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**MINNESOTA DEPARTMENT OF NATURAL RESOURCES**

**DIVISION OF ECOLOGICAL SERVICES**

**STAFF REPORT 36**

**Control of Rooted Aquatic Vegetation,  
Algae, Leeches, Swimmer's Itch, 2003**

**June 2004**

**A Summary of Permitted Control Work for Aquatic Vegetation,  
Algae, Leeches, Swimmer's Itch, 2003**

**By**

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**Minnesota Department of Natural Resources**

**Division of Ecological Services**

**June 2004**

## Executive Summary 2003 Aquatic Plant Management Program

The trend in the number of public waters where permitted aquatic plant management work is done has increased steadily since the program began in 1953. Although the numbers of lakes and permits were down slightly statewide in 2002 the numbers increased again in 2003. In 2003, there were 899 public waters statewide with permitted (APM) activity, 63 more than in 2002. There were 623 more permits issued statewide in 2003 and 724 more properties than in the previous year. Nearly half the increase in permit numbers occurred in the Northwest Region. More than 90% of the growth in permitted properties occurred in the Northwest and South regions in 2003. The increase in the number of properties participating resulted in an increase in application fee revenues, from approximately \$111,000 in 2002 to nearly \$130,000 in the year 2003. The average fee per property increased from approximately \$12.00 in 2002 to nearly \$13.00 in 2003.

In 2003, about 60% of the aquatic plant management permits issued allowed chemical and or mechanical removal as the method of control. The remaining 40% of the permits issued in 2003 were issued for the use of automated aquatic plant control devices like the Crary WeedRoller, the Colman Beach Groomer or the Lake Restoration Lake Sweeper.

### Summary of the types of APM permits issued, 2003.

Region	Harvest Chemical Channel	AUAPCD				All Active Permits
		Issued 2003		Issued 2002	Issued 2001	
		1 year	3 year	3 year	3 year	
Reg 1	369	533	278	*	*	1,180
Reg 2A	52	0	2	*	*	54
Reg 2B	450	137	223	*	*	810
Reg 3A	697	52	22	*	*	771
Reg 3B	389	69	62	*	*	520
Reg 4	96	10	7	*	*	113
All	2,053	801	594	414	346	4,208

\* Region boundaries were realigned in 2002.

2A = Grand Rapids, NE Region  
 2B = Brainerd, NE Region  
 3A = St. Paul, Central Region  
 3B = Little Falls, Central Region

The Department first began issuing permits for Automated Untended Aquatic Plant Control Device's (AUAPCD's) in 1997. In that brief period of time, permits for AUAPCD make up nearly half of the active Aquatic Plant Management permits. The number of permits for these devices increased by 358 statewide in 2003. Issuance of both one-year and three year duration permits increased. The three-year permit option is allowed for persons who limit the size of the area of AUAPCD operation to 2,500 square feet. Persons who obtained a three-year permit in 2003 will not have to reapply again until the year 2006. Many individuals responded on their report form

that they would prefer the three-year permit option. Some people (155 of those reporting) did not run their device in 2003.

Summary of the numbers of APM permits issued, fees collected, numbers of lakes and properties treated or harvested in 2003.

Region	All Permits Issued in 2003	All Lakes*	Fees**	Properties Permitted in 2003	Ave. Fee (Property)	All Reporting ***			
						Harvest Work	Chemical Treatment	Both	**** Other
Region 1 - Northwest	1,180	251	\$26,688.00	1,263	\$21.13	84	145	9	13
Reg 2 - Grand Rapids	54	32		272		10	23	0	1
Reg 2B - Brainerd	810	135		1,283		36	279	15	3
Reg 2 - Total (Northeast)	864		\$20,610.00	1,555	\$13.25				
Reg 3A	771	269		4,685		31	572	14	1
Reg 3B	520	145		2,009		26	252	10	1
Reg 3 Total	1,291		\$75,811.00	6,694	\$11.33				
Reg 4	113	67	\$5,919.00	519	\$11.40	16	56	3	1
2003 TOTAL	3,448	899	\$129,028.00	10,031	\$12.86	203	1,327	51	20
2002 TOTAL	2,825	836	\$110,767.19	9,307	\$11.90	169	1,252	44	8
CHANGE	623	63	\$18,260.81	724	\$0.96	34	175	7	12

\* Includes all public waters where an APM permit was issued for 2003.

\*\* Fee totals provided by Fish and Wildlife Admin. Unit.

\*\*\* Data tabulated from the 1,590 surveys received from individuals and commercials who reported permit used. Does not contain weedroller use.

\*\*\*\* Other Aquatic Plant Management work, i.e. restoration work requiring an APM permit. All Reg.'s determined from APM database, Status = 0, (permits issued)

2A = Grand Rapids, NE Region  
 2B = Brainerd, NE Region  
 3A = St. Paul, Central Region  
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## INTRODUCTION

### Value of Aquatic Plants

Aquatic plants are essential components of most freshwater ecosystems. In many lakes, plants are the base of the aquatic food chain. The habitat aquatic plants provide in the shallow near-shore areas is important to both the aquatic and terrestrial community. They also serve important functional roles in lakes by stabilizing the lake bottom, cycling nutrients and preventing shoreline erosion.

Many of Minnesota's most sought-after fish species depend heavily on aquatic vegetation throughout their life histories. Yellow perch, northern pike, muskellunge, pan-fish and bass all depend on aquatic vegetation to provide food, spawning habitat, and nursery areas. Juvenile fish of most species feed on small crustaceans and insects that are abundant in stands of aquatic vegetation. Even species that may not require vegetation for spawning depend on the cover and forage found in aquatic vegetation.

Many species of wildlife are dependent on aquatic plants for food and nesting sites. Ducks eat the seeds and tubers produced by various water plants. Other aquatic plants, which are not eaten directly by waterfowl, support many insects and other aquatic invertebrates that are important sources of food for migratory birds and their young. Ducks have been known to alter migration patterns in response to food availability. Emergent aquatic vegetation provides nesting cover for a variety of waterfowl, wading birds, shorebirds and songbirds. The reproductive success of ducks that nest near lakes is closely tied to available aquatic plants and the cover it provides to hide young birds from predators.

The muskrat, an important furbearer, is almost entirely dependent on aquatic vegetation for food and shelter. Minnesota's largest mammal, the moose, also relies heavily on aquatic vegetation for food.

The distribution of many amphibians and reptiles is directly linked to the vegetation structure of aquatic habitats. Species preference of particular habitat types is related to food availability, types of escape cover and specific microclimates. Emergent and submerged vegetation support invertebrate populations that provide an important food source for amphibians and reptiles. During the breeding season some species of frogs call from emergent vegetation at the water's edge and their egg masses are often attached to aquatic plants. Aquatic turtles often eat submerged vegetation, which is an important source of calcium.

Beyond providing food and shelter for fish and wildlife, aquatic vegetation is important in maintaining a stable lake environment. Aquatic vegetation helps maintain water clarity by limiting the availability of nutrients, and preventing suspension of bottom sediments. Aquatic plants limit erosion of shorelines by moderating the effects of wave and ice erosion. A healthy native plant community is also important in preventing the establishment of exotic aquatic plants. In short, aquatic plants serve many important functions for lakes, fish and wildlife. Many of the things that we enjoy most about lakes are directly linked to aquatic vegetation.

### The Aquatic Plant Management Program

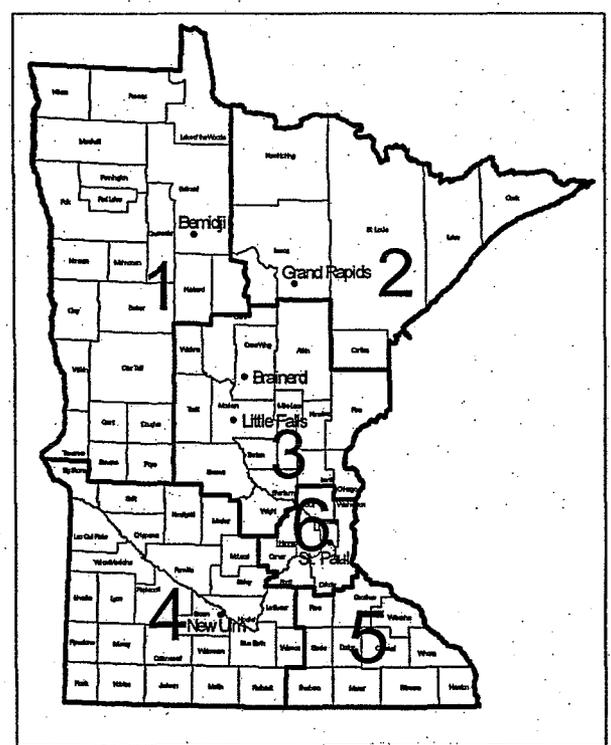
Riparian property owners (lake shore property owners) in Minnesota have a legal right to use and access the lake adjacent to their property. Aquatic vegetation may interfere with a lakeshore homeowner's ability to exercise that right. The purpose of the DNR's Aquatic Plant Management Program is to preserve the functions of aquatic vegetation while allowing the

homeowner the ability to use the lake. Other aquatic organisms can also interfere with the lakeshore property owner's enjoyment of the lake. Swimmer's itch, caused by the immature stage of a parasite common in waterfowl, can cause significant and sometimes severe discomfort in humans depending upon a person's sensitivity to the organism. Algae (plankton and filamentous) can also create a nuisance and occasionally unhealthy conditions when they become over abundant. Relief from these nuisances may also be sought under an aquatic plant management permit.

