now and have been well received by the public. The 27,444 decals distributed during the 1999 boating season also remind boaters to inspect their boat when inspectors are not present.



Future needs/recommendations for watercraft inspections

- Conduct 20,000 hours of inspections during the 2000 boating season.
- Broaden program to include additional non-metro high use lakes.
- Target high use lakes with Curly-leaf pondweed infestations for watercraft inspection activity.

Enforcement

1999 Highlights

- Four road checks for trailered boats were held and aquatic vegetation was found in, or on, an average of 21% of all watercraft inspected. Along with day-to-day enforcement action, road checks and access checks continue to be used to increase public awareness of exotic species laws and to gather information on violation rates of the law prohibiting transportation of aquatic vegetation.

- Conservation Officers spent 1,250 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 102 individuals for violations.

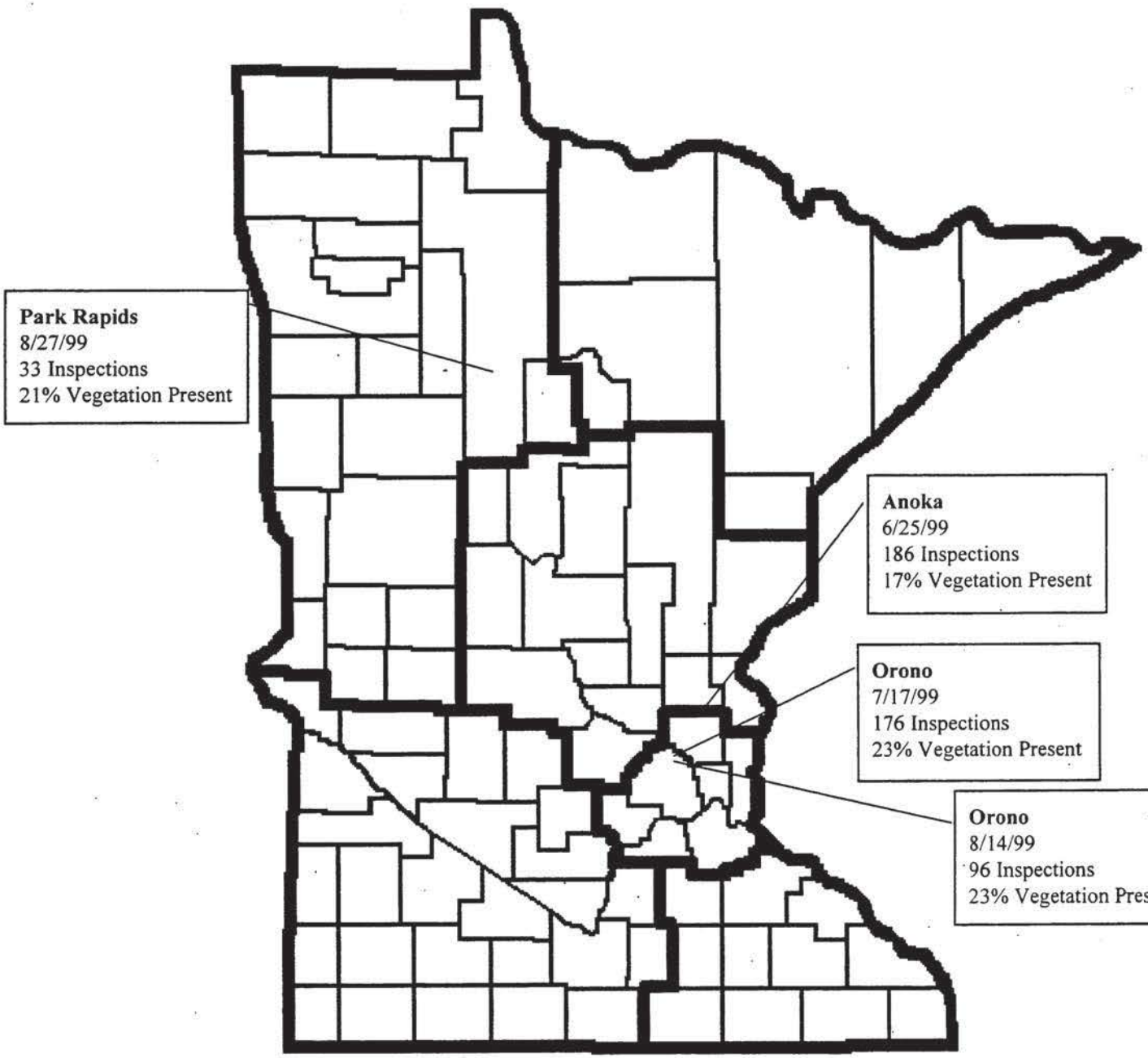
Background

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 and boat inspections 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 barrier to effective enforcement of laws banning the transportation of harmful exotic plants (it was often difficult to positively identify the type of vegetation recovered) and reduced the chances of zebra mussels, that can attach to aquatic plants, being inadvertently spread.

Passage of the 1996 law prohibiting transport of aquatic plants has allowed an increase in exotic species-related enforcement efforts by Conservation Officers. The number of road checks has increased (from three in 1996) as has the number of warnings, both verbal and written, and citations issued. A review of the 1997 road check results suggests that the percentage of watercraft with aquatic vegetation was higher in the Metro Area than in greater Minnesota (see results for Chisago and Hennepin Counties in Table 9).

Figure 2. Results of 1998 Road Checks conducted by DNR Enforcement Officers.



21% Violation Rate Statewide

Progress in Enforcement - 1999

Road Checks

In 1999 four major road checks were conducted, three close to the Metro and one in outstate Minnesota (Figure 2). The two road checks at Orono on County Road 51 exhibited the highest percentage of watercraft carrying vegetation (23%, Table 9). Over half the vegetation was found inside the boats. The Anoka road check on Hwy 10 continued to have the highest volume of traffic. Orono had the second largest volume of traffic. The Hubbard Co. (Park Rapids) road check had the lowest volume of traffic. In 1999, a total of 102 corrective contacts of verbal and written warnings and citations were issued to watercraft owners whose boats were inspected.

An important component of the Department's goal to prevent the spread of exotic species in Minnesota is to lower the percentage of boats transporting vegetation in the Metro area and throughout greater Minnesota. Road checks of trailered boats are method to evaluate the success of that effort. In 1999 the highest violation rates observed continued to be in Hennepin County (23% at both of the Orono checks). However, it is important to note that the 1999 rate was well below the percentages measured in 1997 (44% at Orono and 37% at Chisago, Table 9). The Department intends to continue using road checks - both for their educational value and as a tracking tool. Traffic patterns and safety issues will dictate when and where road checks are implemented.

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 need to be high enough to justify the public inconvenience and expense of the checks. In 1999 the violation rates ranged from 17% to 23% (mean of 21%). In comparison, the violation rates averaged 25% and 20% in 1997 and 1998, respectively. 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.

Public water access and other exotics enforcement activities

In 1999 Conservation Officer's activities were expanded to include more exotic species-related checks of boats, trailers, live wells, etc. at boat access points. Exotic species activities were included as a specific component of the 1999 Work Plan developed by the Division of Enforcement. The plan described in detail each District's responsibilities in meeting various enforcement requirements, including Exotics, and insures that appropriate work activities and levels are targeted.

Enforcement also increased their Information and Education efforts. District Supervisors distributed more exotic species-related information and educational materials. Enforcement had an informational booth at the 1999 Cabella's Fall Exposition which included an exotic species display and Conservation Officers handed out related informational material and answered questions from the public about the spread of exotics.

Table 9. Summary of the numbers of trailered watercraft inspected by the DNR during the educational road checks conducted in 1997, 1998 and 1999.

Location	Number of watercraft inspected	Number of watercraft with aquatic plants	Number of verbal warnings	Number of written warnings	Number of written citations
1997					
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 Hennepin Co.	36	16(44%)	8	4	0
TOTALS	638	161(25%)	135	17	2
1998					
Hwy. 8 Chisago Co.	149	39(26%)	22	11	0
U.S. Rt. 10 Anoka Co.	247	41(17%)	21	19	1
Hwy. 71 Hubbard Co.	74	13(18%)	5	7	0
Orono Co. Rd. 51	81	14(17%)	1	11	2
Orono, Co. Rd. 51 Maxwell Bay, Hennepin Co.	94	20(21%)	11	9	0
TOTALS	645	127(19.8%)	60	57	3
1999					
U.S. 10 Anoka	186	31(17%)	29	2	1
Co. Rd. 51 - 6/25/99 Orono	176	41(23%)	29	10	2
Co. Rd. 51 - 8/18/99 Orono	96	22(23%)	14	5	3
U.S. 71 Park Rapids	33	7(21%)	3	3	1
TOTALS	491	101(21%)	75	20	7

Mississippi River
Conservation Officers conducted exotics enforcement activities along the Mississippi River focusing on the transportation of zebra mussels and infested waters. Boaters using the Mississippi River south of the Twin Cities must empty bilges, live wells, and bait buckets so that they do not transport zebra mussel infested water from the Mississippi. During 1999 officers spent about 92 hours of enforcement time over the summer along the Mississippi River including accesses near Hastings, Red Wing, Lake City, Kellog, Winona, and La Cresent. Many contacts were made for live well and bait container draining.

Waterfowl Hunting Season
Conservation officers conducted exotics enforcement activities during the waterfowl hunting season to inform hunters about the laws prohibiting transportation of aquatic vegetation. Hunters must remove vegetation from their boats, decoys, and anchors before leaving the boat access. There is an exception for the transport of shooting blinds, 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 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.

Conservation Officers also participated in public education and enforcement efforts at Lake of the Woods accesses during late season fishing tournaments. Lake of the Woods (District 1) had one boat that was refused entry into the water at a fishing tournament and directed to a car wash for a thorough cleaning - because of heavy vegetation.

St. Croix River
Divers continued to be employed for underwater inspection of both commercial and recreational vessels in the St. Croix River. In 1999, Conservation Officers ordered the removal and cleaning of two boats found with attached zebra mussels. Conservation Officers also met with the WI DNR and the National Park Service several times to ensure interagency cooperation on this issue.

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. If additional enforcement effort in specific areas of the state appears necessary, the work planning process used by the Division of Enforcement will help to effectively allocate time to meet those identified needs. The DNR's ability to reduce the transportation of aquatic vegetation on public roads will be evaluated after several more seasons under the current statutes.

Future plans and needs regarding enforcement:

- Road checks will continue to be conducted next summer. Our goal is to conduct 4 -8 major road checks between June and August. Annual road checks (Anoka, Hubbard, Hennepin,& Chisago Counties) will continue to be used to track boater compliance. Timing and locations of some of the road checks may be altered.

- Focus additional enforcement activity near lakes with Eurasian watermilfoil infestations. Eurasian watermilfoil now occurs in some larger outstate lakes (Minnewaska and Mille Lacs) and some of the enforcement focus will be moved outstate. In 1999 Eurasian watermilfoil was found in three lakes in the Grand Rapids Region and more enforcement effort will focus there, as well.

- 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, including cooperative assistance with MCC inspectors during access checks.

Management of Eurasian Watermilfoil

1999 Highlights

- Eurasian watermilfoil was discovered in seven additional Minnesota lakes during 1999, including Lake McKinney and Ice Lake in Grand Rapids, and Gilbert Pit Lake in Gilbert in northern Minnesota. There are now 105 Minnesota waterbodies known to contain Eurasian watermilfoil.

- Lake McKinney and Ice Lake were treated with the herbicide Sonar® AS with the goal of reducing the amount of milfoil in these lakes to below detectable levels for 2-3 years. This was done to reduce the chance of milfoil spreading to other lakes in the Grand Rapids area.

- The DNR Exotic Species and Aquatic Plant Management programs worked with cooperators on 35 Minnesota lakes during 1999 to manage Eurasian watermilfoil and initiated control efforts on twelve other "high-intensity" lakes.

- 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 1999 to manage this exotic plant and limit its spread in Minnesota.

Progress in management of Eurasian watermilfoil

Spread of Eurasian watermilfoil in Minnesota

Eurasian watermilfoil is now known to occur in 105 bodies of water in Minnesota. The presence of Eurasian watermilfoil was confirmed by the Exotic Species Program in one new lake during 1999 in the Twin Cities area (Centerville Lake in Anoka County). Outside the Twin Cities area the presence of Eurasian watermilfoil was confirmed in six new bodies of water during 1999: Lake McKinney and Ice Lake in Itasca County, Washington and Stella Lakes in Meeker county, Buffalo Lake in Wright County, and Gilbert Pit (also known as Lake Ore-be Gone) in St. Louis County. Two small lakes connected to Lake Minnetonka (Tanager Lake and Peavy Lake) were also officially designated as infested waters in 1999, although milfoil was discovered in these water bodies in 1988. These waterbodies were originally left off of the list because they were considered part of Lake Minnetonka. They have been added because they have unique DNR, Division of Waters inventory numbers. (Table10 and Figure 3).

The total of seven lakes discovered to have milfoil in 1999 was greater than the average number discovered annually since 1993, but still lower than the number found in any of the four years from 1989 to 1992 (Table 10). Four out of the seven lakes found to have milfoil during 1999 appear to have had milfoil for at least two years before it was discovered. Of particular concern were the infestations in McKinney Lake in Grand Rapids and in Gilbert-Pit near Eveleth, which both appeared to have been there for a few years before they were discovered. Because these lakes are very far away from the main area of milfoil infested lakes the risk of spread to new areas of the state from these lakes is high.

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 1999 of suspected occurrences of milfoil turned out to be another plant species. The Exotic Species Program continues to encourage anyone who suspects there is milfoil in a lake to call and send a sample to the Eurasian Watermilfoil Program Coordinator for identification. The program investigates 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.

Table 10. Numbers of lakes or rivers and creeks in which Eurasian watermilfoil was discovered in Minnesota as of October 1999.

Year	Number of Lakes in which milfoil was discovered	Number of Creeks and Rivers in which milfoil was discovered	Cumulative number of water bodies with milfoil
1987	1	0	1
1988	8[1]	0	9
1989	14	1	24
1990	12	1	37
1991	14	0	51
1992	10	2	63
1993	5	0	68
1994	2	0	70
1995	7	1	78
1996	5	0	83
1997	5	0	88
1998	9[2]	1	98
1999	7	0	105

[1] This total includes Tanager Lake and Peavy Lake which were officially designated as infested in 1999, although milfoil was found in these lakes in 1988.

[2] This total includes a small wetland which is part of the section of the Clearwater River in which milfoil was discovered in 1998 which has a separate Division of Waters number, and so has been added separately to the list of known milfoil infestations.

Management of milfoil in Lake Mille Lacs

As in 1998, milfoil was found growing at several protected harbors in Lake Mille Lacs. In September of 1998 the DNR first discovered milfoil in eight sites in Mille Lacs. These sites were immediately treated. During the spring and summer of 1999 milfoil was found in three of the initial eight sites as well as in six additional sites in Lake Mille Lacs. All milfoil sites were treated with 2,4-D herbicide in 1999. Since most of the lake supports few, if any, submerged aquatic plants, it's likely that the milfoil will take hold only in those parts of the lake where native aquatic plants are already growing. Currently milfoil in Mille Lacs Lake is only known to occur in protected harbors.

Discovery and response to milfoil found in northern Minnesota lakes

The discovery of Eurasian watermilfoil in Lake McKinney and connected Ice Lake, small recreation lakes in Grand Rapids, marked the furthest extent north milfoil has been found in Minnesota. Dense mats of milfoil were found in many areas of Lake McKinney and around the entire shoreline, which means that milfoil had probably been growing there for several years. Because McKinney and Ice lakes are small, are a source of potential spread of milfoil to the northern part of Minnesota, and are far enough away from other lakes with milfoil that the possibility of a quick reinfestation is low, they were considered for treatment with Sonar® herbicide (Welling et al. 1997). After discussion with Fisheries staff, the public, and others who have had experience using Sonar®, the DNR decided to treat both Ice Lake and McKinney with Sonar®. The goal of the treatments was to significantly reduce the abundance of milfoil in these lakes, which in turn will reduce the potential for spread to other lakes in northern Minnesota.

If the treatments are successful, milfoil should be reduced to below detectable levels for 2-3 years. It is likely that milfoil will reappear in these lakes. At that time, the value of a second treatment with Sonar® herbicide will be evaluated. The 1999 Sonar treatments will likely reduce many native plant species for 2-3 years. Certain native plant species may not return to pre-treatment levels of abundance or may not reappear in the lake for many years.

In October 1999, milfoil was found in Gilbert-Pit, an abandoned iron ore mine in the town of Gilbert. This lake is further north and is larger than either McKinney Lake or Ice Lake and is very deep. Therefore it is <u>not</u> well suited for a Sonar® treatment. Current DNR plans are to treat the milfoil by the public water access in order to prevent the spread of milfoil out of Gilbert-Pit.

