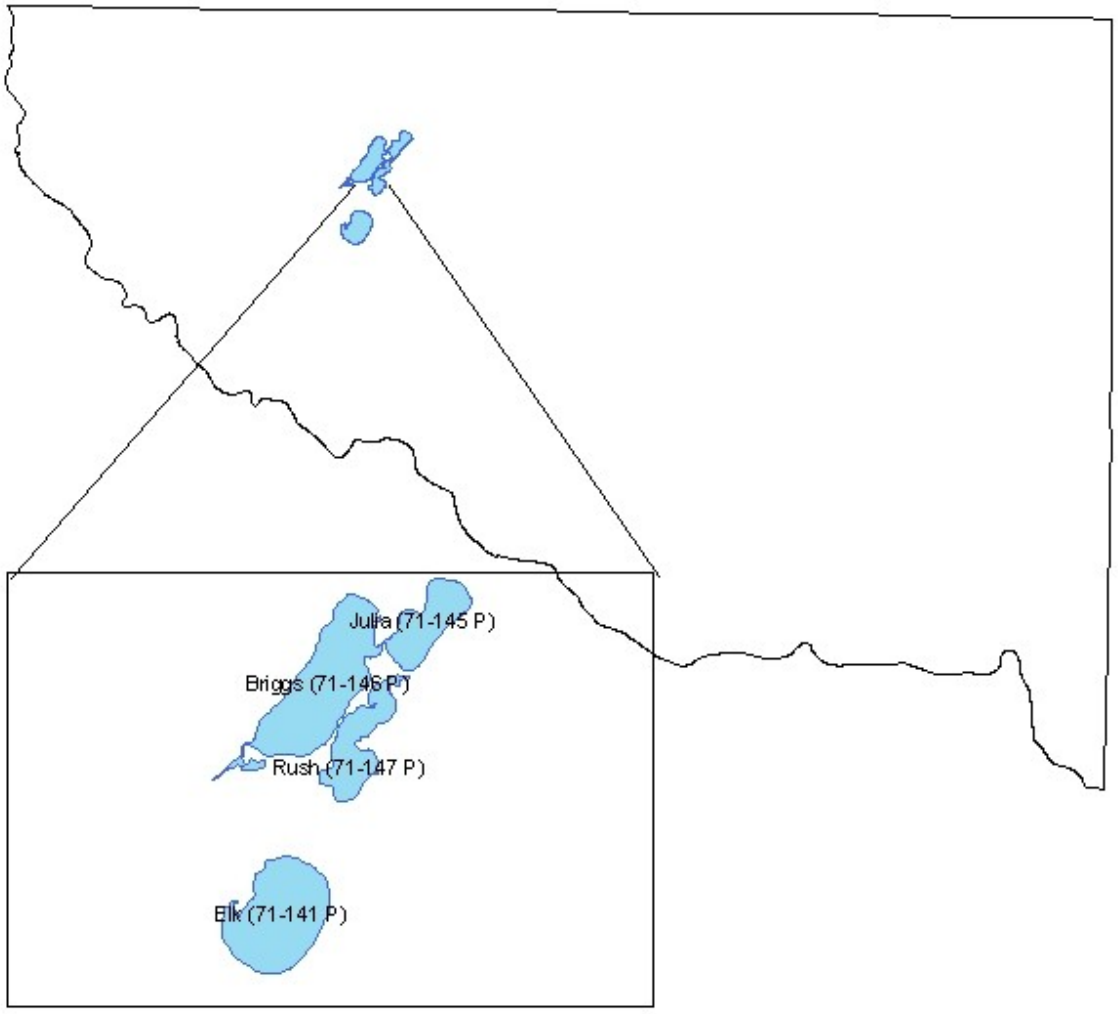
Rush And Julia Lakes
Lake Vegetation Management Plan