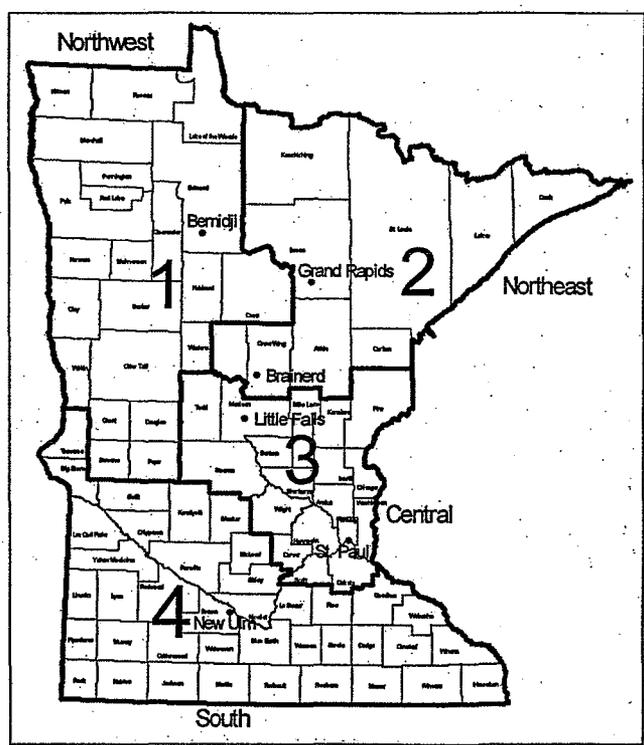
**State Participation**

In July of 2002 the number of DNR administrative regions was reduced. The previous six region structure was reduced to four administrative regions. The Brainerd Lakes Region, previously Region Three, was divided up between the Northeast Region (Region Two) and the Metro Region (Region Six), now the Central region. The southeastern part of the state region five was combined with the South Region or Region Four. Aquatic plant management permits were issued as they had been in the six region structure through the remainder of the 2002 open water season. In 2003 APM permits were issued according to the new regional boundaries.

Pre- July-2002



Post-July -2002



The number of staff reviewing APM permit applications increased concurrent with the reduction of DNR regions. The reorganization moved some regional headquarters farther away from the major centers of APM permit activity. The Brainerd DNR Office retained an Aquatic Plant Management specialist because the Brainerd Lakes Area is a center for APM permit activity. The Central Region added an APM position to the Little Falls Fisheries Office to accommodate the large number of permits previously issued from the Brainerd Office.

The new regional structure makes historical comparisons between regions much more difficult. However, it is still possible to identify statewide trends and make comparisons between years.

The DNR, Section of Fisheries, is responsible for the administration of the Aquatic Plant Management Permit Program. Riparian property owners apply for a permit to their Regional Fisheries Manager. The Northwest, Northeast, and Central DNR Regions have Aquatic Plant Management Specialists (in the Division of Fisheries) to make site inspections and review applications for permit. In the South Region site inspections and application review are the responsibility of the Area Fisheries Supervisor. The recommendation for the disposition of the permit (approval, modification or denial) is determined during the review process. This decision often involves a discussion with the property owner. When applications for APM permits are received for shallow lakes where waterfowl management is the primary focus, the Aquatic Plant Management Specialist will seek the advice of the Area Wildlife Manager. When applications are modified or denied the applicant may appeal to the Commissioner's Office for review. The purpose of this review is to determine if the permit decision was based upon rule standards. Finally, permit decisions can be appealed to an Administrative Law Judge through the contested case hearing process. Usually the cost of control work is borne by the individual (permittee) directly benefiting from the work.

The coordinator of the Aquatic Plant Management Program is in the Division of Ecological Services. This position is the department's contact with commercial aquatic plant harvesters, aquatic herbicide applicators, and the Minnesota Department of Agriculture (MDA). The coordinator provides technical expertise on aquatic plant control methods, and permitting requirements to lakeshore property owners and Department staff. The coordinator works to insure consistent interpretation of the APM rules throughout the Department. This position administers exams, and issues operating permits to commercial aquatic plant harvesters. This person also reviews appeals of permit decisions for the Commissioner. The Program Coordinator maintains current labeling and material safety data sheets on products allowed for aquatic plant control and provides that information to field personnel. The Program Coordinator also prepares an annual report on program activities (this document) and coordinates the development of materials and forms provided to riparian property owners asking about aquatic management.

The APM program coordinator supervises staff in the Division of Ecological Services whose job responsibility includes enforcement of aquatic pesticide rules and pesticide label requirements. Aquatic Pesticide Enforcement Specialists conduct inspections of herbicide applications in public waters to monitor compliance with state and federal pesticide law and respond to reports of pesticide misuse (Appendix Tables E and F). Through June of 2003 there were two Aquatic Pesticide Enforcement Specialist positions, one for the southern half of the state located in the St. Paul Central Office and one for the northern half of the state located in the Brainerd Regional DNR Office. Beginning in July of 2003 the work activity of the Brainerd Aquatic Pesticide Enforcement specialist position was significantly curtailed due to budget reductions. The U.S. Environmental Protection Agency (EPA) partially funds DNR's aquatic pesticide enforcement activities through a grant administered by MDA.

### **Regulations**

Authority for the DNR's aquatic plant management program is found in Minnesota Statutes M.S. 84.091 Subdivision 1, which designates ownership of wild rice and other aquatic vegetation in public waters to the State. M.S. 103G.615 authorizes the Commissioner of the DNR to issue permits to harvest or destroy aquatic plants, establish permit fees, and prescribe standards to issue or deny permits for aquatic plant control. The standards for the issuance of permits to control aquatic vegetation and the permit fee structure are found in MN Rules Chapter 6280.

A permit from the DNR is required to use any pesticide in public waters (generally any body of water 2.5 acres or larger within an incorporated city limit, or 10 acres or larger in rural areas), to use an automated aquatic plant control device, and to control emergent vegetation such as cattails, wild rice or bulrush. A riparian property owner may, without a permit, physically remove (cut, pull or harvest) *submerged* vegetation along one half the individual's lake frontage or 50 feet, whichever is less. The total area may not exceed 2,500 square feet. In addition, a boat channel up to 15 feet wide, and as long as necessary to reach open water, may also be maintained by mechanical means without a permit. If floating leaf vegetation is interfering with riparian owner access a channel not more than fifteen feet wide extending to open water may be mechanically maintained without permit. The vegetation that is cut or pulled must be removed from the lake and the managed area must remain in the same location each year.

The mechanical control of purple loosestrife, a plant on the Minnesota Department of Agriculture's noxious weed list, does not require a permit from the DNR. However, herbicide control of purple loosestrife below the ordinary high water level on public waters does require a permit. Because of the plant's status as a noxious weed, these permits are issued free of charge.

Beyond the permit requirement, any pesticide used in lakes must be labeled for aquatic use and registered with the United States Environmental Protection Agency. When using an aquatic herbicide all label instructions and precautions must be followed. The permittee must post areas treated with herbicides so that anyone entering the area is informed of the herbicide application. The signs must contain the following information: the treatment date, the name of the product used, expiration dates of any water use restrictions on swimming, fishing, household, and other uses, and they must be signed by the applicator. The DNR provides these signs to permittees and commercial applicators at no cost. A list of herbicides most commonly used for aquatic plant control and the amount used under permit in Minnesota is found in Appendix A.1 and A.2.