Effectiveness of efforts to limit the spread of Eurasian watermilfoil

Efforts to limit the spread of milfoil in Minnesota appear to be having a positive effect. The total of seven lakes discovered to have milfoil in 1999 continues the pattern observed since 1993; a low and relatively constant number of new infestations annually. If the spread of milfoil were unchecked we would expect an increasing number of new lakes to be infested each year because each new lake is a source of spread to more lakes. 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 take to prevent the spread of exotics (see sections on Regulations, Public Awareness, Watercraft Inspections, and Enforcement). The low

number of new infestations found in the Twin Cities area may be attributable to high boater awareness of the problems caused by milfoil in the Twin Cities area. The new infestations in outstate areas this summer have brought milfoil to the attention of people in new areas of the state, particularly in the Iron Range. This new awareness has encouraged people in outstate areas to report suspected new milfoil infestations. Watercraft inspectors at public water accesses in these areas have been showing boaters how to clean their boating equipment, which will help prevent the spread of milfoil in the future.

Management of Eurasian watermilfoil in Minnesota lakes

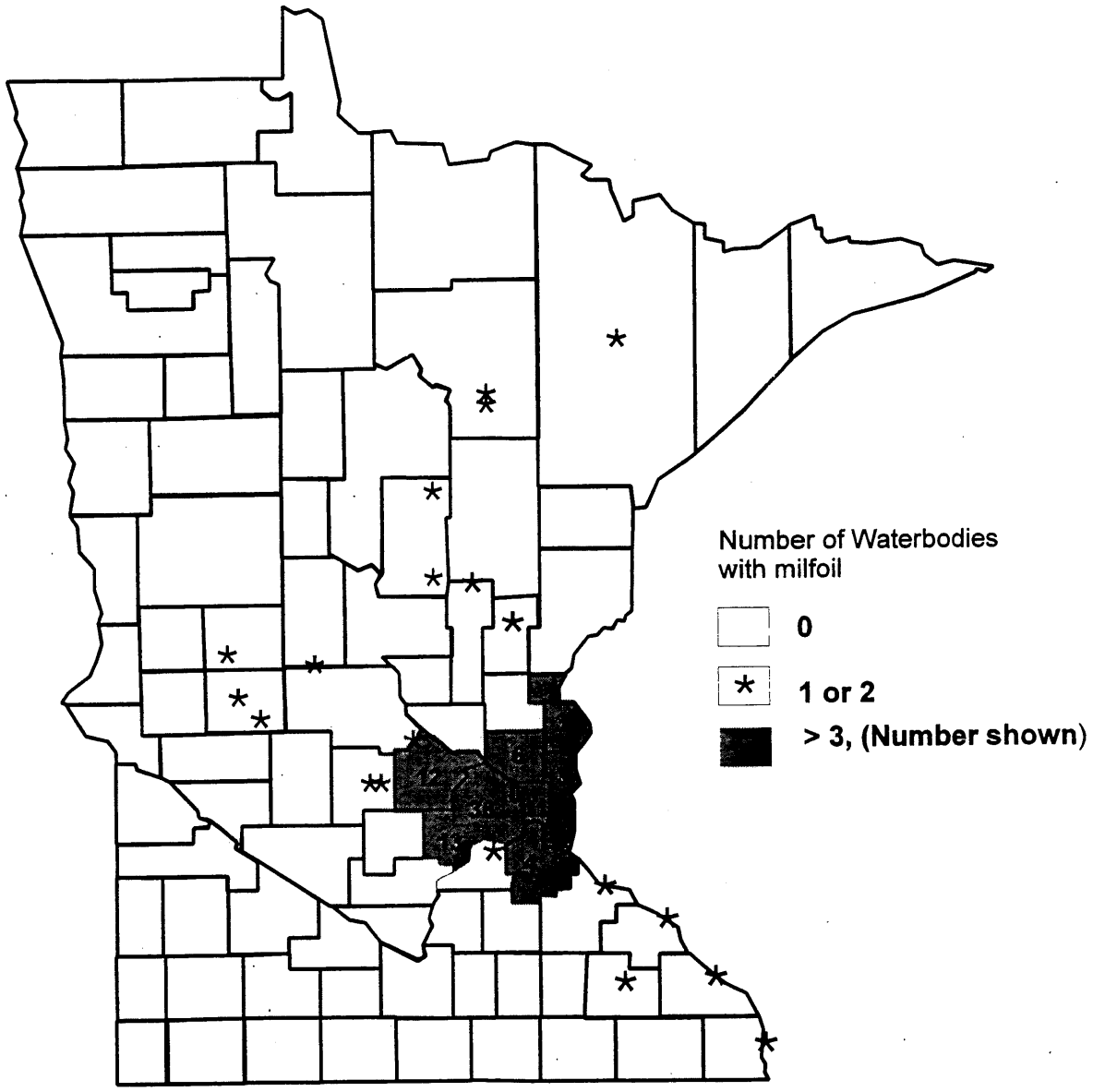
Classification of water-bodies for management of Eurasian watermilfoil

Management of Eurasian watermilfoil by the Exotic Species Program starts by classifying water-bodies known to have the exotic. In the spring of 1999, the Exotic Species Program classified the 98 bodies of water known to have milfoil on the basis of surveys done in 1998. Seventy lakes were determined to be eligible for management with State funds (Table 11). Another 21 lakes were determined to be ineligible for management with State funds because they do not have public water accesses, or are not protected waters. Lastly, seven bodies of water with milfoil are flowing waters (water courses) where management of this exotic is not usually attempted. The seven water bodies that were discovered during 1999 to have milfoil included five lakes classified for high-intensity management and two lakes classified for maintenance management. (Table 11).

Table 11. Classification of bodies of water in Minnesota with Eurasian watermilfoil during 1999.

Classification	Spring	New in Summer	Fall
Eligible for management with State funds			
High-intensity management	9	5	14
Maintenance management	61	2	63
Ineligible for management with State funds			
Public water but no public access	17	0	17
Not public water	4	0	4
Other			
Flowing water (water courses)	7	0	7
Total	**98**	7	**105**

Figure 3. Distribution in Minnesota of water bodies infested with Eurasian watermilfoil as of October 31, 1999.



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 1999 the Exotic Species Program conducted high-intensity management on 14 lakes with Eurasian watermilfoil (Tables 11 and 12). High-intensity management began with surveys of lakes by staff of the Exotic Species Program. Following these surveys, applications of herbicide were made to eleven of these lakes by commercial applicators under contract to the DNR. Sauk Lake in Todd County and Sugar Lake in Wright county were not treated because no milfoil plants were found. Gilbert-Pit in St. Louis County was not treated because milfoil was discovered in mid-October when water temperatures were low, the use of the access at that time of year was low, and milfoil was already dying back.

Table 12. High intensity management milfoil lakes

Record Number	Lake Name	County	Year discovered
1	Christmas	Hennepin	1992
2	Eagle	Hennepin	1992
3	George	Anoka	1998
4	Gilbert-Pit (Ore-be Gone)	St. Louis	1999
5	Gilchrist	Pope	1996
6	Ice	Itasca	1999
7	McKinney	Itasca	1999
8	Mille Lacs	Mille Lacs	1998
9	Minnewaska	Pope	1998
10	Ruth	Crow Wing	1997
11	Sauk	Todd	1994
12	Stella	Meeker	1999
13	Sugar	Wright	1990
14	Washington	Meeker	1999

The amount of state funds spent on high intensity management in 1999 was higher than the amount spent in 1998 (Table 13). This is due largely to the Sonar® treatments done on McKinnney and Ice lakes in Itasca county. Those treatments, which were done to prevent the spread of milfoil to other lakes in northern Minnesota, together cost $46,000.

Table 13. Summary of the funds spent on 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	Maintenance Management		High Intensity Management			Total	
	Number of lakes	Funds from DNR ($)	Number of lakes	Funds from DNR ($)	Additional funds from cooperators ($)	Number of lakes	Funds from DNR ($)
1998	34	60,000	7	23,000	7,700	41	91,000
1999	35	56,000[3]	12	65,000	0	47	119,000

[3] This is an estimate of the amount of DNR funds that will be spent for 1999 because some of the projects eligible for reimbursement have not been completed as of November 17, 1999.

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 near shore areas adjacent to privately owned property, which are used primarily, if not exclusively, by owners of that property. Control of milfoil in near shore areas adjacent to privately owned property, if any is done, is usually undertaken by the owners of the property.

During 1999 State funding and technical assistance were available from the Exotic Species Program to 55 potential cooperators for management on 63 lakes with Eurasian watermilfoil in the maintenance management classification (Tables 11 and 14). The number of lakes exceeds the number of cooperators because we seek one cooperator for connected lakes. This offer of assistance is described in a document that is annually mailed to potential cooperators (MNDNR 1999).

As of November 17, 1999, we have reimbursed eight cooperators on 12 lakes for costs of management of milfoil. We expect to reimburse an additional 15 cooperators on 19 lakes for costs of milfoil management (Table 13). These efforts ranged from the herbicide treatment of milfoil at a public water access at a cost of $335 to a mechanical harvesting program on Lake Minnetonka for which the DNR made $23,850 available. During 1999 the majority of cooperators chose to spend State funds on treatment of milfoil with herbicide. Three cooperators applied for state funds for mechanical harvesting of milfoil on seven lakes. Four cooperators applied for state funds to have contractors survey milfoil. In addition, the Exotic Species Program initiated treatment of milfoil in the immediate vicinity of public water accesses operated by the DNR on five lakes in the maintenance management class.

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.

Effectiveness of management of Eurasian watermilfoil in Minnesota lakes

The main goals of the milfoil management carried out by the Exotic Species Program are to slow the spread of the exotic to other lakes and to manage nuisances caused by milfoil. Management of nuisances caused by milfoil done with State funds usually involves control of milfoil in areas which are used by the general public.
Efforts to limit the spread of milfoil in Minnesota appear to be helping. As previously described, the total of seven new lakes discovered to have milfoil in 1999 continues the pattern observed since 1993 of a relatively low number of new infestations annually (Table 10).

An evaluation of the effectiveness of past DNR efforts to control milfoil showed milfoil acres were reduced the year following treatment with 2,4-D herbicide in 75% of the individual treatments. Although milfoil abundance was often reduced at the treatment sites, milfoil continued to be found in new areas in most of the treated lakes (Crowell, 1999).

Table 14: Maintenance management milfoil lakes

Record #	Lake Name	County	Year discovered	Record #	Lake Name	County	Year discovered
1	Ann	Carver	1995	33	Lotus	Carver	1991
2	Auburn	Carver	1989	34	Lower Prior	Scott	1991
3	Augusta	Wright	1993	35	Marion	Dakota	1998
4	Bald Eagle	Ramsey	1989	36	Mary	Wright	1997
5	Bavaria	Carver	1989	37	Medicine	Hennepin	1999
6	Bay	Crow	1992	38	Minnetonka	Hennepin	1987
7	Beebe	Wing	1993	39	Minnewashta	Carver	1989
8	Brownie	Wright	1991	40	Nokomis	Hennepin	1995
9	Bryant	Hennepin	1991	41	Oscar	Douglas	1992
10	Buffalo	Hennepin	1999	42	Otter	Anoka	1989
11	Bush	Wright	1990	43	Parkers	Hennepin	1991
12	Calhoun	Hennepin	1989	44	Peavy	Hennepin	1988
13	Clear	Hennepin	1990	45	Phalen	Ramsey	1997
14	Centerville	Hennepin	1999	46	Pierson	Carver	1991
15	Clearwater	Anoka	1989	47	Pulaski	Wright	1991
16	Crooked	Wright	1990	48	Rebecca	Hennepin	1989
17	Crystal	Anoka	1991	49	Riley	Carver	1990
18	Dutch	Dakota	1989	50	Rock	Wright	1993
19	Fish	Hennepin	1993	51	Round	Hennepin	1995
20	Forest	Hennepin	1990	52	Rush	Chisago	1992
21	Gervais	Hennepin	1995	53	Sarah	Hennepin	1990
22	Green	Ramsey	1990	54	Silver	Ramsey	1992
23	Harriet	Chisago	1991	55	Tanager	Hennepin	1988
24	Independence	Hennepin	1989	56	Virginia	Carver	1988
25	Island	Hennepin	1991	57	Wabasso	Ramsey	1992
26	Keller	Ramsey	1995	58	Waconia	Carver	1989
27	Knife	Ramsey	1990	59	Waverly	Wright	1991
28	Lake of Isles	Kanabec	1988	60	Whaletail	Hennepin	1996
29	Libbs	Hennepin	1988	61	White Bear	Washington	1988
30	Little Waverly	Hennepin	1992	62	Wirth	Hennepin	1986
31	Little Long	Wright	1991	63	Zumbra	Carver	1989
32	Long	Hennepin	1992				

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

The success achieved in management of Eurasian watermilfoil and the problems it causes in Minnesota is due in large part to cooperation between the Exotic Species Program and organizations outside the DNR such as lake associations, and various local units of government, hereafter called cooperators. The Exotic Species Program also received valuable assistance in management of Eurasian watermilfoil from staff of the Grand Rapids Fisheries office, and the DNR's Aquatic Plant Management Program in the sections of Fisheries and Ecological Services, particularly the Brainerd and Metro offices.

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. The efforts of these outside organizations are strongly supported by the Exotic Species Program.

Potential for biological control of Eurasian watermilfoil

Evaluation of potential biological control agents for Eurasian watermilfoil by researchers at the University of Minnesota is primarily focused on a weevil (*Euhrychiopsis lecontei*), which is a native insect. This research was initiated in 1992; the State of Minnesota has invested over $700,000 in these efforts over the past eight years. Declines in milfoil in some lakes have been associated with weevils. Unfortunately, other lakes with weevils have not experienced declines in Eurasian watermilfoil. Current and proposed future research is focused on attempts to determine what factors or conditions limit the abundance of weevils and prevents the insects from controlling milfoil.

In 1999 researchers at the University of Minnesota continued long-term sampling of milfoil and weevils in 11 sites. They also completed a number of manipulative experiments in lakes.

Minnesota researchers conducting the weevil studies are making good progress, including publication of results in peer-reviewed journals. During 1999, one paper was published in a peer-reviewed journal (Mazzei et al 1999), and one manuscript was submitted to a peer-reviewed journal (Solarz and Newman 1999).

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

The research described above was supported by funding provided through the DNR with appropriations made in 1992, 1993, 1995, 1997, and 1999, by the Minnesota Legislature as recommended by the Legislative Commission on Minnesota Resources (LCMR). The LCMR anticipates continued funding for research on the potential for biological control of milfoil and loosestrife during the next biennium (FY 2001-2002). The appropriations made in 1999 was matched 50:50 by the DNR. This match was made from DNR Exotic Species Program funds which come from a surcharge on watercraft licences (see Overview of MN Exotic Species Programs, Funding).

Predicting the Invasion of Eurasian Watermilfoil into Northern Lakes

An understanding of the factors related to colonization and establishment of milfoil can improve the planning and implementation of milfoil management. The U.S. Army Corps of Engineers, Aquatic Plant Control Research Program analyzed data from lakes containing Eurasian watermilfoil to determine those factors related to milfoil success and to predict which lakes in Minnesota could support significant infestations of Eurasian watermilfoil. Results suggest that a large proportion of lakes in Minnesota across a broad geographical area could support significant populations of Eurasian watermilfoil (Madsen, 1998)

Evaluation of the effectiveness of 2,4-D to manage Eurasian watermilfoil

Due to the limited distribution of the milfoil in the years immediately following its discovery in Minnesota, and the severity of problems caused by milfoil, the DNR initiated aggressive efforts to control the plant. The initial goals of these efforts were to: 1) eliminate the plant from individual lakes, 2) prevent the spread of milfoil within infested lakes, and 3) reduce the abundance of milfoil in treated areas. The DNR evaluated the effectiveness use of 2,4-dichlorophenoxyacetic acid herbicide (2,4-D) in achieving these goals.

Eurasian watermilfoil has not been permanently eradicated from any of the Minnesota lakes where the DNR attempted to find and treat all the milfoil with 2,4-D herbicide. Milfoil acres were reduced the year following treatment with 2,4-D herbicide in 75% of the individual treatments observed. Milfoil acreage increased in 23% of the treatment sites. Although milfoil abundance was often reduced at the treatment sites, it continued to be found in new areas in most of the treated lakes (Crowell, 1999).

The DNR believes that realistic goals for use of 2,4-D as well as other herbicides and methods of control in lakes where milfoil is widespread are to 1.) give users of the lakes relief from the nuisances caused by milfoil, and 2.) reduce the amount of milfoil near water accesses or boat ramps to reduce the chances for boaters to accidentally transport fragments of the exotic to another body of water.