## **DISCUSSION**

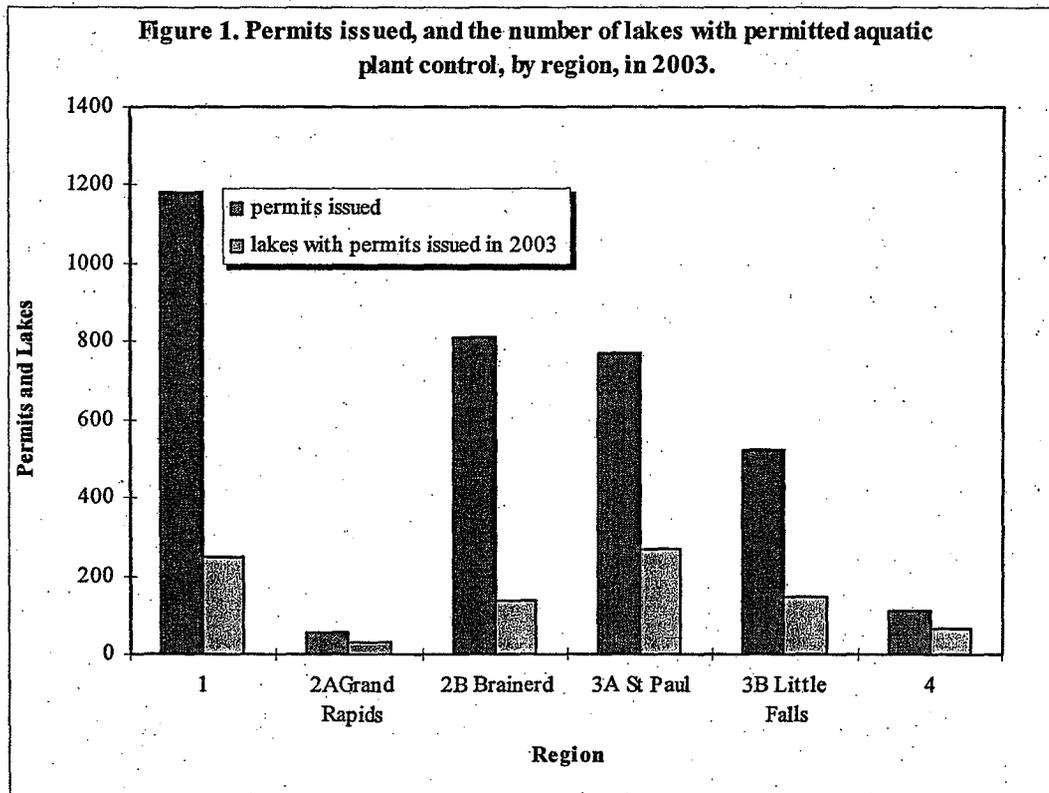
The following is a summary of Aquatic Plant Management Program (APMP) activities in 2003. The data for this report comes from four sources: permittee survey forms (2003 Appendix Table C and D), commercial aquatic applicator and harvester reports, and Aquatic Plant Management (APM) permits. Commercial applicators, harvesters, and riparian property owners who do control work in public waters are required to provide a yearly summary of their APM activity. With this information the past year's activities can be summarized, the control of aquatic vegetation in public waters is monitored, and trends in aquatic plant management are identified.

Since 2000 survey forms are only mailed to permit holders that did their own aquatic plant control work. Prior to 2000 a survey form was mailed to all permit holders including those that hired commercial applicators to perform the control work for them. Those permit holders who hired a commercial service were asked to answer only those few questions pertinent to their situation. This often caused confusion and permittees would either not respond or would send the form to the commercial service for completion. In addition, when commercial applicators do the control work there are usually many customers on a single permit. However, only one of those customers is listed as the permittee, hence you must rely on one individual to provide accurate information for up to 100 or more other people. Since commercial pesticide applicators are required by law to keep detailed records, and their reporting is generally more precise, it was decided to eliminate permit holders who hire a commercial firm from the survey.

Survey forms were sent to all permittees that did their own chemical or mechanical control work. Of the 1,040 surveys mailed 908 (87%) were returned. A separate survey was sent to all 1395 AUAPCD permit recipients, 1,285 (92%) were returned.

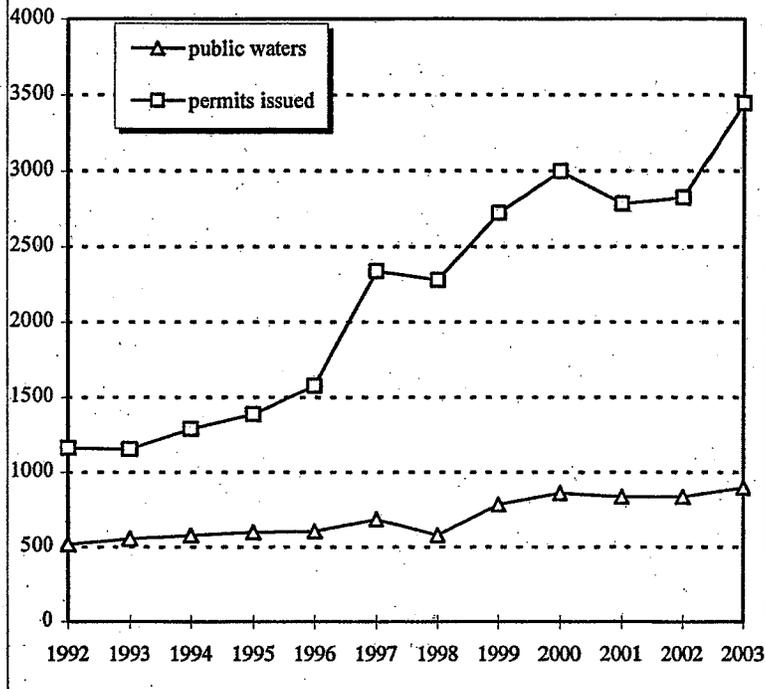
**Permit Issuance**

A total of 3,448 permits were issued statewide for APM activities on 899 public waters (i.e. lakes, ponds, and streams) in 2003 (Figures 1 and 2). This is 623 more permits and 63 additional public water areas than in 2002. In 2003, there were 1,395 permits issued for the operation of Automated Unattended Aquatic Plant Control Devices (AUAPCD) such as the Crary WeedRoller®. The remaining 2,053 permits were issued to municipalities and lakeshore homeowners for either pesticide use (includes algae and swimmer's itch control) or mechanical control (cutting, pulling, or harvesting) of aquatic vegetation.



The regional restructuring resulted in about 500 permits (or about 2,000 properties) being shifted from the Brainerd Fisheries Office to the Little Falls Office now part of the Central Region. The Central Region will now issue about 1300 permits, not quite double what they issued before the restructuring. The Northeastern Region previously issued about 70 permits per year. With the addition of the Brainerd Lakes Area the Northeast Region will now issue more than 800 permits per year to an additional 1,300 properties. The Northwest Region (Region 1), boundaries remained nearly the same as in the previous administrative structure. However, the Northwest Region issued about 300 more permits in 2003 than in 2002.

Figure 2. Protected waters permitted and permits issued statewide, 1992-2003.



The statewide average number of properties per permit was about the same in 2003 (2.9 properties per permit) as 2002 (3.3 properties per permit). The Central Region, which includes the metropolitan area, typically has more large group permits than other areas of the state. In 2003 even with the additional area included in the Central Region there were 5.2 properties per permit issued. The Northwest Region averaged just over one property per permit (1.07), the Northeast Region averaged nearly 2 properties per permit (1.8) and the Southern Region averaged more than 4 properties per permit (4.6).

The number of public waters where permits were issued remained nearly constant until 1999 when the number of public waters with permitted APM activity increased by 204 to 785 (Figure 2 & 3). The number of public waters with permitted APM activity in 2003 was 899, 63 more than in 2002.

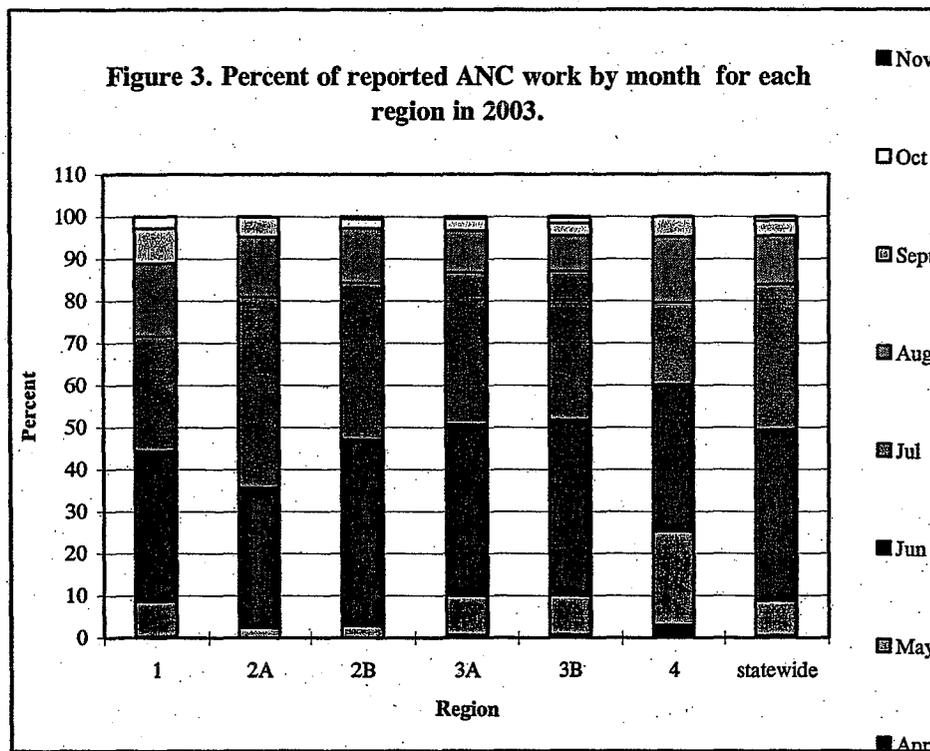
#### Permit Fees

The permit fee structure has not changed since 1993. The permit fee for control of aquatic vegetation is \$20.00 per property, with a \$200.00 cap on multiple property permits. Revenues in 2003 were \$129,028 about \$18,260 more than 2002. The average permit fee per property owner in 2002 was \$11.90, in 2003 the average fee per property was \$12.86. The increase in the average cost of a permit may be due to the increase in the number of permits issued to ten or fewer homeowners and a permit fee increase that went into effect on August 1, 2003. The reason the average permit fee is less than the flat \$20.00 fee, is due to the economy of large group permits and the \$200.00 cap on permit fees.

The 2003 legislature passed a \$15.00 permit fee increase. People applying for APM permits after August 1, 2003 were required to pay the higher fee. The new fee increased many types of APM permit from \$20.00 per property to \$35.00 per property. The cap on large group permits was increased from \$200 to \$750. All permits in 2004 will be issued under the new fee structure.

### Timing of Treatment

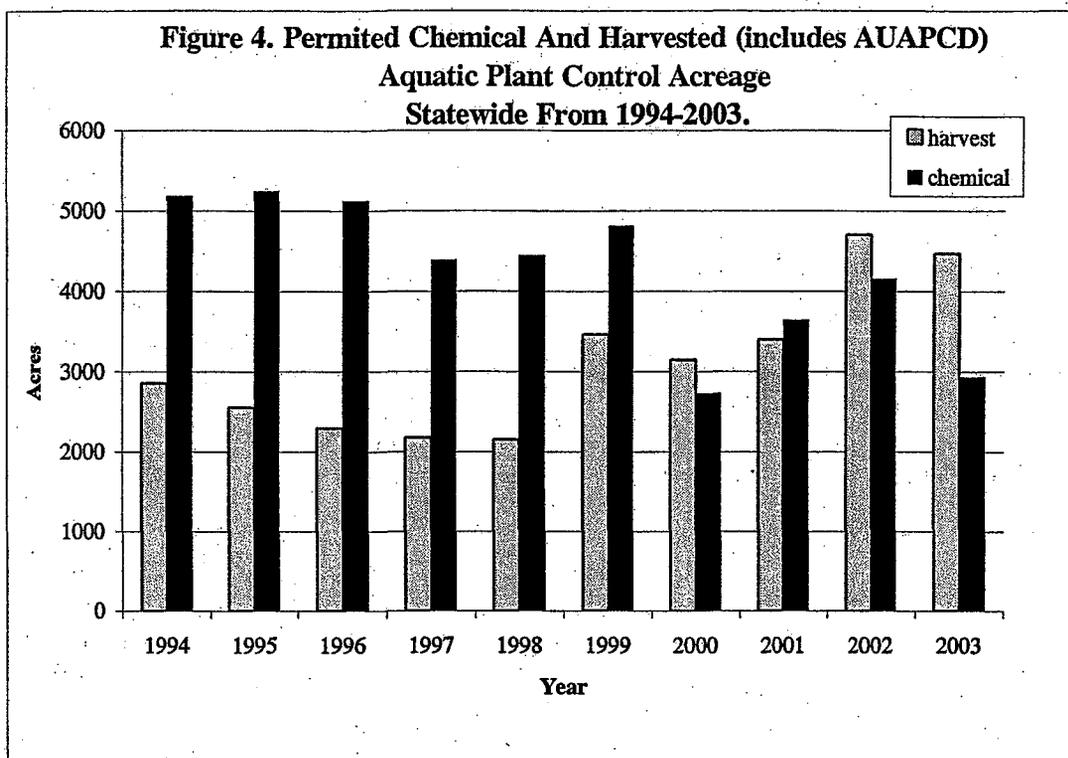
Permits are issued for the open water season generally from May through September<sup>1</sup>. However, aquatic plant control can begin as early as January and extend through November. In 2003, about 90% of the permitted work reported statewide was completed in June, July and August (Figure 3). Because most aquatic plant control in Minnesota is recreationally motivated this pattern has been consistent over time.



- 2A = Grand Rapids, NE Region
- 2B = Brainerd, NE Region
- 3A = St. Paul, Central Region
- 3B = Little Falls, Central Region

### Permit Acreage

The number of acres permitted for aquatic plant control (both chemical and mechanical methods) has fluctuated annually since 1994 (Figure 4). There appears to be no discernable pattern, which may mean that aquatic plant control is highly variable depending on the season. Central Region has many lakes where exotic plants are the focus of APM efforts. A few large Eurasian watermilfoil and curly-leaf pondweed treatments more or less could have a significant influence on the total number of permitted acres. The permitted acreage in 2003 is only slightly greater than the permitted acreage in 2002. However, it appears as though harvesting of aquatic vegetation as a method of aquatic plant control is gaining in popularity over herbicide use.



### Control Work

Permittees were asked to indicate what plant or nuisance control they were trying to accomplish from a list of categories (question 4, Appendix Table C). The percentage of each type of vegetation control reported by region is provided in Table 1. The majority of control work reported is for submerged vegetation, about 43% of the statewide total. The next most common was emergent vegetation at 19% and swimmer's itch control at about 14% of the statewide total. Exotic species control at 7% was similar to 2002. Control of exotic species accounted for 29% of the reported control activity in the Central Region. Curly-leaf pondweed and Eurasian watermilfoil are the two most common exotic species treated. Emergent vegetation control was most common in Northwest.

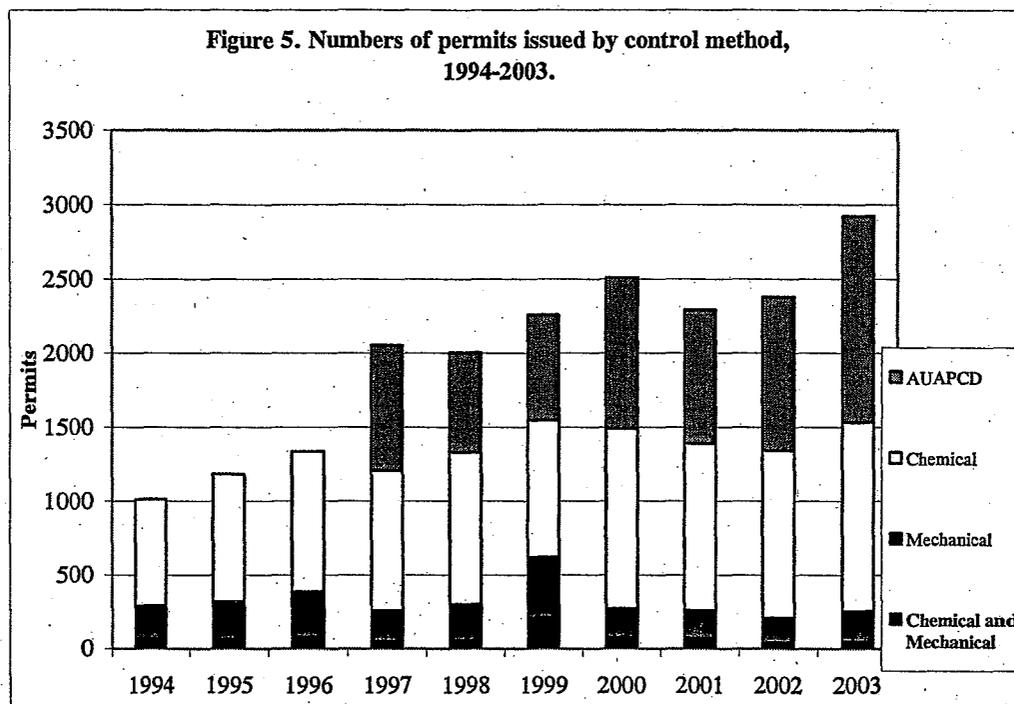
Table 1. Reported chemical and mechanical control work of various vegetation types conducted by the permittee, by region in 2003 as percent of statewide total.\*

	Region						total number of reports
	1	2A	2B	3A	3B	4	
Submerged Vegetation	38	3	22	20	17	11	442
Emergent Vegetation	61	2	16	9	11	7	195
Floating Leaf	48	1	19	17	12	3	122
Exotics	47	6	14	21	8	4	72
Swimmers Itch/Snails	36	11	36	12	0	5	144
Total No. Reporting							1,026

\* Based on 637 permittees who did their own work responding to the survey question regarding what control work was done. A permittee may have done more than one type of control. Excludes control performed by commercial services.

2A = Grand Rapids, NE Region; 2B = Brainerd, NE Region; 3A = St. Paul, Central Region; 3B = Little Falls, Central Region

Herbicide control of aquatic vegetation is a common choice of lakeshore homeowners. In 2003, about 37% of all permitted aquatic plant control was done with herbicides. AUAPCD's accounted for approximately 40% of the permitted aquatic plant management activity. Mechanical control accounts for 6% of permitted aquatic plant in 2003 (Figure 5). It is important to remember that a limited amount of mechanical control of submerged and floating leaf vegetation can be done without a permit and a permit is always required when herbicides or automated devices are used for aquatic plant control. The remaining 17% of permitted control was done using mechanical and chemical control methods.