Management of Eurasian watermilfoil in other states

Eurasian watermilfoil was first found in South Dakota this year, bringing the total number of states known to have milfoil to 45. The only states where it is not known to occur are: Maine, Hawaii, Alaska, Montana, and Wyoming. In Canada milfoil is known

to occur in British Columbia, Ontario, and Quebec (Sandy Engel, Wisconsin Department of Natural Resources, personal communication).

Wisconsin

Eurasian watermilfoil is known to occur in 319 waterbodies in 75% (54) of Wisconsin counties (Sandy Engel, Wisconsin Department of Natural Resources, personal communication). The Wisconsin DNR does not have a specific program to control milfoil, but is involved in the management, research, and public education efforts for this exotic.

Iowa

During 1996, the Iowa legislature passed a law prohibiting the transport of Eurasian watermilfoil and has initiated a program to limit further spread of the exotic in that state. As of June 1998, Eurasian watermilfoil was found in eight waterbodies in Iowa. During 1998 the Iowa Department of Natural Resources conducted 248 hours of boat access monitoring, surveyed 65 lakes for the presence of Eurasian watermilfoil, conducted various public awareness activities aimed at preventing the spread of milfoil, and treated three infested lakes with herbicide. (IaDNR 1998).

North Dakota

A small bed of Eurasian watermilfoil milfoil was found by a group of Valley City State University students in September 1996 in the Sheyenne River below Baldhill Dam near Valley City, North Dakota. This is the only site in North Dakota where the plant is currently known to exist. After its discovery, the Valley City students surveyed additional areas, particularly downstream sites, to determine the extent of the infestation. No plants were found further downstream. The main bed covered approximately 250 square feet and scattered plants were found no more than 1,500 feet downstream (Steinwand 1997). A winter drawdown in 1996 may have caused a reduction in the milfoil at this site (Stockdill 1996). Milfoil was not observed in the area during a casual search of the main bed area in 1997 (Bonnie Alexander, Valley City State University, personal communication).

South Dakota

Dave Ode, a Wildlife Division botanist from Pierre, said Eurasian watermilfoil was discovered in mid - August, 1999 on the Missouri River. This is the first time Eurasian watermilfoil has been discovered in South Dakota. In 1992, the State Department of Agriculture listed Eurasian watermilfoil as a regulated non-native species and it became illegal to transport the weed into South Dakota. Signs were erected at boat ramps throughout the state and it was widely publicized in state publications (State of South Dakota 1999).

Future plans and needs of the Eurasian watermilfoil program:

Priorities for the Eurasian Watermilfoil Program include:

- Keep the public informed about Eurasian watermilfoil and the problems that it can cause;
- 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;
- Attempt to control milfoil in Minnesota lakes, especially new populations in areas of the state without other milfoil infestations; and
- Support research on the potential for biological control of milfoil, including support of the proposal submitted to the LCMR for continued funding, as well as research on the biology of this species.

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Management of Purple Loosestrife

1999 Highlights

- Biological control insects significantly damaged many loosestrife infestations statewide by totally or partially defoliating entire loosestrife infestations. Sites where severe damage occurred from Houston County in the southeast, to Becker County in the west, and to St. Louis County in the north.

- Approximately 1.4 million purple loosestrife leaf-eating beetles were released at more than 200 sites statewide.

- Over 80 percent of insect releases made for biological control of purple loosestrife between 1992 and 1998 have become established.

- 104 high priority purple loosestrife infestations were treated with herbicide.

- No purple loosestrife was found at 16 sites where purple loosestrife plants were treated with herbicide in 1998. This control success is limited to small infestations that are treated soon after loosestrife invades an area.

- 35 sites that were treated with herbicide in 1998 had a 75% reduction in the quantity of herbicide needed to control those infestations in 1999. This is directly due to reductions in infestation size from previous treatments.

Background

Purple loosestrife (*Lythrum salicaria, L. virgatum* and their hybrids) is a wetland plant from Europe and Asia that invades marshes and lakeshores, replacing cattails and other wetland plants. The DNR and other agencies manage purple loosestrife because it harms ecosystems and reduces biodiversity. 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 1999, 47 new purple loosestrife infestations were identified in Minnesota. There are now 1,945 purple loosestrife infestations recorded statewide (Table 14). Of those sites the majority (70%) are lakes, rivers, or wetlands. Inventory totals indicate that MN presently has over 58,000 acres infested with purple loosestrife.

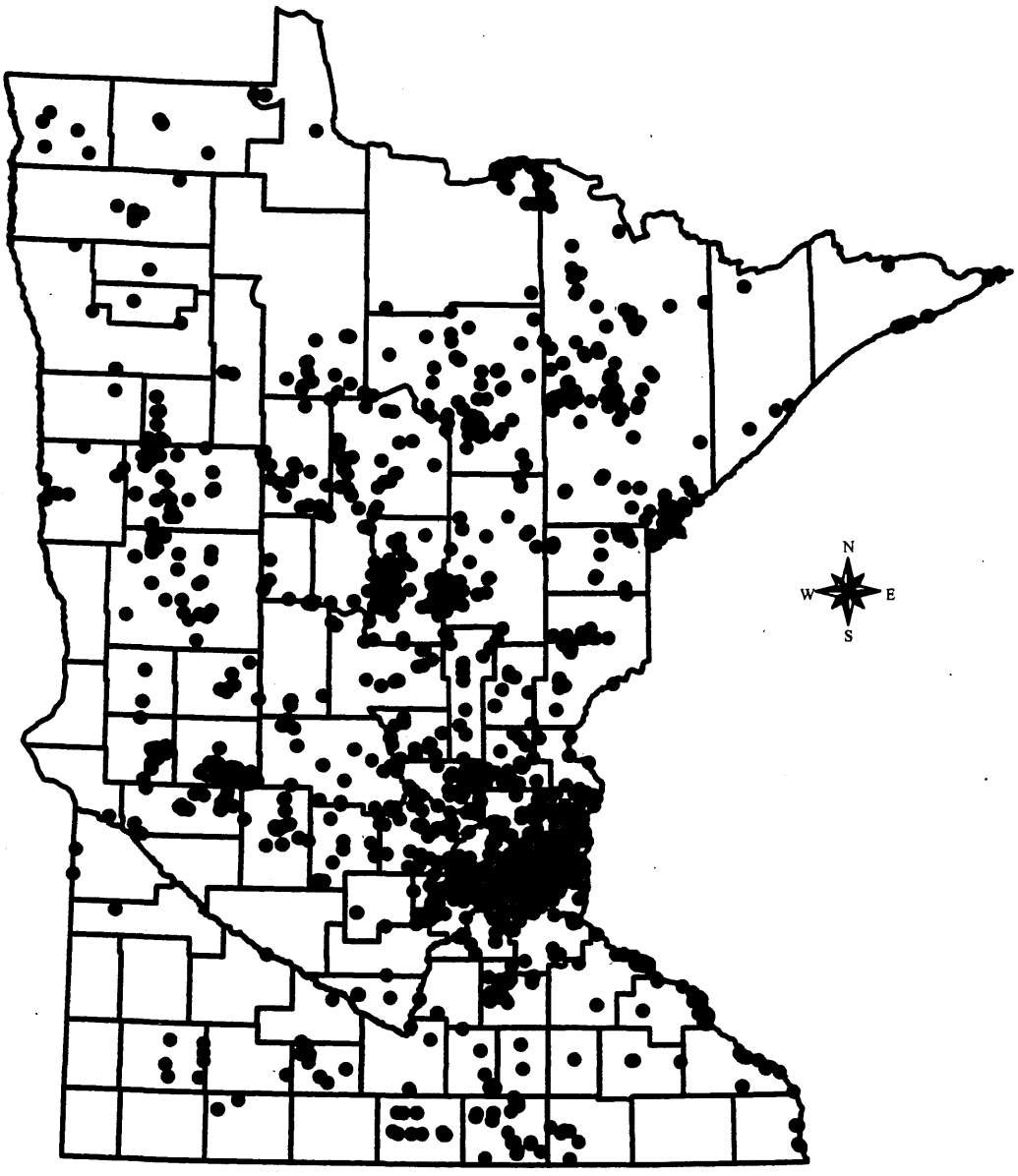

Figure 4. Purple loosestrife infestations in Minnesota as of December, 1999.

Table 14. Purple Loosestrife infestations recorded by the Minnesota Department of Natural Resources in 1998 and 1999.

Site Type	Total sites - 1998	New sites - 1999	Total sites 1999
Lake	571	15	586
River	159	4	163
Wetland	608	19	627
Roadsides and Ditches	411	9	420
Other[1]	149	0	149
Total	**1898**	**47**	**1945**

[1] Includes gardens and other misc. sites.

Progress in Management of Purple Loosestrife - 1999

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, or 2,4-dichlorophenoxyacetic acid, is less frequently 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, Renovate, or triclopyr, has been applied to purple loosestrife on a trial basis to test its effectiveness and selectivity. If Renovate is registered for aquatic use in the U.S., it will be the herbicide of choice for loosestrife control. Renovate has proven to be very effective and is more selective than Rodeo (i.e., it is less harmful to non-target plants). Renovate is also less expensive than Rodeo. Renovate was applied to wetland sites under an Experimental Use Permit obtained from the Environmental Protection Agency by SEPRO, the manufacture of Renovate.

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 1,880 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 15).

Between 1990 and 1999, herbicides were applied to an average of 151 sites per year (Table 15). 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 1999, the DNR or contractors visited 131 purple loosestrife stands for herbicide control work. At 27 sites workers found no loosestrife plants to treat. One site had loosestrife plants which were hand pulled. At one site workers could not get to the loosestrife plants (Tables 15 and 16). A total of 104 sites were treated with herbicides. Most of the sites were very small, 63% had less than 100 plants (Table 15). In total these site visits used 5.1 gallons of Rodeo, 4.4 gallons of Renovate, took 791 worker hours, and cost $26,141 (Table 16).

Table 15. Number of purple loosestrife infestations treated in 1998 by the Purple Loosestrife Program classified by infestation size.

Year	<20 plants	20 - 99 plants	100 - 1,000 plants	>1,000 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
1997	35	31	36	15	117	27
1999	26	39	32	6	104	27

Table 16. Summary of herbicide applications to purple loosestrife infestations in 1999 by the Purple Loosestrife Program, Minnesota Department of Natural Resources.

DNR Region	Total number of sites visited	Number of sites treated with Rodeo	Number of sites treated with Renovate	Number of sites requiring no treatment	Hours of Labor	Total Cost
I - Northwest	17	15	0	2	111	$5,298
II- Northeast	65	52	0	12	369	$8,456
III - North Central	28	20	1	8	131	$4,899
IV - Southwest	16	12	0	4	143	$6,200
V- Southeast	6	5	0	1	37	$1,288
VI- Metro	0	0	0	0	0	$0
Total	**131**	**103**	**1**	**27**	**791**	**26,141**

Biological control of purple loosestrife

Insects for biological control of purple loosestrife were first released at one research site by DNR staff in 1992. This initial release occurred after years of testing to make sure the insects were purple loosestrife specific and would not damage other native plants or agricultural crops. Once the insects were approved for release by the United States Department of Agriculture, insects were provided by Cornell University for release in Minnesota. This research was expanded in 1993, 1995, 1997 and 1999 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.

Leaf-Eating Beetles: Biocontrol insects released between 1992 and 1998 have established at more than 80 percent of the sites. Insect populations increased significantly at many locations with pronounced damage to loosestrife plants. More than 120 insect release sites were visited during the summer of 1999 to assess the insects establishment and level of control achieved. At 24% of the sites surveyed, the insect populations are rapidly increasing and causing significant damage to the loosestrife infestations. At nearly half of these sites, the loosestrife was 90-100% defoliated. This includes sites scattered statewide. The most severe defoliation of loosestrife plants occurred in the City of Winona where a 7-acre wetland, that was virtually solid loosestrife, was completely defoliated. Sites in Ottertail, Becker, St. Louis, Carlton, Ramsey, Dakota , Rice, Houston, Hennepin, Washington, Pope, Mille Lacs and Wadena Counties all have loosestrife infestations that are being heavily damaged by the beetles.

From 1997-1999, rearing efforts were increased through recruiting more partners to rear insects statewide. Insect rearing "starter kits" were provided to rearing partners including County Agricultural Inspectors, Minnesota Department of Agriculture staff, Minnesota Department of Transportation staff, DNR Area Wildlife Managers, Nature Centers, 4-H and Garden clubs.

A starter kit is composed of pots, potting soil, insect cages, leaf eating beetles, and other materials necessary to rear 20,000 leaf-eating beetles(*Galerucella* spp.). The insects were then released on high priority areas. Cooperators statewide reared and release more than 1.3 million leaf-eating beetles in 1999. All insect rearing was completed outdoors for ease of production and to 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 1.4 million leaf-eating beetles were produced and released on more than 199 sites statewide. As of December 1999, insects have been released at more than 375 sites statewide (see Figure 5).

With success of insect establishment in the field, organized rearing efforts are anticipated to come to an end in the next couple of years. Resource managers will be able to collect insects from established release sites and move them to new infestations. This collection and move method will reduce the effort and costs needed to further distribute leaf-eating beetles in Minnesota.

Root-Boring Weevils: Because there are only a small number of root-boring weevils brought to Minnesota, the adult weevils were kept in the 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 were still small, 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.

In 1999, Cornell University provided 800 adult root-boring weevils for field release. The weevils were released at two sites (one in Ramsey County and one in Washington County). These weevils have mated, laid eggs, and larvae can now be found in the roots of the plants.

Research

Insects as biological control agents

Funding from the Minnesota Legislature, as recommended by the LCMR, was used to continue efforts to monitor impacts to loosestrife populations by the all insects used as purple loosestrife biological control agents. In particular, the leaf-eating beetles, *Galerucella* spp., were monitored at several locations to assess their impacts on loosestrife seed production, seed germination and carbohydrate stores in roots. The study has shown that Galerucella feeding on shoot tips resulted in dramatically fewer seed capsules and shorter inflorescences compared with control plants. Germination

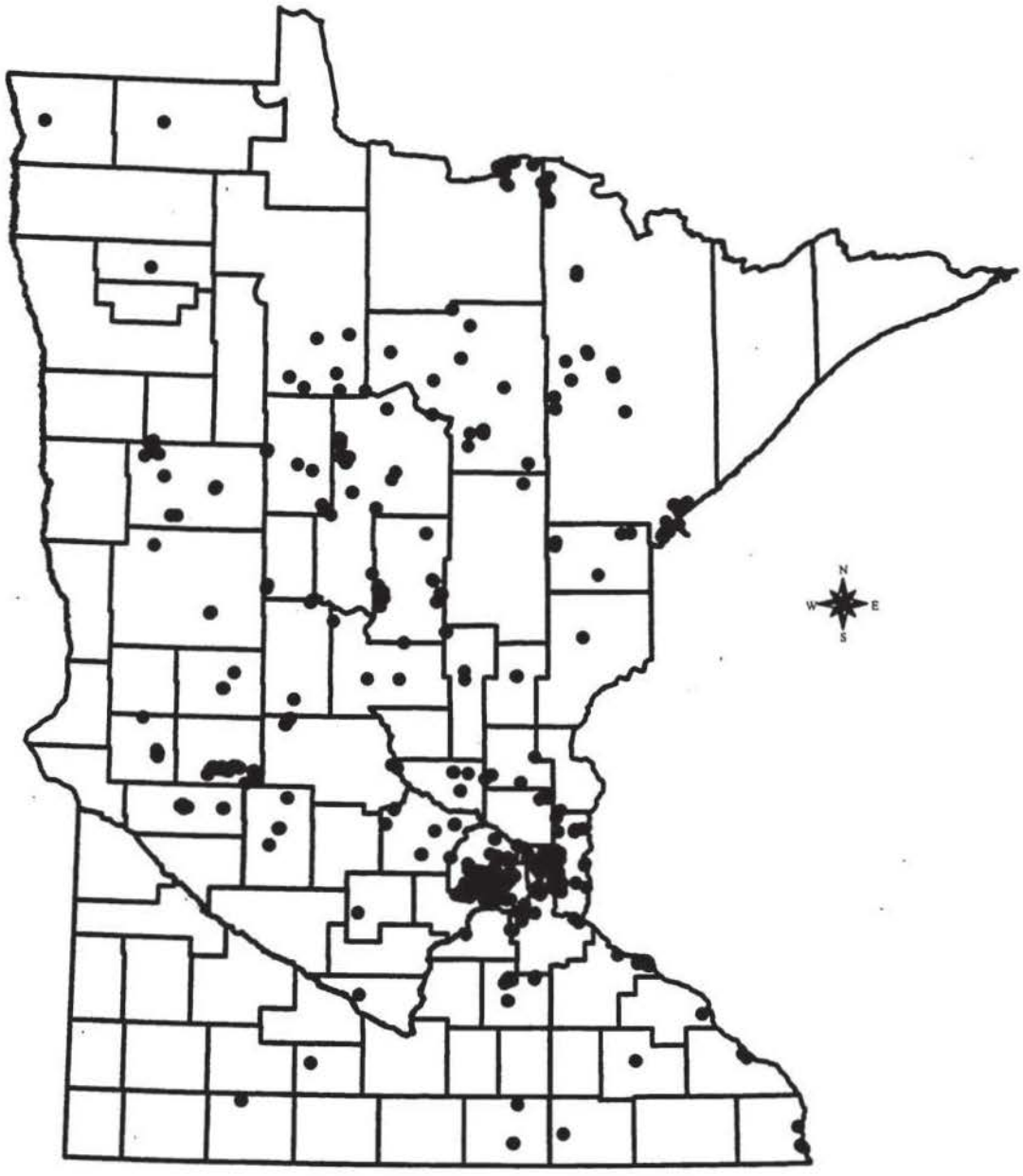

Figure 5. Leaf-eating beetle, *Galerucella* spp. releases in Minnesota as of December, 1999.

percentages and seed numbers per capsule were not significantly different from control plants if the flowers were not impacted by the feeding of the leaf beetles. The study also showed that *Galerucella* feeding, with complete defoliation, does not immediately kill a plant. It will require more than two years of successive *Galerucella* feeding to kill purple loosestrife plants, even when high amounts of defoliation occur. However, Galerucella feeding of shoot tips does result in shorter loosestrife plants and reduces seed production. This will reduce the competitiveness of purple loosestrife in wetlands and should help to increase abundance of native plant species.

Research was also sponsored at Cornell University to develop an artificial diet to rear the root-boring weevil, *Hylobius transversovittatus*. In nature, it takes one to two years for the root-boring weevil to go from egg to adult. The artificial diet fed to larvae and reared in temperature controlled growth chambers will speed up this time to three or four months. Cornell University has completed the development of the diet and provided the University of Minnesota with a recipe for making the artificial diet. The University of MN is currently working with the diet to produce weevils for release in Minnesota. To date, researchers at the University of MN have not been able to duplicate the results of Cornell. Work continues to solve these problems and start producing the weevils.

Management of purple loosestrife in other states

In 1997, the DNR received two federal grants to rear and distribute insects for purple loosestrife control nationwide. A total of $312,000 was received from two 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.

In 1999, the DNR received a second grant from the USFWS-Federal Aid Program for $300,000 to continue rearing and distributing the root-boring weevil nationwide. Distribution of insects to participating states began during the summer of 1999 and will continue through 2001.

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

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 (16 in 1999) 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 1999, the DNR worked with a variety of local governments and other organizations to control purple loosestrife in Minnesota (Table 17). 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, MDA field staff, and DNR Area Wildlife Managers with a starter kit for rearing their own leaf-eating beetles (described above in the biological control section). There were 64 rearing partners, in the 33 counties who reared an estimated 1.3 million leaf beetles for release in the participating counties (Table 17).

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 are 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 Ag. Inspectors, DOT, DNR Area Wildlife Managers, Nature Centers) to expand scale of rearing efforts.

Table 17. 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. Started new effort for biocontrol.
City of Sunfish Lake	DNR provided equipment and herbicide for loosestrife control
Birch Lake Association, Ramsey Co.	DNR provided equipment and herbicide for loosestrife control
Cornell University, Ithaca NY	Working under contract to the MN DNR to develop an artificial diet for rearing the root-boring weevil.
MN Department of Agriculture	Partner with DNR in statewide biological control efforts including releasing and monitoring insects.
Anoka, Becker, Beltrami, Carlton, Carver, Cass, Crow Wing, Dakota, Douglas, Freeborn, Goodhue, Hennepin, Hubbard, Itasca, Kanabec, Kandiyohi, Koochiching, Mcleod, Meeker, Mille Lacs, Mower, Ottertail, Pine, Pope, Ramsey, Rice, Scott, Sherburne. St. Louis, Stearns, Stevens, Swift, Todd, Wadena, Washington, Watonwan, Winona	Counties where insects were reared and released by County Agricultural Inspectors, MDA field staff, MDOT Field Staff, DNR Area Wildlife Managers, 4H Clubs and Schools.

Management of Flowering Rush

1999 Highlights

- DNR Exotic Species Program staff removed flowers from flowering rush in Forest Lake, the only known population in Minnesota that produces fertile seeds.
- DNR Exotic Species Program coordinated the control of flowering rush at a public swim beach in Twin Lakes, Itasca County for a second year.
- Several WalMart and Home Depot stores were found to be selling flowering rush in spring of 1999, stores and national distributers were contacted by Exotic Species Program staff and now appear to be complying with state law prohibiting sale of this exotic.
- Queen's University researchers returned to Minnesota to evaluate reproductive ecology of flowering rush.

Background

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

The plant spreads primarily vegetatively from thick rhizomes, from small tubers that break off the rhizome, and from small bulblets that form in the inflorescence. Water currents, ice movement (Haber 1997) and muskrats (Gaiser 1949) can easily move these reproductive structures to new locations within a waterbody. There are two varieties of flowering rush differing in genetic composition and sexual reproductive capacity. One variety has a diploid number of chromosomes (26) and the other has a triploid number of chromosomes (39). Both varieties are able to reproduce vegetatively, but the diploid variety produces fertile seeds, while the triploid variety does not. However, triploid plants may be vegetatively more robust than diploid plants (Hroudova et al. 1996).

Flowering rush was likely brought to North America in the late 1800's in ship ballast and has also been repeatedly introduced as an ornamental plant. Although flowering rush occurs in Canada and every U.S. state bordering Canada from Vermont to Idaho (Haber 1997), its distribution is disjunct. Resource managers and researchers have expressed concern that flowering rush may grow more aggressively in North America than in its native Europe and may become an aggressive competitor with native wetland vegetation (Anderson 1974, Staniforth and Frego 1980).

Flowering rush in Minnesota

Flowering rush was first recorded in Anoka County, Minnesota in 1968 (Moyle 1968) and has since been located in five other counties (Table 18). Despite its 30 year presence in the state, the distribution of flowering rush remains disjunct. New introductions are likely the result of intentional plantings from horticultural sales.

The abundance of flowering rush varies greatly within and between waterbodies. Dense stands occur in areas of Detroit Lakes and Twin Lakes that lack native vegetation, but flowering rush is sparse within stands of native bulrush. There are several stands of flowering rush in the Cannon River extending from Morristown to Wells Lake. Wells Lake is immediately downstream of Cannon Lake in Faribault. Flowering rush was first documented in Cannon Lake in 1972 and in the Cannon River at Morristown in 1977. None has been observed downstream of Wells Lake on the Cannon River thus far. The DNR has looked for and not found the three populations of flowering rush in Anoka County, although the populations were originally reported by reputable sources. These populations are likely still present, but 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.

Researchers from Queen's University concluded that all but one of the known populations of flowering rush in Minnesota are the infertile, triploid variety. The exception is the population in Forest Lake, Washington Co., which is diploid and produces fertile seeds (Eckert pers comm. 1998).

Management of Flowering Rush

Flowering rush is a prohibited exotic plant in Minnesota, but horticultural sales are the most likely means of introduction into a new area. 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. Mechanical control by cutting appears the most effective method of reducing dense stands of flowering rush. Cutting is most effective if done early and repeated several times during the growing season (Hroudova 1989). Disadvantages of cutting include that it is not selective, is labor intensive, and does not eliminate the exotic. Digging flowering rush may increase its spread if the entire rhizome is not removed. Herbicide applications, particularly in water, have been ineffective because herbicide is quickly washed away from the plant.

Since the Forest Lake infestation produces fertile seeds, there may be an increased risk of these plants spreading to neighboring waters. In an effort to reduce this risk, the Exotic Species Program staff removed the umbels (flowers) from the plants in this lake.

Table 18. Recorded locations of flowering rush in Minnesota.

County	Water body	DOW #	Year identified	Source
Anoka	Amelia Lake	02-0014	1968	MDNR survey
	Bass Lake	02-0135	1968	MDNR survey
	Reshanau Lake	02-0009	1970	MDNR survey
Becker	Detroit Lakes	03-0381	1976	Univ MN herbarium collection
	Pelican River	------	1987	Pelican River Watershed District (PRWD)
	Muskrat Lake	03-0360	1987	PRWD
	Sallie Lake	03-0359	1989	PRWD
	Melissa Lake	03-0475	1993	PRWD
Itasca	Twin Lakes	31-0191	1995	MDNR survey
Rice	Cannon Lake	66-0008	1972	Univ MN herbarium collection
	Cannon River	------	1977	Univ MN herbarium collection
	Wells Lake	66-0010	1998	Queen's University
Todd	Sauk River	------	1997	MDNR survey
Washington	Forest Lake	82-0159	1998	MDNR survey

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

Research on flowering rush

Researchers from Queen's University in Ontario conducted field surveys of flowering rush populations in Canada and central US, including all existing Minnesota populations for a second year. The DNR Exotic Species Program is supporting the Minnesota portion of this research through funding ($4000 over the current biennium) and logistic support. Results from the 1998 research indicate that most Minnesota populations are sexually sterile (Eckert pers comm. 1998). Sterile populations of flowering rush do not spread over a long distance because their vegetative propagules (such as rhizomes) are susceptible to desiccation. The researchers predict that seeds from plants at Forest Lake

may be capable of long distance dispersal and may increase the rate of spread of this exotic in Minnesota.

The goals of the current research project by Queen's University, funded in part by the Exotic Species Program, are to determine the geographical and ecological distribution of flowering rush in North America including habitat requirements and geographical variation in sexual fertility of this species. Queen's University researches are looking at the variation in population genetics in the regions where flowering rush occurs in order to determine genetic relatedness within and among regions to better understand the colonization history of these introduced populations. Long-term goals of the research include examining the impact this exotic species has on wetland habitats, determining the most effective control methods, and exploring possible biological controls (Eckert and Lui 1999).

Management in other countries and states

Known populations of flowering rush exist in several states including North Dakota, South Dakota, Montana, Wisconsin, Ohio, Indiana, New York, Vermont, Idaho, Wisconsin, Michigan (Haber 1997).

Few states recognize flowering rush as a harmful species. An exception is Vermont, which recently listed flowering rush as "Category One" exotic species, defined as having a demonstrated ability to be highly invasive on a localized or widespread scale and currently having an economic and/or ecological impact in that state (Vermont Agency of Natural Resources 1998). In Connecticut, flowering rush is on a "watch list" because it's aggressive invasiveness into natural habitats may be questionable (Merhoff 1997). However, sale of flowering rush is not prohibited in either of these states (Shackleford et al. 1998). In some states, flowering rush is promoted as a desirable plant for landscaping wet sites and for wetland restoration (Ranney et al. 1994, Feedback no date).

Wisconsin Department of Natural Resources recommends that lake residents control small areas of flowering rush by cutting or digging, based on information they received from the Minnesota DNR. 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).

However, in states and Canadian provinces adjacent to Minnesota it is legal to buy, sell and possess flowering rush, leading to difficulties in preventing its distribution in Minnesota. New Hampshire is the only other state in the region of the U.S. in which flowering rush has been found where the sale and possession of the plant is prohibited (Shackleford et al. 1998).

Effectiveness of management - 1999

Although Minnesota has designated flowering rush as a prohibited exotic species, the DNR has not effectively stopped the sale of flowering rush in Minnesota. In 1999, several large discount stores in the metro area and in Brainerd were found to be selling

flowering rush in their garden departments. The DNR contacted these businesses and national wholesale distributors and notified them that it is illegal to buy or sell flowering rush in Minnesota. The remaining flowering rush was removed from store shelves. These business and distributers appeared to be unaware of flowering rush's prohibited status in Minnesota, but were willing to comply once notified about the law prohibiting sale and possession of flowering rush. Flowering rush continues to be sold as an ornamental plant and is advertised through the INTERNET as a desirable, hardy plant for water gardens. Some nursery catalogs now indicate that flowering rush cannot be shipped to Minnesota (Perleberg 1998).

Hand-cutting appears to be the most successful method to seasonally reduce dense stands of emergent flowering rush. The DNR Exotic Species Program again coordinated a flowering rush hand-cutting project at a public swim beach in Twin Lakes, Itasca County. Flowering rush impedes fishing and swimming activities at this beach and fishing pier. This beach was cut in 1998 as well. Flowering rush was not as abundant at this site in 1999 compared to 1998 (in 1998, nine truck loads of material was removed, while five were removed in 1999). The reduction in abundance is likely due to changes in the water level, as previous experience seems to indicate that hand cutting reduces the seasonal abundance of flowering rush, but provides little long-term control. The care-taker of the beach is pleased with the control of flowering rush by hand cutting and wants to cut again in 2000 possibly in both the spring and fall. The Exotic Species Program will continue to coordinate this effort.

In previous years, the Exotic Species Program has coordinated the hand-cutting of a small area of flowering rush in Deadshot Bay of Big Detroit lake. The area cut was a small portion (~one acre) of the flowering rush infestation in Detroit Lakes. This project was initially started in 1995 to determine the effectiveness of hand cutting at reducing flowering rush. Flowering rush was hand cut at this location at least twice each summer from 1995-1998 by Sentence to Service crews. The hand-cutting project on Deadshot Bay in Detroit lakes was not continued this year. Flowering rush was not reduced in overall abundance at this site after several years of cutting, nor was cutting at this site reducing a nuisance of any kind, although this project did help us determine that hand-cutting is the best known way to seasonally reduce the abundance of this exotic species. The Pelican River Watershed District continues extensive mechanical harvesting of flowering rush and other aquatic plants in Detroit Lakes.

Lake Melissa is the farthest known downstream location in the Pelican River watershed to have flowering rush, thus control of this population is a high priority. A small area of flowering rush had been hand-dug by the DNR in 1996. Flowering rush was located again in this same area in 1999. High water levels precluded hand-digging again this year but this method also seems only to temporarily reduce the amount of flowering rush, rather than eradicating it.

Participation by other groups

Others involved in flowering rush management in Minnesota in 1999 include: DNR Fisheries and Wildlife, DNR Minnesota Conservation Corps (MCC), Pelican River Watershed District, Greenway Township in Itasca County, and Queen's University, Ontario.

Future needs for flowering rush management

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

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Management of Curly-Leaf Pondweed

1999 Highlights

- Assistance was provided to the Army Corps of Engineers (ACOE) to continue to study the effectiveness of the contact herbicide endothall to control curly-leaf pondweed in spring when water temperatures are low. Exotic Species Staff assisted ACOE staff in selecting small Minnesota lakes to test endothall next spring, and in pre-treatment sampling this summer.

- Exotic Species Staff provided technical assistance to various groups studying new curly-leaf management techniques. In particular, staff designed and helped implement studies to evaluate the effectiveness of various curly-leaf control projects.

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

Background

Curly-leaf pondweed (*Potamogeton crispus* L) is 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 occurs in well over 500 lakes and in almost 70 of the counties in the state. This number is based on DNR Fisheries plant survey data and is likely an underestimate of the number of lakes with curly-leaf pondweed (Exotic Species Programs 1999). 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. 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. Because curly-leaf pondweed produces turions which can remain viable in lake sediments for years (like a seed bank), long term reduction of curly-leaf pondweed in 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

Control of curly-leaf pondweed

- In 1998, the DNR issued 2,279 permits to control aquatic plants, algae, or snails to control swimmers itch. Of those permits, 113 (5%) were issued at least in part, to control curly-leaf pondweed. Under those 113 permits herbicide was applied to 567 acres and 1,133 acres were mechanically harvested. Most of the permits to control curly-leaf

pondweed issued in 1998 were in the Twin Cities metropolitan area (48%), with an additional 26% issued in north central Minnesota, and 17% 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 1999.

Research on curly-leaf pondweed

- DNR Exotic Species Program staff assisted the Lake Benton Area association in an experiment to evaluate the effectiveness of iron filings for control of curly-leaf pondweed in Lake Benton (Lincoln County). Results indicated that iron filings can reduce the biomass of curly-leaf in treated areas compared to untreated areas. Nevertheless, curly-leaf plants still grew to the surface in the treated area. This experiment will be continued next summer.