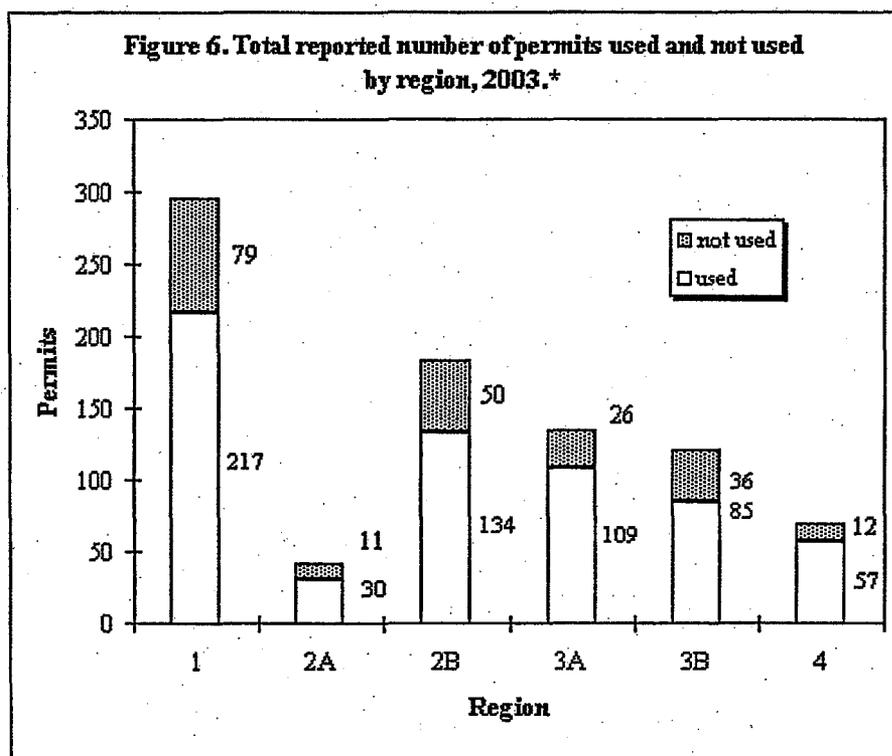


### Who Did Work

Each year some permits issued for aquatic plant management activities are not used (Figure 5). Statewide, 74% of permittees reported that they used their permits. The permittees indicating that their permit was not used, 238 (26%), were asked to indicate why by responding to one or more choices provided on the survey. The results are summarized in Table 2, below. In 2003, the reason most frequently given (43%) for not using an APM permit was that the property owner was unable to do the permitted work; 27 permit recipients (12%) reported not doing the work because of getting their permit too late.

Lakeshore homeowners perform about 41% of mechanical and herbicide control work permitted statewide. About 59% of the control work in 2003 was done by commercial applicator and aquatic plant harvesting companies. In 2002, commercial services performed about 57% of all permitted control work. Permit holders in the Central Region hire commercial services more frequently than any other region (Figure 7). About 80% of the control work performed in the Central Region is done by aquatic control companies. In 2002, very little of the permitted control work was done by commercial services in the Northeast Region. However, after regional restructuring about half of the control work in 2003 was done by commercial service in the Northeast Region. However, most of the commercial work was done in the Brainerd Lakes Area, most permitted control in the Grand Rapids area is still done by the homeowner. In the

Northwest and South Regions the majority of the permitted APM work is done by the permit holder.



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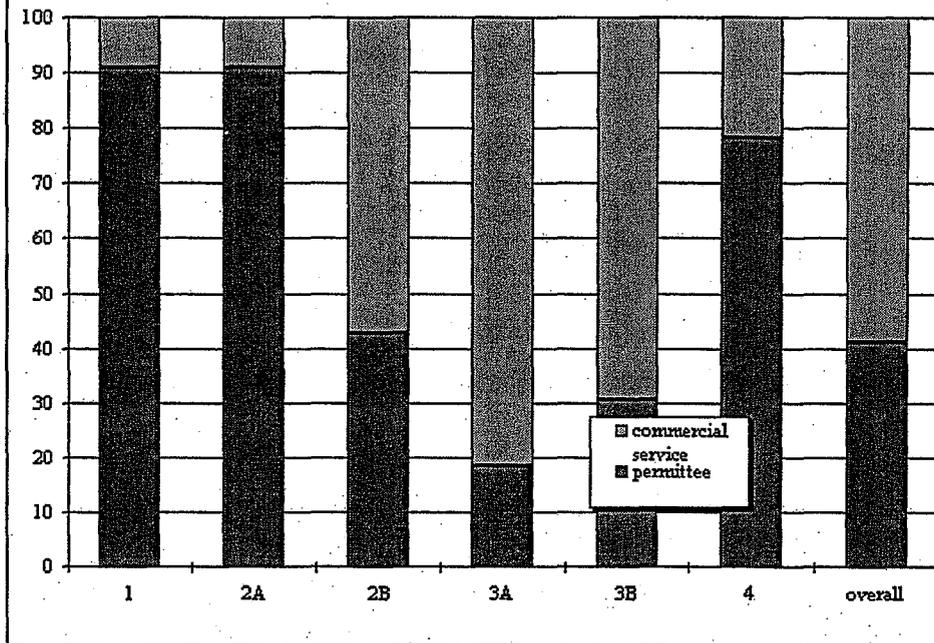
Table 2. Response to choices provided to indicate that the permit was not used and why, expressed as a percent, by region in 2003.

Region	1	2A	2B	3A	3B	4	Statewide
Nuisance condition did not develop	8	0	13	18	24	25	14
Got permit too late	12	18	6	11	24	8	12
Unable to do the work	50	55	52	36	34	25	45
Other	30	27	29	36	18	42	29
Total	100	100	100	100	100	100	100

214 permit holders who would do their own work reported not using their permit.

2A = Grand Rapids, NE Region  
 2B = Brainerd, NE Region  
 3A = St. Paul, Central Region  
 3B = Little Falls, Central Region

**Figure 7. Percent of reported permitted APM work done by permittee and by commercial service for each region in 2003.**



2A = Grand Rapids, NE Region  
 2B = Brainerd, NE Region  
 3A = St. Paul, Central Region  
 3B = Little Falls, Central Region

**Satisfaction**

Permittees who personally undertook aquatic plant control activities were asked to indicate their satisfaction with the results of the aquatic plant control. Generally permit holders were satisfied with the results of the control (Table 3). About 66% of the respondents were satisfied with the results of the herbicide control. About 75% of those responding were satisfied with the results of treatments to control swimmer's itch and 64% of respondents were satisfied with results of mechanical control. It is important to remember that permit holders hiring commercial services were excluded from the survey.

Table 3. Reported satisfaction with various aquatic vegetation control options statewide, 2003.

	Yes	Not Sure	No	Total
<b>Satisfied with chemical control</b>				
Submerged Vegetation	215	36	46	297
Emergent Vegetation	22	15	15	52
Floating Leaf Vegetation	29	18	9	56
Exotics	18	12	9	39
Swimmers Itch	96	19	131	128
Bog Removal	-	-	-	-
<b>Satisfied with mechanical or hand control</b>				
Submerged Vegetation	70	17	18	105
Emergent Vegetation	88	13	23	124
Floating Leaf Vegetation	33	6	12	51
Exotics	7	8	8	23
Swimmer's Itch	-	-	-	-
Bog Removal	13	7	8	28

Tabulated from 637 permittees who reported doing their own control work. Includes both mechanical and chemical control and no AUAPCD's.

Permit holders were asked if they would apply for a permit in 2004. Of the 843 responses, 594 (70%) said they would reapply next year a 13% increase from 2002. The number of permittees reporting that they would not apply (30 or 4%) was the same as in 2002. The percent of undecided permittees was also less than in 2002, by about 12 percent, (219 or 26% were undecided in 2003). Regardless of their response, all 2003 permit holders whose permits expire will receive reapplication materials in 2004.

#### **Automated Untended Aquatic Plant Control Devices (AUAPCD)**

Before 1997 the operation of an *automated untended aquatic plant control devices* (like the Crary WeedRoller®) in public waters did not automatically require an APM permit, and few AUAPCD permits were issued. The Aquatic Plant Management Rules were revised to require a permit for the operation of these devices because of their potential to excavate bottom sediments, and impact spawning habitat. In 2003, there were 1,395 permits issued for these devices statewide. Of those permits 801 were issued for a one-year term and 594 were issued for a 3-year permit term. Permits are issued for 3 years if the applicant agrees to a reduced area of operation and qualifies for a 3-year permit based on the vegetation types present. More than 84 percent of the AUAPCD permits were issued in the Northwest and Northeast Regions. In addition to the permits issued in 2003, there are active three-year permits issued in 2001 and 2002 (346 and 414 respectively). Of the 1,395 surveys mailed 1,285 (92%) of the AUAPCD permit holders statewide responded to the questionnaire. Three year AUAPCD permit holders issued permits in 2001 and 2002 were not surveyed.