- Exotic Species Program staff worked closely with Blue Water Science to studying the effects of mechanically harvesting curly-leaf using a boat - towed cutter in late spring. Specifically we helped design and implement a study to determine the effects of early summer cutting on winter turion densities in cut areas. For the third summer in a row DNR Exotic Species Program staff surveyed the aquatic plants in French Lake (Rice County) and Weaver Lake (Hennepin County) where experimental cutting of curly-leaf pondweed is being conducted. It appears that cutting is effective in removing curly-leaf in the cut areas, though annual cutting appears to be required.

- The Army Corps of Engineers (ACOE) continued the work done in 1998 to evaluate both the efficacy of contact herbicides to control curly-leaf pondweed at low water temperatures, and the efficacy of those herbicides to reduce turion production (Exotic Species Annual Report, 1999). The ACOE will test the ability of endothall to control curly-leaf pondweed and to reduce turion production in whole ponds in Minnesota in the spring of 2000. ACOE staff came to Minnesota in 1999 to choose experimental ponds and to collect pre-treatment data. Exotic Species Program staff are assisting ACOE staff with this project.

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 noninfested water bodies in Minnesota. During 1999, 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 focused on containing curly-leaf pondweed to where it is already found. Opportunities include our watercraft inspection program, literature, and public speaking engagements.
- Continue to provide information on the current state of curly-leaf pondweed in Minnesota and existing management technology through the preparation of a fact sheet, a report on the current state of curly-leaf control, speaking engagements, articles, and work with individual lake managers.
- Continue to provide technical assistance to researchers working on curly-leaf control, and the relationships between curly-leaf populations and lake water quality in Minnesota.
- Explore opportunities for cooperative research on curly-leaf pondweed management with Universities and other government agencies.

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Exotic Species Programs. 1999. Ecologically harmful aquatic plant and wild animal species in Minnesota: Annual Report for 1998. Minnesota Department of Natural Resources, St. Paul, MN.

Moyle, J.B. and N. Hotchkiss. 1945. The aquatic and marsh vegetation of Minnesota and its value to waterfowl. MN Dept. Conservation. Tech. Bulletin 3. 122 pp.

Management of Zebra Mussels

1999 Highlights

- Divers discovered only two boats with attached zebra mussels in Minnesota waters of the St. Croix River and DNR 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 (DNR) 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 zebra mussels in the St. Croix River.

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. The zebra mussel has established populations throughout most of the eastern United States and its eventual distribution could include most of the U.S. and southern Canada.

Progress on management of zebra mussels - 1999

Progress was made in the following areas that were identified as future needs for 1999:

- Veliger sampling was continued in Lake Pepin.

- Exotic Species Program staff attended the 1999 International Zebra Mussel Research Conference. The zebra mussel coordinator assisted in planning the conference, which was held in Duluth, Minnesota. The coordinator moderated one session of the meeting. Additionally, the DNR Deputy Commissioner spoke at the Plenary session about the Department's exotics efforts and several DNR staff made presentations.

Current distribution/inventory of zebra mussels

Zebra mussel population levels in the Mississippi River continued to increase in 1999 and native mussels in Lake Pepin and elsewhere in the river showed increased levels of colonization. Zebra mussels have not yet been documented above Lock and Dam 1 on the Mississippi River (Figure 7). Zebra mussels continue to be found in the Duluth Harbor, with 1999 densities exceeding all other years. It is unknown why populations in the Harbor are increasing now after nearly a decade of little or no successful reproduction.

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. DNR Aquatic Invertebrate Biology Laboratory staff also provided assistance to the United States Fish and Wildlife Service and the National Park Service for laboratory work on samples from the St. Croix River. While single zebra mussels were found attached to rocks on the lower end of the river, where it enters the Mississippi River, there is still no evidence to suggest reproducing populations of this exotic in the St. Croix River.

Public Awareness

Watercraft access inspectors conducted over 270 hours of access inspections at public access sites on the St. Croix River north of Stillwater, where the National Park Service restricts boat traffic. Additionally, over 1,090 hours of inspections were conducted at access sites on the river south of the Federal zone. Over 3,700 watercraft were inspected and boaters were given information on exotics.

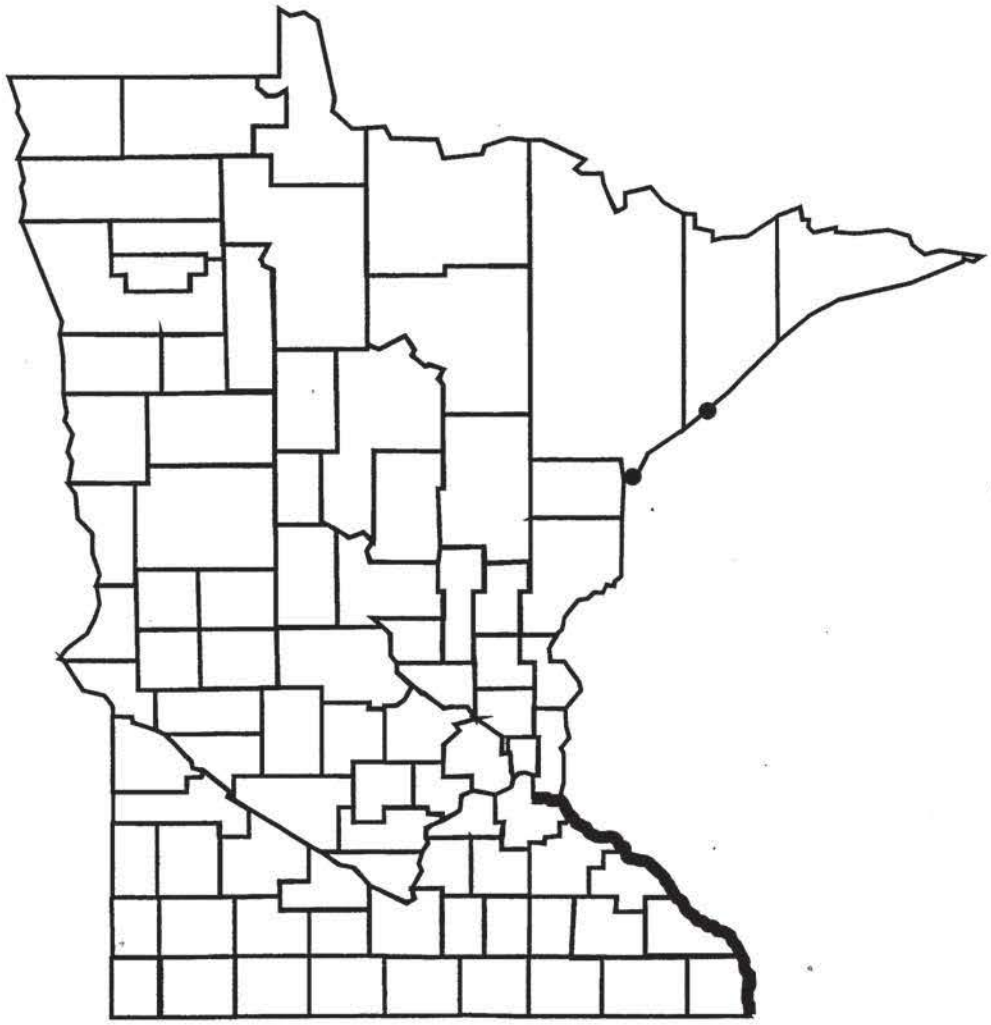
Control of zebra mussels

There was no control of zebra mussels within natural ecosystems conducted in 1999 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

DNR biologists collected plankton tows from Lake Pepin to examine veliger densities in the Mississippi River. Results from previous years 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. Veliger numbers continue to increase, indicating increased density of reproductive age zebra mussels in this area. Staff biologists also examined slides set out on settling plate samplers and collected by NPS and USFWS personnel from the St. Croix River. All samples from the St. Croix River were negative. DNR staff attended the Ninth International Zebra Mussel Research Conference to gather current information on research being conducted in the United States and Canada.

Figure 7. Zebra mussel distribution in Minnesota, December 1999. (Heavy line indicates Mississippi River from St. Paul downstream - zebra mussel populations along entire river length)



Management of zebra mussels in other states

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

Effectiveness

The primary goals of DNR's zebra mussel management efforts are to contain zebra mussels to water bodies where they presently occur and to support research to track their impacts and improve control methods. Targeted public awareness and enforcement activities will be used to reduce the spread of zebra mussels by trailered watercraft. No inland lakes in Minnesota are known to be infested with zebra mussels.

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 require boat owners on the St. Croix River to remove and clean their boats when zebra mussels are found attached during routine monitoring dives.

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

Public awareness and education efforts have benefitted from cooperation from the many groups involved in the zebra mussel issue: federal and state agencies, local groups and private industry. Some of these efforts are covered more fully in the Education section.

Future needs for management of zebra mussels

- Continue coordinated monitoring and prevention efforts on the St. Croix River with other resource agencies and seek continued federal funds for the St. Croix Riverway Interstate Management Plan for aquatic nuisance species.
- Monitor findings of international research efforts including the 2000 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 is widely distributed in Minnesota. The rusty crayfish lives in permanent water bodies and can grow slightly larger than Minnesota's native crayfish species. It is more aggressive than native species of crayfish, and in many lakes where it was introduced, it has displaced other species of crayfish or altered the community composition of this group. 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 in some lakes with native crayfish. It is more active than our native species during the day, and thus tends to be more visible to the lake user. To defend itself from fish during daytime activity, the rusty crayfish has somewhat larger claws than native species, and is more prone to aggressive displays towards predators, rather than evasion. While this makes it more difficult for some fish to eat, other fish such as walleye and bass have been reported to feed heavily on rusty crayfish.

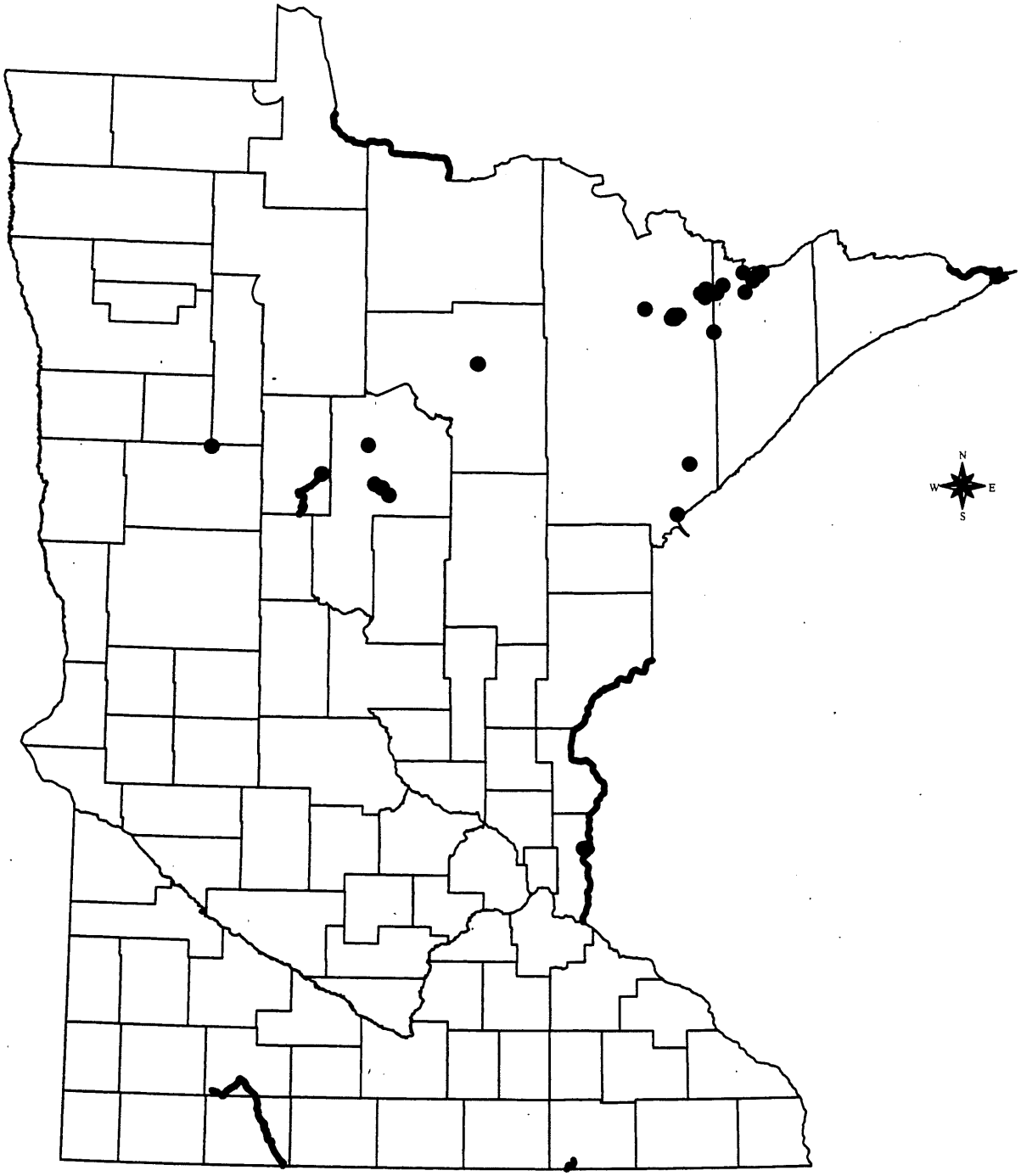
Progress in management of rusty crayfish - 1999

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 targeted management activities within the state.

Current distribution of rusty crayfish

Rusty crayfish have been reported from lakes and rivers scattered across the state, from the far northeast down to south-central Minnesota. Section of Fisheries staff have reported additional lakes where rusty crayfish are present in the last couple of years. The proximity of "new" lakes to other recorded occurrences suggests that these locations are not new movements, but were simply not collected in initial surveys. Judging from the widespread geographic distribution, rusty crayfish are likely present in more Minnesota waters. The majority of the lakes found in St. Louis and Lake counties are often interconnected, presenting no barriers to the spread of the rusty crayfish. It is likely that as more lakes are more closely examined, they will also be found to contain this exotic. Rusty crayfish were reported from a small pond in the Duluth area as well as from sites in the St. Louis River and Duluth Harbor area in 1999.

Figure 8. Rusty crayfish distribution in Minnesota, December 1999. Data from Helgen (1990) and DNR field surveys. (Heavy lines indicate river segments where localized collections suggest widely dispersed populations).



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 (Bills and Marking 1988) found that while trapping may harvest adults, it was doubtful that it could be used as a successful control method. Additionally, trapping efforts are labor intensive, both in terms of numbers of traps needed and the daily removal and rebaiting of the traps. Finally, intensive commercial trapping efforts often result in creating a crayfish population that is larger in numbers and smaller in body size. Thus, in any large lake, trapping is not likely to succeed in reducing the population or problem.

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. Discussions with fisheries managers from the Long Lake area indicated that the problems with rusty crayfish have declined to a minimal or non-existent level, aquatic vegetation has re-established in some areas of the lake, and a thriving fisheries is present.

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.

References Cited

Bills, J.D. and L.L. Marking. 1988. Control of Nuisance Populations of Crayfish with Traps and Toxicants. The Progressive Fish Culturist 50:103-106.

Management of Ruffe

1999 Highlights

- No ruffe have been discovered in inland waters of Minnesota.
- Minnesota Sea Grant developed a Eurasian ruffe bibliography with 844 world wide references. It will be published and also available online at the National Aquatic Nuisance Species Clearinghouse's web site (www.entryway.com/seagrant/).

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 - 1999

Educational activities conducted by the DNR and other cooperating agencies in past years to prevent the spread of ruffe were continued in 1999. 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.

Minnesota Sea Grant developed a Eurasian ruffe bibliography with 844 world wide references. It will be published and also available online at the National Aquatic Nuisance Species Clearinghouse's web site (www.entryway.com/seagrant/).

Current distribution and inventory of ruffe

The USGS-BRD, Lake Superior Biological Station has taken the lead role in ruffe population investigations in the Great Lakes and their tributaries. According to their surveys, the density and biomass of ruffe in the St. Louis River estuary have varied annually, and the ruffe population remains at a high level.

The USFWS Fishery Resources Offices continues 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

since the original discovery of the St. Louis River estuary population. A reproducing population was discovered in Thunder Bay, Ontario in 1994, and ruffe were discovered in Lake Huron for the first time in 1995. In 1999, they were found in Lake Superior as far east as the Firesteel River in Michigan. The new location is seven miles further east than 1998.

No ruffe were confirmed in Minnesota inland waters in 1999. 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 did not appear to check the ruffe population size or ruffe expansion. The DNR is not currently attempting to use other ruffe management methods in these areas.

The current goals and objectives of Federal Ruffe Control Program are available at http://www.fws.gov/index.html (search for "ruffe control program").

(See the 1998 annual report for additional ruffe control information)

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, or Indian entity has used chemical control to manage ruffe in tributaries along the south shore of Lake Superior. Chemical control of ruffe had been proposed for Wisconsin or Michigan waters. Laboratory tests show that ruffe are vulnerable to

available fish toxicants, but most information indicates that treatments would not be effective in preventing the spread of ruffe in open systems like the Great Lakes.

Participation of others in ruffe 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.

Sea Grant-sponsored research was completed at the Natural Resource Research Institute of U of M - Duluth and the U of M - St. Paul Campus. The research showed that Eurasian ruffe can have significant impacts on Great Lakes ecosystems.

Future Needs

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

- Support national and regional efforts to 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 by the USFWS and others.
- Support continued biological assessment efforts by the DNR Section of Fisheries, University of Minnesota, USFWS, and USGS-BRD so that the impact of ruffe on native communities can be ascertained.
- Continue monitoring using routine fish sampling and angler reports.
- Expand efforts to increase public awareness of ruffe in areas of Minnesota where introduction of ruffe may occur.

Management of Round Goby

1999 Highlights

- Significant numbers of round gobies were reported and confirmed in the St. Louis River estuary during 1999.

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

- US Army Corps of Engineers made some progress in 1999 toward installing an electrical barrier in the Illinois waterways, as required by the National Invasive Species Act of 1996, but the earliest that installation could occur is spring of 2000.

Background

The round goby *(Neogobius melanstomus)* is a small bottom-dwelling fish native to the Black and Caspian Seas. The first reported finding of round goby in the Great Lakes was in the St. Clair River, Michigan in 1990. This fish was likely introduced through transoceanic ballast water discharge. The first round gobies in Minnesota were discovered during the summer of 1995 in the Duluth-Superior harbor (St. Louis River estuary). There is documented harm to native fish populations, such as mottled sculpins, where round gobies have invaded. Populations of other species such as logperch and lake sturgeon may be harmed as well. If round gobies enter the Mississippi River basin, 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. Gobies appear to have another impact on recreational angling — because they can reach high densities and quickly take live bait— they can make it difficult to catch game fish such as yellow perch.

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

Progress in management of round goby - 1999

Because there are not any acceptable management options available to reduce or eliminate the established round goby population, management of gobies has not

occurred in the Duluth-Superior harbor. Prevention of their spread to inland waters continues to be the focus of round goby management in the state.

State efforts to address future needs for round goby management, as identified in the 1998 annual report, are describe below.

Round goby identification cards (Minnesota Sea Grant 1995) and fact sheets continue to be distributed to anglers and others in the state by DNR offices and by Minnesota Sea Grant. This information will help ensure that if round gobies are discovered in inland waters they will be reported to the DNR.

At the regional and national level, the DNR's Exotic Species Program supported management actions for the Illinois waterways to limit round goby spread to the Mississippi River drainage (see cooperation of others). Minnesota's involvement occurred through the Mississippi Interstate Cooperative Resources Association (MICRA), attendance at meetings, and through direct contact with the Army Corp of Engineers in the Chicago District. In response to an inquiry from the USFWS, the DNR wrote the USFWS and encouraged it to conduct research necessary for Environmental Protection Agency registration of a bottom formulation of the piscicide Antimycin as a management tool for round gobies and other benthic exotic fish.

Minnesota Sea Grant compiled an extensive round goby bibliography that will be available online at Sea Grant's SIGNIS web site and at the National Aquatic Nuisance Species Clearinghouse's web site.

Current distribution of the round goby

From its initial introduction into the St. Clair River, which connects Lake Huron and Lake St. Clair, the round goby has spread to the Detroit River, all the Great Lakes, the Illinois waterways, and to the Lake Superior watershed (see Figure 9). Many round gobies were located in several locations in the Duluth-Superior harbor during 1999. Round goby have not been identified in any inland waters in the state.

Surveys conducted by the USFWS and others in 1999 found gobies located in the Chicago Sanitary and Ship Canal just upstream from the Des Plaines River. This location is 13 miles further downstream than the furthest previous collection point and a distance of about 44 miles downstream from Lake Michigan. The presence of round gobes in the Illinois waterways beyond a proposed electric barrier site means almost certain introduction of round gobies throughout the Mississippi River watershed. In Minnesota, the Mississippi River up to the Coon Rapids dam, the St. Croix River, and other Mississippi River tributaries are likely to become infested if no barrier exists upstream of the confluence of the Illinois River and the Mississippi River.

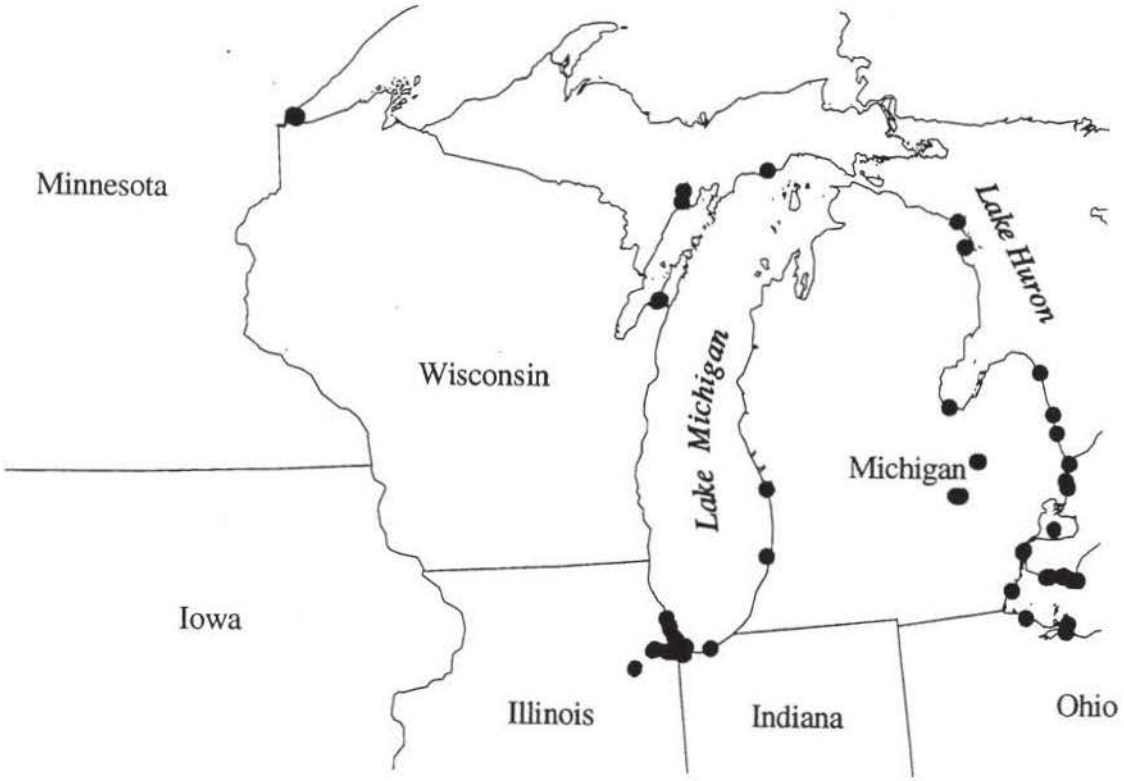


Figure 9. Confirmed round goby sightings as of December 1999.
(Source: U.S. Geological Survey - Biological Resources Division)

Participation of others - 1999

The U.S. Army Corps of Engineers is responsible for installing a demonstration barrier in the Illinois waterways to block to movement of round gobies and other harmful exotic species into the Illinois River and throughout the Mississippi River drainage. In August 1999, an Environmental Assessment was prepared regarding the barrier, and on December 28, 1999 a finding of No Significant Impact was issued, thus allowing the project to proceed. An engineering contract was issued by the Corps to Smith-Rudd to design the project. The earliest that the installation of the barrier could occur is spring of 2000, and that is contingent on a significant amount of additional funding for the project. Installation in spring or summer 2000 is several months after the first round gobies have spread downstream past the proposed barrier site.

During the summer of 1999, when it was clear that gobies were nearing the proposed barrier site, the Mississippi Interstate Cooperative Resources Association (MICRA), an organization representing states in the Mississippi River watershed, sought to have the appropriate agencies (USFWS, ILDNR, Greater Chicago Area Water Reclamation District, and Federal ANS Task Force) attempt to control the goby population in part of the Illinois waterways. It was hoped that a piscicide treatment might have set back the gobies enough to allow the barrier to be installed before gobies moved past its proposed location. A variety of issues prohibited a piscicide treatment in the waterway or the implementation of other temporary barriers. The Greater Chicago Area Water Reclamation District opposed any piscicide treatment or establishing an anoxic zone in the waterways.

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.
- Continue watercraft inspections at waters with round goby populations.

Regional/National

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

References Cited

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

Management of Eurasian Swine

1999 Highlights

- A landowner sought to import and raise Eurasian swine in Northeast Minnesota. The DNR informed the landowner that state law prohibits importation and establishment of new Eurasian swine herds in the state.

- The Minnesota Department of Agriculture (MDA) issued permits for the known, eligible Eurasian Swine herds in the state.

- No wild herds of Eurasian Swine are known to exist in Minnesota.

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.

State 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 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.

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

Progress in 1999

MDA issued permits to the eligible known Eurasian Swine herds in the state.

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.
- 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

1999 Highlights

- On six occasions, mute swans were found to be in the wild and not confined under a game farm license as required by state law. Most of these birds are being raised and bred for the purpose of Canada goose management, although this is not an effective means of keeping Canada geese from an area.

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 Cass 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; 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 1999

During 1999, the DNR investigated several reports of wild or escaped mute swans in the state. Birds were reported at Winona, Coon Rapids, Plymouth, Square Lake in Washington County, Faribault, Wayzata, Monticello, and Cokato. A warning was issued to one owner of a mute swan pair for violating the state regulations pertaining to mute swans. Information is being distributed to newly identified mute swan owners to inform them of state regulations regarding mute swans.

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.

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

The USFWS endorses a mute swan policy adopted by the Atlantic Flyway Council. Among several recommendations are:

- Both state and federal wildlife species should institute programs to prevent the establishment and/or eliminate mute swans.
- States and provinces should seek to make mute swans an unprotected species if this is not already the case.

Future Management Needs

- Verify occurrences of mute swans in the state and take appropriate actions to have the birds confined under game farm licenses or remove the naturalized birds from the wild.
- Develop and distribute informational materials about mute swans and related laws.

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Prevention

Introduction

Experience in Minnesota and other states has shown that proactive prevention efforts need to be a key component of a comprehensive approach to addressing the exotic species issue. There are many commercial and recreational activities which bring exotic species into Minnesota and/or move them across the state. In addition, control of established populations is expensive (if feasible at all) and eradication is seldom achieved. It is therefore key to be aware of the potential of new species to invade and to target prevention efforts on high risk species and high risk pathways.

One of the emerging threats is the increasing level of aquatic plant sales in the state. Aquatic plants represent the largest taxonomic group of aquatic exotics introduced into the Great Lakes area (Mills *et al.* 1993). Major pathways of introduction include accidental escape of cultivated plants and dumping of aquarium waters. Today, new pathways are emerging as activities such as water gardening, wetland restoration projects, and shoreline plantings increase in popularity.

The Exotic Species Program pursued two studies in 1998 to help identify potential sources of introduction and species of concern. Under contract with the DNR, the Army Corps of Engineers' Aquatic Plant Control Research Program completed a study, "Evaluating the Potential for Nonindigenous Aquatic Plant Species to Colonize Minnesota Water Resources" (see 1998 report). The study suggested that growth of four species, water chestnut (*Trapa natans*), variable milfoil *(Myriophyllum heterophyllum)*, hydrilla *(Hydrilla verticillata)* (monoecious biotype), and fanwort (*Cabomba caroliniana)*, was expected to be most severe.

In 1998, the Exotic Species Program initiated a study to evaluate the risk of exotic introductions associated with mail order shipments of aquatic plants into Minnesota (Perleberg 1998). Objectives of this study include: 1) Continue to identify exotic aquatic plant species that may be harmful to Minnesota resources; 2) Identify businesses that sell aquatic plants to Minnesotans and 3) Evaluate the risk of exotic introductions associated with the sale of aquatic plants.

Mail order catalogs from 30 U.S. and foreign businesses specializing in aquatic plants were reviewed to assess the potential for intentional exotic plant shipments to Minnesota. Aquatic plant orders were placed with three of these businesses to assess the potential for both intentional and accidental introductions of exotics. Results of this study include:

- More than 700 taxa of aquatic plants are available for sale into Minnesota and the majority (96%) of these taxa are exotics.

- At least 66% of the federal and state "restricted" aquatic plant taxa are available for sale into Minnesota.

- At least 31% of the "watch" species identified for this report are available for sale into Minnesota.

- Most businesses surveyed (87%) sell at least one federal or state "restricted" aquatic plant taxa.

- Species prohibited for sale under federal and/or state regulations were intentionally shipped to Minnesota.

- Identification of many taxa is difficult because businesses do not use standardized nomenclature. Taxonomic problems will hinder education and enforcement efforts.

Progress in 1999

Aquatic plant sales

The risks associated with sales of exotic aquatic plants identified by DNR efforts in 1998 were apparent in 1999. Three different issues emerged.

Retail sales of flowering rush, a state prohibited exotic species, occurred in the state at stores from two major retail chains. The DNR confirmed these sales and notified the companies that the sale was illegal. All remaining plants were removed from the stores and the suppliers of the plants were notified by the DNR and they indicated they will not be selling flowering rush in the future.

An exotic bur-reed (*Sparganium erectum*), on the federal noxious weed list, was imported into the state and other midwest states for retail sale as a water garden plant. The US Department of Agriculture - APHIS took the lead on recovering these plants from retail stores. Many of the plants were removed from sale, but others still exist in the state. The supplier of this plant was also notified that this species cannot be shipped into the country.

Businesses in other states requested permits from the U.S. Department of Agriculture to ship three species of federal noxious weeds to Minnesota for sale as aquarium plants. The Minnesota Department of Agriculture and DNR reviewed the requests and encouraged the USDA to deny the permits and they did.

Ballast water demonstration project

Minnesota is participating in and is partially funding the Great Lakes regional demonstration project to test technology that could eliminate exotic organisms in the ballast tanks of ships. The project produced clear results in 1998 that indicated the following:

- automatic backwash ballast filtration should be practical operationally for shipboard application;

- a 50 micron screen is feasible and effective for shipboard use;
- a 25 micron screen has biological advantages over the 50 micron screen and should be used if screen design modifications improve operational performance to the level of the 50 micron screen; and
- secondary treatment technologies may be necessary to supplement primary treatment using filtration.

These results are impressive and encouraging. The project's steering committee members (of which DNR is a member) were encouraged and pleased with these results and believe they will lead to technological advances in ballast water management.

In 1999, refinements to the primary filter and the backwashing system have been made by Ontario Hydro. Testing of these second generation filters and backwash systems will be conducted in Duluth during June 2000.

A "notice of request for proposals" and a "request for proposals" (RFP) was issued for secondary treatment technologies that can be installed and tested on the demonstration barge in Duluth. Several firms were interested in testing their technology on the barge although their equipment would not be ready until spring 2000. As a result, secondary technology testing that meets the RFP specifications will occur in June 2000. An alternative primary treatment technology (hydrocyclone) and secondary treatment method (ultraviolet radiation) already produced by Velox Technology Inc. in Canada may be tested at the Duluth site using the Minnesota funds.

Future needs for prevention

Aquatic plants

- Cooperatively develop and distribute information about regulations regarding selling, buying, and planting aquatic plants in Minnesota.
- Develop a database and maintain file at the DNR with literature about exotic aquatic plant species to guide regulatory classification.
- Encourage, fund, and support research to enhance techniques that predict which exotic aquatic plants are likely naturalize and be harmful in Minnesota

Regulations

- Continue research to evaluate and designate additional exotic species into appropriate categories.
- Seek better federal laws that prohibit import and use of invasive animals such as black carp.

Mississippi River basin

- Support federal and regional efforts to establish an barrier in the Illinois waterways that is effective against all types of aquatic exotic species.
- Seek cooperative efforts in the Mississippi River basin to establish basin-wide protocols for use and introduction of aquatic species.

Appendix A - Minnesota Statutes Regarding Exotic Species

CONTENTS

MINNESOTA STATUTES - HARMFUL EXOTIC SPECIES

M.S. 84D.01 DEFINITIONS.

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

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

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

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

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

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

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

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

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

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

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

Subd. 10. **[repealed]**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(1) coordinated detection and prevention of accidental introductions;

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

(3) a coordinated public education and awareness campaign;

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

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

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

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

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

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

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

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

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

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

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

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

(4) information on management efforts in other states;

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

(6) an assessment of future management needs.