There are at least three different companies producing AUAPCD's that are used in Minnesota, the Crary Company WeedRoller®, the Colman Beach Groomer and the Lake Restoration Lake Sweeper. Nearly half of AUAPCD owners in Minnesota have owned their device for more than 3 years, 455 or 48% of the respondents. Only 243 have owned their device from 1 to 3 years and 254 people responded that they have owned their device for less than one year.

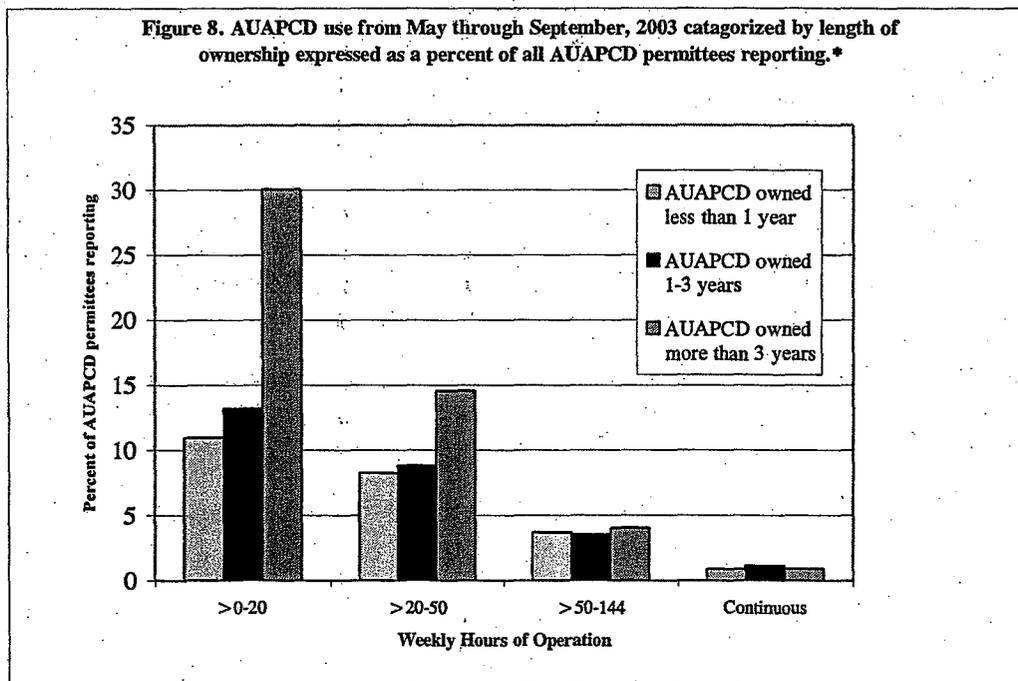
Most of the people responding to our questionnaire (84%) own their AUAPCD. In 2003, eight claimed to have rented the device as opposed to six in 2002. Some homeowners opt to purchase the device cooperatively and share it during the summer months. Approximately 16%

of the people who used an AUAPCD in 2003 either, borrowed, own and share, or jointly own their AUAPCD, down slightly from 18% in 2002.

The manufacturer of the WeedRoller® has stated that with time people will need to use the WeedRoller® less frequently to achieve acceptable control. The company explained that once the plants were gone there would be little need to use the machine. We have asked the question, how often do you operate your AUAPCD? and sorted the responses by the length of time people had indicated they had owned the machine. Recent AUAPCD owners are more likely to operate the device longer than those people who have owned the device for several years (Figure 8). It will remain to be seen if this trend continues as other types of automated plant control devices become more popular.

The AUAPCD had higher satisfaction ratings than other methods of aquatic plant control. When asked, were you satisfied with your AUAPCD?, 97% of those responding indicated that they were satisfied with these devices. This was nearly the same as reported in 2002.

The DNR sends AUAPCD permit holders a sticker to help identify permitted units. Beginning in 2000 use of the sticker became a mandatory condition of the permit. About 97% of the permit holders responding to this question had no difficulties displaying the sticker.



### Exotic Species Control

In addition to oversight (permitting) responsibilities for aquatic plant management efforts conducted by individuals to attain access or recreational use, the DNR has statewide control programs for two exotic plants: purple loosestrife and Eurasian watermilfoil. These program activities are summarized below.

### **Purple Loosestrife Program**

Purple loosestrife, an exotic plant that can out compete native wetland vegetation, was introduced to North America from Europe in the 1800's and until 1987 was a common ornamental sold by nurseries and landscape companies. Natural resource managers became aware of the plant's invasive nature and disruptive effects on native wetland vegetation in the early 1980's. The DNR, concerned about the plants impact on native species and wildlife habitat, conducted preliminary surveys to determine the status of the plant in Minnesota. The survey revealed that 77 of 87 counties had populations of purple loosestrife in wetlands, lakeshore, stream banks and ditches. In 1987 Minnesota became one of the first states in the nation to develop a program to control this invasive exotic. Purple loosestrife was designated a noxious weed, which makes it illegal to import, buy, sell, propagate and transport. The main components of the purple loosestrife program are:

- An inventory of purple loosestrife sites is maintained and prioritized for control.
- Carry out management activities including chemical and biological control.
- Support research to evaluate and expand biocontrol efforts.
- Monitor and evaluate biological control and other management efforts success.
- Public education/awareness efforts to involve the public in the management of this plant.

Large stands of purple loosestrife are extremely difficult to control because of their enormous seed bank; therefore, it is necessary to prioritize purple loosestrife control efforts. Highest priority stands are those in watersheds with little purple loosestrife, that are small and newly established (e.g., they consist of a few plants covering a small area) and are found near the headwaters of the watershed. Because of their small size these newly established sites are poor candidates for biocontrol. Rodeo, a broad-spectrum glyphosate herbicide, is used to spot treat high priority purple loosestrife sites with a backpack sprayer.

### **Eurasian Watermilfoil Program**

Eurasian watermilfoil, hereafter called milfoil, is an exotic aquatic plant introduced to North America in the mid-1900's. It was first identified in Minnesota in 1987 in Lake Minnetonka. Milfoil was identified in 11 new water bodies in 2003, which brought the total number of water bodies with EWM in Minnesota to 152.

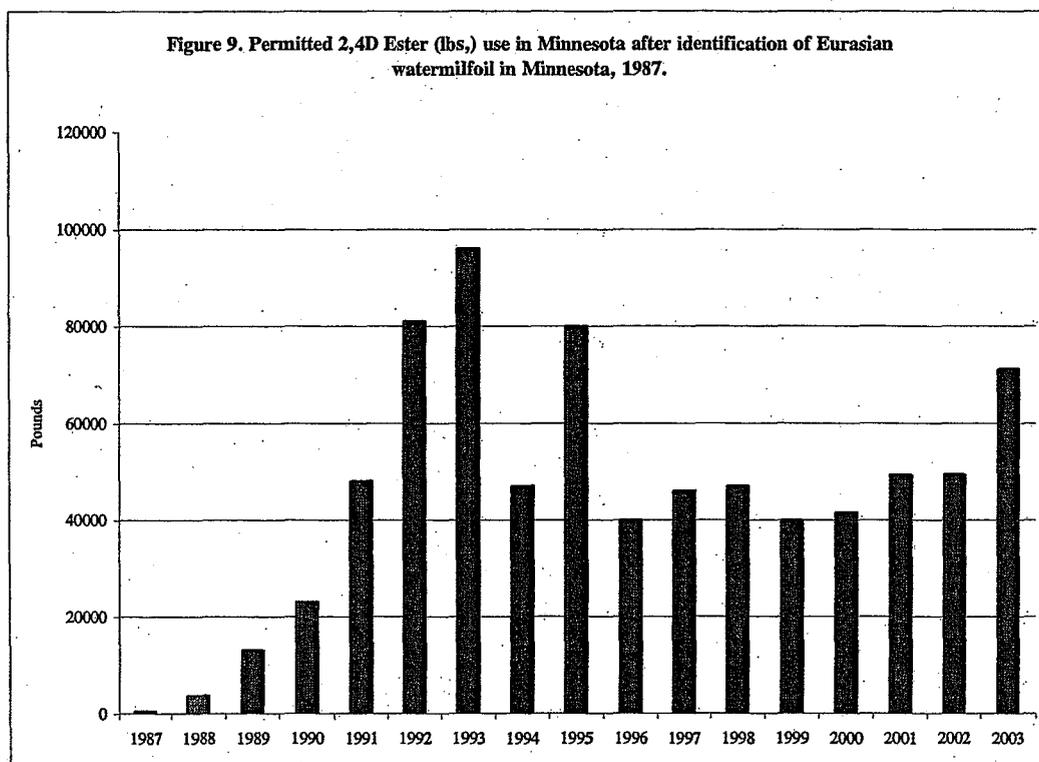
Milfoil is a submerged aquatic plant that can displace native vegetation. The plant reproduces by fragmentation, establishes itself readily in disturbed areas, and has the potential to become a nuisance in Minnesota lakes. The main strategies of the Eurasian watermilfoil program are:

- Slow the spread of the plant through public education and awareness activities.
- Support lake associations and local units of government to manage problems caused by milfoil.
- Maintain an accurate inventory of populations.
- Investigate new methods for control and the biology of the plant.