M.S. 84D.03 INFESTED WATERS.

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

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

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

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

(3) whether regulations specific to infested waters containing a specific species will be effective to prevent spread.

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

Subd. 2. **[repealed]**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(5) other criteria the commissioner deems appropriate.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

M.S. 84D.09 AQUATIC MACROPHYTES.

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

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

(1) that are duckweeds in the family Lemnaceae;

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

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

(4) when legally purchased or traded by or from commercial or hobbyist sources for aquarium,

wetland or lakeshore restoration, or ornamental purposes;

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

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

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

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

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

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

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

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

(1) that are duckweeds in the family Lemnaceae;

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

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

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

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

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

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

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

M.S. 84D.11 PERMITS.

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

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

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

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

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

M.S. 84D.12 RULES.

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

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

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

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

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

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

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

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

(1) prohibited exotic species;

(2) regulated exotic species;

(3) unregulated exotic species; and

(4) infested waters.

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

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

Subd. 2. **Cumulative remedy.** The authority of conservation officers to issue civil citations is in addition to other remedies available under law, except that the state may not seek penalties under any other provision of law for the incident subject to the citation.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Subd. 6. **Watercraft license suspension.** A civil citation may be issued to suspend, for up to a year, the watercraft license of an owner or person in control of a watercraft or trailer who refuses to submit to an inspection under section 84D.02, subdivision 4, or who refuses to comply with a removal order given under section 84D.13.

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

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

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

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

SELECTED MINNESOTA STATUTES - DEPARTMENT OF NATURAL RESOURCES

M.S. 84.027 POWERS AND DUTIES.

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

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

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

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

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

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

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

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

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

(2) the attorney general approves the rule; and

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

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

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

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

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

M.S. 86B.415 LICENSE FEES.

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

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

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

Subdivision. 1, **License requirements.**

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

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

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

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

An enforcement officer is authorized to:

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

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

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

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

(5) arrest, without a warrant, a person who is detected in the actual violation of the game and fish laws, a provision of chapters 84, 84A, **84D**, 85, 86A, 88 to 97C, 103E, 103F, 103G, sections 86B.001 to 86B,815, 89.51 to 89.61; or 609.66, subdivision 1, clauses (1), (2), (5), and (7); and 609.68; and (6) take an arrested person before a court in the county where the offense was committed and make a complaint. Nothing in this section grants an enforcement officer any greater powers than other licensed peace officers.

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

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

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

SELECTED MINNESOTA STATUTES - NOXIOUS WEEDS

M.S. 18.75 PURPOSE

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

M.S. 18.76 CITATION.

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

M.S. 18.77 DEFINITIONS.

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

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

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

Subdivision 2. **Control of purple loosestrife** Except as provided below, an owner of nonfederal lands underlying public waters or wetlands designated under section 103G.201 is not required to control or eradicate purple loosestrife below the ordinary high water level of the public water or wetland. The commissioner of natural resources is responsible for control and eradication of purple loosestrife on public waters and wetlands designated under section 103G.201, except those located upon lands owned in fee title or managed by the United States. The officers, employees, agents and contractors of the commissioner of natural resources may enter upon public waters and wetlands designated under section 103G.201 and, after providing notification to the occupant or owner of the land, may cross adjacent lands as necessary for the purpose of investigating purple loosestrife infestations, formulating methods of eradication, and implementing control and eradication of purple loosestrife. The commissioner, after consultation with the commissioner of agriculture, shall, by June 1 of each year, compile a priority list of purple loosestrife infestations to be controlled in designated public waters. The commissioner of agriculture must distribute the list to county agriculture inspectors, local weed inspectors, and their appointed agents. The commissioner of natural resources shall control listed purple loosestrife infestations in priority order within the limits of appropriations provided for that purpose. This procedure shall be the exclusive means for control of purple loosestrife on designated public waters by the commissioner of natural resources and shall supersede the other provisions for control of noxious weeds set forth elsewhere in Minnesota Statutes, chapter 18. The responsibility of the commissioner to control and eradicate purple loosestrife on public waters and wetlands located on private lands and the authority to enter upon private lands ends ten days after receipt by the commissioner of natural resources of a written statement from the landowner that the landowner assumes all responsibility for control and eradication of purple loosestrife under sections 18.78 to 18.88. State officers, employees, agents, and contractors of the commissioner of natural resources are not liable in a civil action for trespass committed in the discharge of their duties under this section and are not liable to anyone for damages, except for damages arising from gross negligence.

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

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

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

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

MINNESOTA STATUTES - RESTRICTED SPECIES

M.S. 17.457 RESTRICTED SPECIES.

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

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

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

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

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

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

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

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

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

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

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

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

(as amended by emergency rule)

CONTENTS

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 CHAPTER 6216 - HARMFUL EXOTIC SPECIES

6216.0100 PURPOSE.

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

STAT AUTH: MS s 84.9691; 84D.12

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

6216.0200 DEFINITIONS.

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

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

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

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

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

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

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

(1) waters identified as public waters;

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

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

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

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

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

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

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

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

"Introduce" means the act of introduction.

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

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

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

STAT AUTH: MS s 84.9691; 84D.12

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

6216.0230 NOMENCLATURE.

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

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

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

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

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

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

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

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

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

STAT AUTH: MS s 84D.12

HIST: *22 SR 2076*

6216.0250 PROHIBITED EXOTIC SPECIES.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

D. round goby (*Neogobius melanostomus*);

E. rudd (*Scardinius erythrophthalmus*) Linnaeus;

F. ruffe (*Gymnocephalus cernuus*) Linnaeus;

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

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

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

J. zander (*Stizostedion lucioperca*) Linnaeus.

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

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

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

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

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

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

STAT AUTH: MS s 84.9691; 84D.12

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

6216.0260 REGULATED EXOTIC SPECIES.

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

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

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

B. parrot's feather (*Myriophyllum aquaticum*) (da Conceicao Vellozo) Verdcourt; and

C. nonnative waterlilies (*Nymphaea* spp.) Linnaeus, or any variety, hybrid, or cultivar thereof. Native Minnesota waterlilies are: *Nymphaea odorata* Aiton subsp. *odorata* Aiton, *N. leibergeii* Morong, and *N. Odorata* Aiton subsp. *tuberosa* (Paine) Wiersema & Hellquist.

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

A. alewife (*Alosa pseudoharengus*) Wilson;

B. common carp, koi (*Cyprinus carpio*) Linnaeus;

C. goldfish (*Carassius auratus*) Linnaeus;

D. rainbow smelt (*Osmerus mordax*) Mitchell; and

E. tilapia (*Tilapia, Oneochromis, Sartheradon* spp.).

Subp. 4. **Invertebrates**. The following invertebrates are designated as regulated exotic species:

A. Chinese mystery snail, Japanese trap door snail (*Cipangopaludina* spp.) Hannibal;

B. rusty crayfish (*Orconectes rusticus*) Girard; and

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

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

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

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

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

STAT AUTH: MS s 84D.12

HIST: *22 SR 2076*

6216.0265 PERMITS FOR PROHIBITED AND REGULATED EXOTIC SPECIES.

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

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

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

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

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

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

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

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

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

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

Subp. 5. **Permit application**.

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

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

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

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

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

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

(6) a written contingency plan for eradication or recapture in the event of an unauthorized introduction of the prohibited exotic species; and

(7) an agreement to comply with the requirements of parts 6216.0100 to 6216.0600.

B. The commissioner may request additional information from the applicant in writing after the application is received if necessary to evaluate the potential risk to the state's resources.

C. The commissioner shall review the permit applications and respond to the applicant within 30 days of receipt of the application or the additional information requested in item B.

Subp. 6. **Inspection of facilities or equipment**. After receipt of an application for a prohibited exotic species permit, and a determination by the commissioner that the applicant has satisfied all the initial requirements for a permit as described in this part, the commissioner may inspect the applicant's holding facilities or other containment or transportation equipment. Facilities holding prohibited exotic species under permit are subject to inspection by the commissioner at any reasonable time.

Subp. 7. **Transferability.** A permit issued under this part is not transferable.

Subp. 8. **Expiration date and renewal**. All prohibited exotic species and regulated exotic species permits expire at midnight on December 31 of each year, unless otherwise specified in the permit. Applications for renewal of permits shall be made by October 1 of the year the permit expires. Applications for renewal shall describe any changes to the information initially required in subpart 5.

Subp. 9. **Revocation of permit**.

A. The commissioner may revoke all or part of a permit issued under this part when:

(1) the commissioner determines that a permittee has failed to comply with parts 6216.0100 to 6216.0600; or

(2) it is necessary to protect the interests of the public, to protect native plant and animal populations in the state, or to otherwise protect the state's natural resources.

B. Except in an emergency situation when delay would threaten the state's natural resources, the commissioner shall, at least 14 days prior to the effective date of the revocation, inform the permit holder in writing of the nature of the revocation and of the conditions that, in the commissioner's opinion, require revocation.

C. Within 30 days of receipt of a notice of revocation, the permit holder may apply for an amendment to the permit or request a hearing before the commissioner to contest the revocation, to support the permit holder's proposed amendment, or both.

D. The permit shall be revoked on the date stated on the revocation notice until such time that the decision is reversed or modified.

Subp. 10. **Disclaimer of liability**. A prohibited exotic species permit or regulated exotic species permit issued under this part is permissive only. No liability is assumed by the state or any of its officers, agents, or employees by issuing a prohibited or regulated exotic species permit or by any acts or operations of the permittee or any prohibited or regulated exotic species in possession of the permittee.

Subp. 11. **Effective date**. A person possessing, importing, purchasing, selling, propagating, transporting, or introducing a prohibited exotic species on June 2, 1998, must apply for a permit within 60 days of June 2, 1998.

STAT AUTH: MS s 84D.12

HIST: *22 SR 2076*

6216.0270 UNREGULATED EXOTIC SPECIES.

Subpart 1. **Designation**. The species in subparts 2 to 5 are designated as unregulated exotic species. These exotic species are not subject to regulation under Minnesota Statutes, chapter 84D.

Subp. 2. **Fish**. The following fish are designated as unregulated exotic species:

A. Atlantic salmon (*Salmo salar*) Linnaeus;

B. brown trout (*Salmo trutta*) Linnaeus;

C. coho salmon (*Oncorhynchus kisutch*) Walbaum;

D. Chinook salmon (*Oncorhynchus tshawytscha*) Walbaum;

E. pink salmon (*Oncorhynchus gorbuscha*) Walbaum;

F. rainbow trout (*Oncorhynchus mykiss*) Walbaum; and

G. subtropical, tropical, and saltwater fish, except anadromous species.

Subp. 3. **Invertebrates.** The following invertebrates are designated as unregulated exotic species: subtropical, tropical, and saltwater invertebrates.

Subp. 4. **Mammals.** The following mammal is designated as an unregulated exotic species: rat (*Rattus norvegicus* and *Rattus rattus*).

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

A. chuckar partridge (*Alectoris chuckar*) Gray;

B. helmeted Guinea fowl (*Numida meleagris*) Linnaeus;

C. house sparrow (*Passer domesticus domesticus*) Linnaeus;

D. Hungarian partridge, gray partridge (*Perdix perdix*) Linnaeus;

E. peafowl (*Pavo cristatus*) Linnaeus;

F. pigeon or rock dove (*Columba livia*) Gmelin;

G. ring-necked pheasant (*Phasianus colchicus*) Linnaeus; and

H. starling (*Sturnus vulgaris vulgaris*) Linnaeus.

STAT AUTH: MS s 84D.12

HIST: *22 SR 2076*

6216.0280 ESCAPE OF EXOTIC SPECIES.

Subpart 1. **Reporting.** To report an unauthorized introduction of prohibited, regulated, or unlisted exotic animal species, in compliance with Minnesota Statutes, section 84D.10, a person shall notify the department's area or regional conservation officer or the exotic species program staff in the department's St. Paul office by telephone within 48 hours after learning of the unauthorized introduction.

Subp. 2. **Information required**. The following information shall be provided to the department about the unauthorized introduction:

A. the quantity and species;

B. the location of the introduction;

C. the date and time the introduction occurred or was discovered;

D. the last known location of the species; and

E. the reporter's address and daytime and evening telephone numbers.

STAT AUTH: MS s 84D.12

HIST: *22 SR 2076*

6216.0290 PROCESS FOR REVIEW OF PROPOSED INTRODUCTIONS OF UNLISTED EXOTIC SPECIES.

Subpart 1. **Applications and information required**.

A. A person who seeks to introduce an unlisted exotic species in the state according to Minnesota Statutes, section 84D.06, shall submit an application on a form prescribed by the commissioner. The form shall request the following information:

(1) the name, address, and telephone number of the applicant;

(2) the scientific and common names, family, and reference used for the scientific name of the unlisted exotic species proposed for introduction;

(3) the number of individual plants or animals proposed for introduction;

(4) the reason and need for the proposed introduction;

(5) the potential to use native species for the same purpose;

(6) the location for the proposed introduction;

(7) scientific-based information about the native range of the unlisted exotic species;

(8) the source of the actual individual organisms proposed to be introduced;

(9) scientific-based information about the ability of the unlisted exotic species to naturalize, displace native species, and harm natural resources or their use in similar climates and latitudes; and

(10) an assessment of the potential adverse impacts on native Minnesota species and ecosystems, including scientific-based information about:

(a) the potential to introduce disease or parasites to native fish or wildlife populations;

(b) the potential for interbreeding or hybridizing with native fish or wildlife;

(c) the potential predation on native fish or wildlife; and

(d) any possible competition with native fish, wildlife, or aquatic plants for food, habitat, water, or other resources.

B. The commissioner may request additional information in writing after the application is received if necessary to assess the potential impacts of an introduction.

Subp. 2. **Application review.** The commissioner shall reject an application within ten working days after receipt of the application if the application does not contain the information required in subpart 1.

Subp. 3. **Review period**. Within 60 days of receipt of an application that contains the information in subpart 1, the commissioner shall assess the apparent risk of the introduction in the state and classify the species according to Minnesota Statutes, section 84D.04, subdivision 2. If the commissioner determines during the 60-day period that there should be a public comment period for the proposed introduction, or the commissioner determines that additional information is necessary to adequately evaluate the proposed introduction, the commissioner may extend the review period and state the basis of the extension in writing to the applicant. The review period may be extended to a date 30 days from the end of the public comment period or receipt by the department of the additional information requested from the applicant.

Subp. 4. **Review process**. Prior to classification of an unlisted exotic species and making a final assessment on a proposed introduction, the commissioner may:

A. seek information and opinions from technical experts;

B. solicit public comment and hold public hearings on the proposed introduction;

C. consult with other potentially affected jurisdictions; and

D. in the case of an animal species, request a certificate of veterinary inspection or other appropriate certification that the animal is pathogen-free.

Subp. 5. **Comment period and comments**. If the commissioner determines that a public comment period is necessary on the proposed introduction, the commissioner shall promptly proceed to publish a notice in the EQB Monitor, which is published by the Environmental Quality Board. A 30-day period for review and comment begins the day a notice of the public comment period is published in the EQB Monitor. Written comments to the commissioner during the public comment period may address the accuracy and completeness of material contained in the application, additional information regarding the proposed introduction that is not contained in the application, or potential impacts that may warrant further investigation before the commissioner acts on the proposed introduction.

Subp. 6. **Designation and notification**. After completion of the review of a proposal to introduce an unlisted exotic species and making a determination of the appropriate classification, the commissioner shall designate the species and notify the applicant as required under Minnesota Statutes, section 84D.06.

STAT AUTH: MS s 84D.12

HIST: *22 SR 2076*

6216.0300 DESIGNATION, NOTICE, AND MARKING OF INFESTED WATERS AND LIMITED INFESTATIONS OF EURASIAN WATER MILFOIL.

Subpart 1. **Designation of infested waters and notice**. The commissioner shall designate infested waters. The commissioner shall publish the names of designated water bodies in the State Register before May 1 of each year and provide notice through other available means where practical. The department shall post signs describing the infestation at all public accesses to designated water bodies. At any time, the commissioner may designate additional water bodies or remove from designation those water bodies which no longer are infested waters.

Subp. 2. **Designation of limited infestations of Eurasian water milfoil and notice**. The commissioner shall designate water bodies having limited infestations of Eurasian water milfoil as defined in Minnesota Statutes, section 84.967, subdivision 3. The commissioner shall publish the names of designated water bodies in the State Register before May 1 of each year and provide notice through other available means where practical. The department shall post signs describing the infestation at all public accesses to designated water bodies. At any time, the commissioner may designate additional water bodies or remove from designation those water bodies which no longer have limited infestations.

Subp. 3. **Delineation and markers for limited infestations of Eurasian water milfoil**. Areas of infestation of Eurasian water milfoil where control is planned in water bodies designated 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 and the posting requirements specified in Minnesota Rules, part 6280.0600, subpart 2, have been met.

STAT AUTH: MS s 84.9691; 84D.12

HIST: *20 SR 2292(NO. 43); 22 SR 2076*

6216.0350 DESIGNATED INFESTED WATERS.

Subpart 1. **Listing of waters infested with Eurasian water milfoil.** The following water bodies are designated by the commissioner as infested with Eurasian water milfoil (*Myriophyllum spicatum*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

Name	DNR Protected Waters Inventory Number
A. Anoka County	
(1) Cenaiko Lake	02-0654
(2) Centerville Lake	02-0006
(3) Crooked Lake	02-0084
(4) Lake George	02-0091
(5) Otter Lake	02-0003
(6) Unnamed lake in Springbrook Nature Center	02-0688
B. Carver County	
(1) Ann Lake	10-0012
(2) Auburn Lake	10-0044
(3) Bavaria Lake	10-0019
(4) Firemen's Lake	10-0226
(5) Lotus Lake	10-0006
(6) Lake Minnewashta	10-0009
(7) Pierson Lake	10-0053
(8) Riley Lake	10-0002
(9) Schutz Lake	10-0018
(10) Stone Lake	10-0056
(11) Lake Virginia	10-0015
(12) Lake Waconia	10-0059
(13) Lake Zumbra	10-0041

C. Chisago County	
(1) Ellen Lake	13-0047
(2) Green Lake	13-0041
(3) Rush Lake	13-0069
D. Crow Wing County	
(1) Bay Lake	18-0034
(2) Ruth Lake	18-0212
E. Dakota County	
(1) Crystal Lake	19-0027
(2) Lac Lavon	19-0347
(3) Lake Marion	19-0026
(4) Twin Lakes	19-0028
F. Douglas County	
(1) Oscar Lake	21-0257
G. Hennepin County	
(1) Arrowhead Lake	27-0045
(2) Bass Lake	27-0098
(3) Brownie Lake	27-0038
(4) Bryant Lake	27-0067
(5) Bush Lake	27-0047
(6) Lake Calhoun	27-0031
(7) Cedar Lake	27-0039
(8) Christmas Lake	27-0137
(9) Dutch Lake	27-0181
(10) Eagle Lake	27-0111
(11) Fish Lake	27-0118
(12) Forest Lake	27-0139
(13) Gleason Lake	27-0095
(14) Lake Harriet	27-0016
(15) Hiawatha Lake	27-0018
(16) Lake Independence	27-0176
(17) Lake of the Isles	27-0040
(18) Libbs Lake	27-0085
(19) Little Long Lake	27-0179
(20) Long Lake	27-0160
(21) Medicine Lake	27-0104
(22) Minnehaha Creek	27-0000
(23) Lake Minnetonka	27-0133
(24) Niccum's Pond	private
(25) Lake Nokomis	27-0019
(26) Parker's Lake	27-0107
(27) Peavy Lake	27-0138
(28) Lake Rebecca	27-0192
(29) Rice Lake	27-0116
(30) Round Lake	27-0071
(31) Lake Sarah	27-0191
(32) Schmidt Lake	27-0102
(33) Swan Lake	27-0000
(34) Tanager Lake	27-0141
(35) Whaletail Lake	27-0184
(36) Wirth Lake	27-0037
H. Itasca County	
(1) Ice Lake	31-0372
(2) McKinney Lake	31-0370
I. Kanabec County	
(1) Knife Lake	33-0028

J. Meeker County	
(1) Stella Lake	47-0068
(2) Lake Washington	47-0046
K. Mille Lacs County	
(1) Lake Mille Lacs	48-0002
(2) from the mouths of each tributary of Lake Mille Lacs upstream to the first public road	48-0000
L. Olmsted County	
(1) George Lake	55-0008
M. Pope County	
(1) Gilchrist Lake	61-0072
(2) Lake Minnewaska	61-0130
N. Ramsey County	
(1) Bald Eagle Lake	62-0002
(2) Lake Gervais	62-0007
(3) Island Lake	62-0075
(4) Keller Lake	62-0010
(5) Phalen Lake	62-0013
(6) Round Lake	62-0012
(7) Silver Lake	62-0001
(8) Spoon Creek, between Keller and Phalen lakes	62-0000
(9) Sucker Lake	62-0028
(10) Lake Vadnais	62-0038
(11) Lake Wabasso	62-0082
O. St. Louis County	
(1) Gilbert Pit Lake	69-1306
P. Scott County	
(1) Lower Prior Lake	70-0026
Q. Stearns County	
(1) unnamed wetland along Clearwater River	73-0312
R. Todd County	
(1) Sauk Lake	77-0150
S. Washington County	
(1) Powers Lake	82-0092
(2) White Bear Lake	82-0167
(3) St. Croix River	82-0001
T. Wright County	
(1) Augusta Lake	86-0284
(2) Beebe Lake	86-0023
(3) Buffalo Lake	86-0090
(4) Clearwater Lake	86-0252
(5) Clearwater River, downstream of Clearwater Lake	86-0000
(6) Lake Mary	86-0156
(7) Little Waverly Lake	86-0106
(8) Lake Pulaski	86-0053
(9) Rock Lake	86-0182
(10) Sugar Lake	86-0233
(11) Waverly Lake	86-0114
(12) Weigand Lake	86-0242
U. Multiple Counties	
(1) Mississippi River, downstream of St. Anthony Falls	

Subp. 2. **Listing of waters infested with round goby**. The following water bodies are designated by the commissioner as infested with round goby (*Neogobius melanostomus*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

Name	DNR Protected Waters Inventory Number
Multiple Counties	
(1) Lake Superior	16-0001
(2) St. Louis River, downstream of the Fond du Lac dam	

Subp. 3. Listing of waters infested with ruffe. The following water bodies are designated by the commissioner as infested with ruffe (*Gymnocephalus cernuus*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

Name	DNR Protected Waters Inventory Number
Multiple Counties	
(1) Lake Superior	16-0001
(2) St. Louis River, downstream of the Fond du Lac dam	

Subp. 4. **Listing of waters infested with spiny water flea**. The following water bodies are designated by the commissioner as infested with spiny water flea (*Bythotrephes cederstroemi*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

Name	DNR Protected Waters Inventory Number
A. St. Louis County	
(1) Fish Lake	69-0491
(2) Island Lake	69-0372
B. Multiple Counties	
(1) Lake Superior	16-0001
(2) Cloquet River from Island Lake to the St. Louis River	
(3) St. Louis River, downstream of the Cloquet River	

Subp. 5. **Listing of waters infested with white perch**. The following water bodies are designated by the commissioner as infested with white perch (*Morone americana*). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

Name	DNR Protected Waters Inventory Number
Multiple Counties	
(1) Lake Superior	16-0001
(2) St. Louis River, downstream of the Fond du Lac dam	

Subp. 6. **Listing of waters infested with zebra mussels**. The following water bodies are designated by the commissioner as infested with zebra mussels (*Dreissena* spp.). Activities at these waters are subject to parts 6216.0100 to 6216.0600, Minnesota Statutes, section 84D.13, and other applicable laws.

Name	DNR Protected Waters Inventory Number
Multiple Counties	
(1) Lake Superior	16-0001
(2) Mississippi River, downstream of St. Anthony Falls	
(3) St. Louis River, downstream of the Fond du Lac dam	

6216.0400 RESTRICTED ACTIVITIES ON INFESTED WATERS AND WATERS WITH LIMITED INFESTATIONS OF EURASIAN WATER MILFOIL.

Subpart 1. **Prohibition of taking bait from infested waters**. The taking of wild animals from infested waters for bait or aquatic farm purposes is prohibited.

Subp. 2. **Prohibition of sport gill netting for whitefish and ciscoe in infested waters.** If the commissioner designates waters that are open to sport gill netting for whitefish and ciscoe as infested waters, the commissioner may close the gill netting season for the designated water body or require that gill nets used in the infested waters not be used in other water bodies. The commissioner shall publish the names of designated water bodies and new requirements or closures in the State Register and provide notice through media releases and other available means where practical. In addition, the commissioner shall post notice of the restrictions at public access points to designated water bodies.

Subp. 3. **Commercial fishing restrictions in infested waters**. Nets, traps, buoys, anchors, stakes, and lines used for commercial fishing 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. **Entry into delineated areas prohibited.**

A. Entry by boaters, anglers, or other water users and their equipment into marked areas of a water body where limited infestations of Eurasian water milfoil have been delineated in accordance with part 6126.0300 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 water milfoil 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.

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 except as provided in subpart 4. Live fish taken under a commercial fishing license may be transported from infested waters to other waters or holding facilities from May 1 to October 31 with a transportation permit issued by the department pursuant to Minnesota Statutes, section 17.4985.

Subp. 2. **Disposition of water used to transport 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 designated as having populations of zebra mussel or spiny water flea must drain bait containers, other boating-related equipment holding water excluding marine sanitary systems, and livewells and bilges by removing the drain plug before transporting the watercraft and associated equipment on public roads.

Subp. 4. **Diversion, appropriation, and transportation of infested waters**. Infested waters may not be transported on a public road or off property riparian to infested waters except:

A. in emergencies, such as fire emergencies;

B. as specified in a water appropriation or public waters work permit issued by the commissioner pursuant to Minnesota Statutes, chapter 103G; or

C. under a permit issued pursuant to this part.

Infested waters may not be diverted to other waters without a permit issued pursuant to this part, or as authorized in a public waters work permit or water appropriation permit issued by the commissioner pursuant to Minnesota Statutes, chapter 103G.

Subp. 5. **Fish hatchery or aquatic farm operations in infested waters.**

A. Natural lakes or wetland basins that are designated as infested waters will not be licensed by the department pursuant to Minnesota Statutes, section 17.4984, for aquatic farms or pursuant to Minnesota Statutes, section 97C.211, as private fish hatcheries.

B. Artificial water basins that have populations of prohibited or regulated exotic species may be used for aquatic farm or private hatcheries under license by the department. After notifying a licensee that an artificial water basin has a prohibited or regulated exotic species, the commissioner may require that nets, traps, buoys, stakes, and lines that have been used in such artificial water basins must be dried for a minimum of ten days, or frozen for a minimum of two days, before they are used in noninfested waters. All aquatic plants must be removed from nets and other equipment that are removed from the artificial water basins.

C. The commissioner may license aquatic farm or private fish hatchery facilities to use infested waters as a source for the facilities' water. The commissioner may require that the waters be treated to eliminate prohibited or regulated exotic species.

D. Fish raised in artificial water basins that have populations of prohibited 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.

6216.0600 VIOLATIONS; CONFISCATIONS.

Unless a different penalty is prescribed, a violation of parts 6216.0265, 6216.0280 to 6216.0290, or 6216.0400 to 6216.0500 is a misdemeanor as set forth in Minnesota Statutes, section 84D.13. Where a violation has occurred, the department may confiscate the prohibited, regulated, or unlisted exotic species immediately upon discovery wherever found and, at the department's discretion, destroy it. Where infested water is being appropriated, or diverted or transported without a permit, or otherwise contrary to the provisions of parts 6216.0100 to 6216.0600, the department may order that the activities cease. Any expense or loss in connection with enforcement of the order shall be borne by the permittee or responsible person.

Appendix C - Proposed Permanent Rule Amendments

The following rules related to harmful exotic species and infested waters are proposed to be amended as shown during the year 2000. Underlined portions are proposed additions and strike through portions are proposed for deletion.

6216.0400 RESTRICTED ACTIVITIES ON INFESTED WATERS; ~~AND WATERS WITH LIMITED INFESTATIONS OF EURASIAN WATER MILFOIL~~ PERMITS.

Subpart 1. ~~**Prohibition of**~~ **Taking bait from infested waters.** The taking of wild animals from infested waters for bait or aquatic farm purposes is prohibited, except:

A. by permit according to part 6254.0200 and Minnesota Statutes, sections 84D.03, subdivision 3, and 84D.11, subdivision 2a; and

B. for bait purposes for noncommercial personal use in waters that are designated as infested waters solely because they contain Eurasian water milfoil.

Subp. 1a. **Permit application.**

A. Written application for a permit to harvest wild animals from infested waters for bait or aquatic farm purposes shall be made on a form provided by the commissioner and shall contain the following:

1. the applicant's legal name, business name, license number, address, and daytime and evening telephone numbers;

2. the names of the waters and counties where the applicant desires to harvest wild animals for bait or aquatic farm purposes; and

3. a description of the harvest and transportation equipment to be used, including boats, motors, and trailers.

B. An application for a permit according to Minnesota Statutes, section 84D.11, subdivision 2a, must be mailed or delivered to the Minnesota DNR-Commercial Fisheries Program Coordinator, 500 Lafayette Road, St. Paul, MN 55155-4012.

C. An application for a permit under this part, must be submitted by March 1 to be considered for permits that are effective on April 10 of the same year.

Subp. 1b. **Expiration; renewal; transferability.** Permits issued under this part expire at midnight on April 9th of each year, unless otherwise specified in the permit. An application for renewal shall describe any changes to the information submitted in the prior year. A permit issued under this part is not transferable.

Subp. 1c. **Revocation of permit.**

A. When the commissioner determines that a permittee has failed to comply with conditions of the permit, the commissioner may issue a warning, or revoke all or part of a permit. When it is determined that a third offense occurs, the commissioner shall revoke the permit.

B. Except in an emergency situation when delay would threaten the state's natural resources, the commissioner shall, at least 7 days prior to the effective date of the revocation, inform the permit holder in writing of the nature of the revocation and of the conditions that, in the commissioner's opinion, require revocation.

C. Within 30 days of receipt of a notice of revocation, the permit holder may apply for an amendment to the permit or request a hearing before the commissioner to contest the revocation, to support the permit holder's proposed amendment, or both. The permit shall be revoked on the date stated on the revocation notice until such time that the decision is reversed or modified.

Subp. 2. ~~**Prohibition of**~~ **Restrictions on Sport gill netting for whitefish and cisco in infested waters.** If the commissioner designates waters that are open to sport gill netting for whitefish and cisco as infested waters, the commissioner may close the gill netting season for the designated water body, ~~or~~ require that gill nets used in the infested waters not be used in other water bodies, or require that nets used in infested waters must be dried for a minimum of ten days or frozen for a minimum of two days before they are used in non-infested waters. The commissioner shall publish the names of designated water bodies and new requirements or closures in the State Register and provide notice through media releases and other available means where practical. In addition, the commissioner shall post notice of the restrictions at public access points to designated water bodies.

Subp. 3. **Commercial fishing restrictions in infested waters.** Nets, traps, buoys, anchors, stakes, and lines used for commercial fishing or turtle, frog or crayfish harvesting purposes that are used in infested waters must be dried for a minimum of ten days or frozen for a minimum of two days before

they are used in non-infested waters. All aquatic vegetation must be removed from nets and other equipment when they are removed from infested waters. Commercial operators must notify the department's regional or area fisheries office or a conservation officer when removing nets or equipment from infested waters and before resetting those nets or equipment in non-infested waters.

~~Subp. 4. **Entry into delineated areas prohibited.**~~

~~A. Entry by boaters, anglers, or other water users and their equipment into marked areas of a water body where limited infestations of Eurasian water milfoil have been delineated in accordance with part 6126.0300 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 water milfoil 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.~~

6216.0500 TRANSPORTATION AND APPROPRIATION OF WATER FROM INFESTED WATERS.

Subpart 1. **Transporting water and ~~live fish~~ wild animals from infested waters.** Water from infested waters may not be used to transport ~~fish~~ wild animals except as provided in subpart 4. Live fish taken under a commercial fishing license may be transported from infested waters to other waters or holding facilities from May 1 to October 31 with a transportation permit issued by the department pursuant to Minnesota Statutes, section 17.4985.

Subp. 2. **Disposition of water used to transport ~~fish~~ wild animals from infested waters.** Water used to transport ~~live fish~~ wild animals from infested waters pursuant to subpart 1, including water from waters or facilities permitted to hold fish from infested waters, may be disposed of only at sites approved in writing by the commissioner.

[For text of subps 3 and 4, see MR]

Subp. 5. **Fish hatchery or aquatic farm operations in infested waters.**

[For text of A to C see MR]

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

(1) the commissioner may by permit allow the stocking or transport of such fish where the receiving waters contain populations of the same prohibited or regulated exotic species as the source facility's waters, or

(2) the commissioner may by permit allow the stocking or transport of such fish in waterbodies that do not contain populations of prohibited or regulated exotic species if the source facility uses adequate treatment to remove the prohibited or regulated exotic species from the facility.