Large populations of Eurasian watermilfoil are difficult to control using current technology. The most commonly used herbicide for control of milfoil is a granular 2,4-D ester product labeled for aquatic use. In 2001, a liquid dimethylamine salt 2,4-D product was registered for aquatic use and has been applied to milfoil in Minnesota. Late in 2002, a liquid trimethylamine salt, triclopyr product, was registered for aquatic use and is available for control of milfoil in Minnesota. These systematic herbicides are preferred because they are the most selective products available.

In 2003, the DNR provided \$76,000 in state funds to cooperators on 23 lakes for management of milfoil. In addition, the DNR initiated management on another three lakes where \$9,000 were spent on milfoil control efforts.

The use of 2,4-D ester products increased steadily from 1988 through 1993 to a high of more than 95,000 pounds. The total reported for 2003 was 71,000 pounds which was last exceeded in 1995. The total reported annual use of 2,4-D ester products since 1987 is provided in Figure 10. For more detailed information on the management of invasive species see the 2003 Exotic Species Program Annual Report.



# APPENDIX

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Table A. A list of commonly used herbicides registered by the EPA for aquatic use and approved by the MN DNR.

Product Name	Selective	Broad Spectrum	Active Ingredient (Formulation)
<u>Part 1. Aquatically labeled systemic herbicides.</u>			
Aquacide (Pellet)	X		2,4 Dichlorophenoxyacetic Acid (Sodium Salt)
Navigate® (Granular)	X		2,4 Dichlorophenoxyacetic (Butoxyethyl Ester)
Riverdale™ (Granular)	X		2,4 Dichlorophenoxyacetic (Isooctyl Ester)
SEE 2,4-D (Liquid)	X		2,4 Dichlorophenoxyacetic (Isooctyl Ester)
Weedtrine II (Granular)	X		2,4 Dichlorophenoxyacetic (Isooctyl Ester)
Sonar™ (Liquid or Granular)		X	Fluridone
Rodeo (Liquid)		X	Isopropylamine salt of Glyphosate
Pondmaster (Liquid)		X	Isopropylamine salt of Glyphosate
Garlon-3A		X	Triclopyr ( <i>Experimental use permit, full aquatic label pending</i> )
<u>Part 2. Contact Herbicides.</u>			
Aquathol (Liquid or Granular)		X	Dipotassium salt of endothall
Hydrothol 191 (Liquid or Granular)		X	Mono-amine salt of endothall ( <i>liquid by licensed applicator only</i> )
Reward (Liquid)		X	Diquat dibromide ( <i>licensed applicator only</i> )
<u>Part 3. Copper Compounds (Algaecides and Herbicides).</u>			
Cutrine Plus (Liquid or Granular)	X (A)		Copper-Ethanolamine complex
Komeen (Liquid)	X (H)		Copper-Ethylenediamine complex
K-Tea	X (A)		Copper-Triethanolamine complex
<u>Part 4. Other.</u>			
Copper sulfate	X (A)		CuSO <sub>4</sub> (wide variety of registered brands)
Aquashade (Liquid)			Acid Blue 9 / Acid Yellow 23 (Filters light in wavelengths required for plant growth)

Table B. Reported various aquatic herbicide use statewide, 1981-2003.

Year	2,4-D Ester lbs.	2,4-D Salt lbs.	Aquathol lbs.	Aquathol gal.	Diquat (Reward) gal.	Hydrothol 191 lbs.	Hydrothol 191 gal.	Copper Sulfate lbs.
1981	150	370	1,900	1,300	730	3,200	390	*
1982	120	320	1,700	1,500	550	4,200	44	*
1983	-	350	1,400	1,500	560	11,900	31	*
1984	110	130	730	980	780	7,300	80	*
1985	25	270	740	1,200	870	14,000	100	*
1986	25	370	1,100	1,400	1,200	6,900	170	*
1987	100	1,400	1,100	1,400	1,400	13,000	62	*
1988	3,700	600	950	1,300	1,300	11,000	100	*
1989	13,000	470	910	1,300	1,700	12,000	200	*
1990	23,000	290	680	1,100	1,500	9,500	130	*
1991	48,000	1,300	1,400	850	1,400	9,600	210	55,400
1992	81,000	320	870	1,600	1,700	9,000	67	64,000
1993	96,000	400	830	1,000	1,600	5,000	240	34,600
1994	45,000	700	710	940	1,800	10,000	510	59,800
1995	80,000	87	930	700	2,300	8,300	420	55,000
1996	39,000	400	1,000	730	1,900	8,900	830	32,500
1997	46,000	290	1,200	700	2,400	7,800	820	39,700
1998	47,000	440	790	1,280	2,580	4,460	670	50,000
1999	39,800	650	1,050	740	2,280	4,190	740	31,600
2000	41,500	700	1,380	1,850	2,970	5,820	530	41,900
2001	49,300	1,000	700	2,600	2,700	3,900	950	58,200
2002	49,400	700	540	2,660	2,530	4,220	760	42,200
2003	71,100	634	339	2,515	2,370	7,610	429	47,100

\* Data not available.

897 responded  
 1040 mailed requests  
 13 returned undelevered

Please check the appropriate circle.

1. Was your 2003 permit used?

Yes, permitted work was done.(includes transplant work)

86.25% returned

32 No, because: The nuisance conditions did not develop.	Thanks! Please use the back for comments
28 No, because: I got the permit too late.	
103 No, because: I was unable to get the work done.	
51 No, because:	
13 unknown	

2. When my permit expires:

594 I will reapply for a permit. 30 I will not apply for a permit. 219 I am undecided at this time.

3. The method of nuisance control was:

191 mechanical or hand removal. 42 mechanical and chemical treatment.  
 435 chemical treatment. 42 other

4. Were you satisfied with the control work done ? (check the appropriate circle for the nuisance control work done)

<b>Submerged Vegetation</b> example pondweed, milfoil, algae, chara	298 YES	70 NO	64 NOT SURE
<b>Emergent Vegetation</b> example cattails, bulrushes, wildrice	118 YES	42 NO	31 NOT SURE
<b>Floating Leaf Vegetation</b> example water lilies, duckweed	69 YES	25 NO	26 NOT SURE
<b>Exotics</b> example Purple Loosestrife, Eurasian Watermilfoil	26 YES	21 NO	21 NOT SURE
<b>Swimmers Itch</b> example snail or leech control	104 YES	20 NO	28 NOT SURE
<b>Bog Removal</b>	16 YES	18 NO	17 NOT SURE

5. When was the work done?

12 uncertain 1 January 2 February 1 March  
 11 April 104 May 287 June 243 July 149 August 53 September 19 October 1 November

6. To provide us with some idea of how much control actually took place we would like to know if the control work done was the entire area allowed by the permit or less than the allowed area.

407 Yes, control work was done on the entire area permitted  
 161 No, less control work was done than the permit allowed

7. If you used herbicide, please indicate what you used and how much?

<u>What Did You Use?</u>	<u>How Much Did You Use?</u> (concentrated product before mixing)	
liq. Aquathol K _____	gal., qts., oz.	Aquakleen/Navigate _____ lbs.
gran. Aquathol _____	lbs.	Riverdale _____ lbs.
liq. Hydrothol 191 _____	gal., qts., oz.	Cutrine Plus _____ gal., qts., oz.
gran. Hydrothol 191 _____	lbs.	SEE 2,4 D _____ lbs.
Reward _____	gal., qts., oz.	Rodeo _____ gal., qts., oz.
Copper sulphate _____	lbs.	other: _____ lbs., gal., qts., oz.
Aquacide _____	lbs.	other: _____ lbs., gal., qts., oz.

We value your comments. Please use the back for comments. Thanks!

I have comments on the back.

Please return survey by **DECEMBER 1, 2003.**

1285 responded out of  
 1395 mailed requests  
 92.11% returned

Please check the appropriate circle.

1. The type of AUAPCD device I use is at: 1126 Crary WeedRoller®  
 16 Lake Restoration Lake Sweeper
2. I used an AUAPCD this year. 100 Colman BeachGroomer.  
 1130 Yes 37 did not say  
 155 No, I did not use an AUAPCD this year.  
 I'll explain on the back of this form.

3. The AUAPCD I used in 2002-  
 I have owned for:  
 254 less than 1 year  
 243 1 - 3 years  
 455 more than 3 years  
 is jointly owned and shared with the other co-owners and has been for:  
 32 less than 1 year  
 40 1 - 3 years  
 78 more than 3 years  
 8 was rented.  
 20 was borrowed.

4. How often monthly did you operate the AUAPCD you used ?

	not used	few hours	several hours	many hours	continuous
	>0-20	>20-50	50-144		
In May:	744	256	88	31	11
In June:	248	440	301	115	26
In July:	122	442	393	144	29
In August:	174	529	287	113	27
In September	834	223	49	18	6

5. Were you satisfied with the AUAPCD you used?  
 1090 Yes  
 38 No

6. Did you have any problems displaying the sticker you got with your permit ?  
 33 Yes, please explain:
- 
- 

1094 No

We value your comments. Please use the back for comments. Thanks!

I have comments on the back.

Please return survey by **DECEMBER 1, 2003.**

Table E. Aquatic Pesticide Enforcement Citizen Complaint Investigations, 2003.

Date	Complaint	Lake Name	County	Observation	Action	Result
February 24	Neighbor bragging about cutting cattail without a permit	Big Horseshoe	Chisago	No field inspection made	Referred to conservation officer	Unknown
March 29	Backhoe used to dig channel and remove cattail along creek	Lady lake creek	Todd	Cattail debris piled near road and along ditch	Referred to APM specialist	APM permit had been issued, closed without action
March 31	Numerous property owners had removed cattail last summer	Bass lake	Crow Wing	Cattail had been cut at 2 properties	Referred to APM Specialist	Closed without action
May 5	Unlicensed applicator name on APM permit form	Daggett	Crow Wing	Numerous phone calls	Referred to MDA	Applicator could work for relative without pay
May 22	Large number of people cutting wild rice	Big Sandy	Aitkin	No field inspection made	Referred to CO	Unknown
May 27	Cattail bog cut and moved across lake	Section 10	Aitkin	No field inspection made	Referred to CO	Warning citation issued
May 27	Unpermitted chemical control of cattails	Mtka-Jennings	Hennepin	No recent evidence of cattail herbicide damage	Complainant advised to watch for illegal activity	Samples negative, no action taken
June 3	Cattails and bulrush cut at new home	Unnamed	Cass	No field inspection made	Referred to CO	Unknown
April 23 and June 6	Bulrush removal violation from 2002	Upper Mission	Crow Wing	Several site inspections	Restoration order written	CO issued citation and restoration order
June 9	White substance found on lake bed	Ossawinnamakee	Crow Wing	Eurasian water milfoil plant survey	Took samples and referred to CO	Citation issued
June 11	Cut weeds floating on shore	Bass	Crow Wing	No field inspection made	Referred to Fisheries office	Closed without action
June 18	Bulrush removed along shore	Star	Otter Tail	Stem count and photos taken	Referred to CO and restoration order written by Jed Anderson	Cease and desist order, citation, and restoration order issued
June 19	Water lilies cut and washed up on shore	Crooked	Crow Wing	No field inspection made	Referred to CO	CO gave verbal warning to pick up plants since site was under DOW permit

Date	Complaint	Lake Name	County	Observation	Action	Result
June 23	Bulrush and spike rush cut	Pelican	Crow Wing	Site inspection	Referred to CO	CO issued citation
June 30	Bogs cut at night and allowed to float on lake	Edward	Crow Wing	No field inspection made	Referred to CO	Unknown
July 1	Emergent plants removed at newly developed site	Hammal	Aitkin	Large area of emergent plants removed along with lake bed	Referred to CO	Citation and restoration order issued
July 7	Weed roller operating without a permit	Miller	Crow Wing	No field inspection made	CO found site and asked for advice on how to proceed	CO issued a citation
July 8	Pesticides application in the vicinity of a swimming beach while children were in the water	Silver (NSP)	Ramsey	Treatment occurred 70 yards from beach and was properly posted	Contacted commercial applicator for spray records	Commercial applicator warned not to treat while children were swimming
July 9	Lake shoreline destruction	Lake (#27-108P)	Hennepin		Contacted DOW	Person involved had DOW permit for shoreline restoration project
July 11	Bulrush removed by cutting and perhaps chemically	Stakke	Otter Tail	Site inspection, measured control area, took photos	Referred findings to CO	CO issued cease and desist order
July 15	All vegetation disappeared from Peltier Lake	Peltier	Anoka	Very turbid water, aquatic vegetation sparse and only in very shallow area	None	Turbid water likely reduced light to plants
July 21	Dead cattails seen along shore	Hanks Bay	Crow Wing	Samples taken	Referred to CO and restoration order written	Citation and restoration order issued
July 24	Ortho weed be gone was sprayed near shore	Mille Lacs	Mille Lacs	No field inspection made	Referred to MDA	Unknown
August 1	Boat at repair shop had mussel type organisms	Nisswa Marine	Crow Wing	Site inspection found barnacles	Referred to Gary Montz	Case closed
August 8	Bogs were pushed around lake by pontoon boats	Big Swan	Todd	No field inspection made	Referred to Audrey Kuchinski	Unknown
August 12	Cattail bog floated in to beach	Edward	Crow Wing	No field inspection made	Referred to Greg Berg	Unknown

Date	Complaint	Lake Name	County	Observation	Action	Result
August 15	Aquatic plants washing up on shore	Sylvan	Cass	Surveyed lake by boat	Referred to Fisheries	Natural uprooted vegetation, case closed
August 25	Weed roller cut vegetation which floated in to shore	Fawn	Crow Wing	No field inspection made	Referred to CO	Verbal warning by CO
August 25	Copper sulfate was sold by feed store in brown paper bag	Aitkin Feed Store	Aitkin	No field inspection made	Referred to MDA	Unknown
August 26	Cattail and bulrush removal	Smith	Douglas	Routine survey found violation	Referred to CO	CDO, citation, and restoration order issued
August 25	Herbicide controlled cattail and grass	Cross Lake	Crow Wing	Several sites around the bay were inspected	Referred to Fisheries	Case closed
August 26	Cattail sprayed with herbicide	Smith	Douglas	Routine survey found violation	Referred to CO	CDO, citation, and restoration order issued
September 18	Cattails destroyed	Wetland	Mille Lacs	No field inspection made	Referred to CO	Case closed
October 21	Rotenone project: helicopter crashed in lake	Christina	Douglas	Supervising treatment when the applicator's helicopter crashed	Referred to MDA	Thorough investigation by DNR and MDA
October 31	Wild rice removed in outlet channel	Sibley	Crow Wing	No evidence found	Referred to Fisheries	Case closed

**Table F. Aquatic Pesticide Enforcement Use Inspections, 2003.**

Treatment Date	County	Lake	Applicator	Number of Treatments Inspected
April 28	Washington	LeSueur	Lake Restoration	2
May 1	Ossawinnamakee	Crow Wing	Minnesota Shoreline Services	1
May 17	Cedar	Scott	Cedar Lake Farm	1
May 20	Hubbard	Portage	Professional Lake Management	1
May 21	Crow Wing	Crow Wing	Minnesota Shoreline Services	1
May 21	Julia	Sherburne	Lake Management	1
May 21	Rush	Crow Wing	Lake Management	1
May 21	Rush	Sherburne	Lake Management	1
May 22	Grand	Stearns	Lake Management	1
May 22	Mtka-Black	Hennepin	Lake Restoration	2
May 27	South Center	Chisago	Lake Management	2
May 28	Crow Wing	Crow Wing	Minnesota Shoreline Services	1
May 29	Owasso	Ramsey	Lake Management	2
May 29	South Center	Chisago	Lake Management	2
June 2	Marion	Dakota	Midwest AquaCare	2
June 3	Eagle	Hennepin	Lake Restoration	2
June 4	Bone	Washington	Lake Management	2
June 5	Orchard	Dakota	Lake Management	2
June 6	Johanna	Ramsey	Lake Management	2
June 9	Virginia	Carver	Lake Restoration	2
June 11	Green	Chisago	Green Lake Assn.	2
June 13	Pierson	Carver	Lake Management	2
June 16	Forest	Washington	Lake Restoration	2
June 17	White Bear	Washington	Lake Restoration	1
June 20	Gervais	Ramsey	Lake Improvement	1
June 20	Gervais	Ramsey	Lake Improvement	1
June 26	Itasca	North Twin	Lake Management	1
June 26	St. Louis	Gilbert	Lake Management	1
July 7	Bone	Washington	Lake Management	2

Treatment Date	County	Lake	Applicator	Number of Treatments Inspected
July 11	Coon	Anoka	Lake Restoration	2
July 15	Josephine	Ramsey	Lake Management	2
July 16	Lotus	Carver	Lake Restoration	2
July 17	Forest	Washington	Lake Management	1
July 18	Mtka-Forest	Hennepin	Lake Restoration	1
July 18	Mtka-Jennings	Hennepin	Lake Restoration	1
July 21	Bald Eagle	Washington	Midwest AquaCare	2
July 22	Pierson	Carver	Lake Management	2
July 23	Owasso	Ramsey	Lake Management	2
July 28	White Bear	Washington	Lake Restoration	1
July 29	Owasso	Ramsey	Lake Management	1
July 22	Mille Lacs	Mille Lacs	Lake Restoration	9
July 30	Itasca	McKinney	Lake Management	1
August 12	Morrison	Alexander	Lake Restoration	1
August 18	Ossawinnamakee	Crow Wing	Minnesota Shoreline Services	1

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