Lake Vegetation Management Plan

28 February 2006

drafted by Joel Stiras

Purpose of the Plan: The purpose of this document is to describe how submersed aquatic plants will be managed in Rush and Julia lakes. Specific details and criteria are outlined within this plan that state how and when aquatic plants will be controlled, when chemical treatments will occur, and what variances will be given. Curly-leaf pondweed (*Potomogeton crispus*) is of particular concern because it is a non-native, invasive aquatic plant that because of its life cycle, can cause several nuisances. The plant itself can form dense mats at the surface inhibiting recreational boating. Curly-leaf pondweed also is associated with water quality problems, specifically blooms of algae, that often develop following the die-back or senescence of the plant during mid-summer. It is not clear to what extent these blooms of algae are caused by release of nutrients from dying curly-leaf plants or to generally high levels of nutrients from other sources. In addition, curly-leaf pondweed can displace native submersed plants. Through this plan, we hope to achieve an overall reduction in curly-leaf pondweed biomass, production of turions, and provide long-term control, thereby reducing pesticide use. Prolonged control of this nuisance plant may increase both water clarity and abundance of native submersed plants. Aquatic vegetation is an essential part of lake and river ecosystems. Aquatic plants provide necessary habitat for fish and wildlife and provide water quality benefits. The purpose of the Minnesota Department of Natural Resources' Aquatic Plant Management Program is to protect Minnesota's aquatic plant communities while allowing riparian property owners reasonable access to enjoy our lakes and rivers.

Preparation of the plan: This plan was developed by the Minnesota Department of Natural Resources with input from the Division of Fish and Wildlife, Division of Ecological Services, Briggs Lake Chain Association, and Lake Management, Inc.

1. Lake Name: Rush and Julia

2. DOW Number: 71014700 (Rush) and 71014500 (Julia)

3. County: Sherburne

4. Acreage total/Littoral: 142/142 (Rush), 136/136 (Julia)

5. Percentage Littoral: 100% (both lakes)

6. Water clarity and aquatic vegetation in lake

A. Secchi (Rush)	Mean value:	0.9 m	(Source: PCA web site)
	Number of Observations:	129	
	Over number of years:	17	(See Appendix 1)
A. Secchi (Julia)	Mean value:	0.9 m	(Source: PCA web site)

Number of Observations: 153

Over number of years: 18 (See Appendix 1)

B. Submersed aquatic vegetation (Rush)

Grows to a depth of 6.5 feet (Source: DNR, Donna Perleberg, 2003)

Number of native species present: 6
List species known to be in lake: (see Appendix 2)

Number of non-native, invasive species present: 1

Eurasian watermilfoil present: N

Curly-leaf pondweed present: Y

B. Submersed aquatic vegetation (Julia)

Grows to a depth of 7 feet (Source: DNR, Donna Perleberg, 2003)

Number of native species present: 8
List species known to be in lake: (see Appendix 2)

Number of non-native, invasive species present: 1

Eurasian watermilfoil present: N

Curly-leaf pondweed present: Y

C. Water lilies and watershield (Rush and Julia)

Number of native species present: 1
List species known to be in lake: (see Appendix 2)

Number of non-native, invasive species present: None

D. Emergent species

Number of native species present: 7
List species known to be in lake: (see Appendix 2)

Number of non-native, invasive species present: None
List species known to be in lake: None

7. Problems to be addressed in this plan:

_X_ A. Plants interfere with recreational use of the lake:

list dominant problem-causing plant species, describe the problems they cause, and **show where the problems occur on a map** (see Step 21):

curly-leaf pondweed_

_____

_____

42 (Rush), 42 (Julia) (# of acres where plants interfere with use)

_X_ B. Invasive, non-native, submersed plants are causing ecological problems. Identify problem(s):

_X_ 1) native submersed aquatic plants are being displaced

_X_ 2) declines in water quality (increased concentrations of phosphorus and associated algal blooms) are associated with the die-off of curly-leaf pondweed

__ C. Other (explain):

8. Goals for management of aquatic plants (check all that apply)

_X_ Goal A. Reduce interference with recreational use of the lake caused by: (list plant species)

curlyleaf pondweed

Anticipated size of treatment area to reduce interference_42 (Rush), 42 (Julia)_ (# of acres)

_X_ Goal B. Increase abundance of native submersed aquatic plants by control of invasive, non-native submersed plants

Anticipated size of treatment area to reduce invasive plants_lake-wide (Rush and Julia)_(# of acres or lake-wide)

_X_ Goal C. Attempt to reduce peaks in concentrations of phosphorous, and associated algal blooms by control of curly-leaf pondweed

Anticipated size of treatment area to reduce curly-leaf pondweed _lake-wide (Rush and Julia)_(# of acres or lake-wide)

__ Goal D. Identify standards for issuing APM permits that are more limited than those in rule to protect sensitive areas or plants (e.g. if rare or

special concern aquatic plants are present, to provide greater protection for shallow bays or fish spawning areas)

State goal of alternate standards: _____

__ Goal E. Identify strategies to restore or enhance lakeshore habitat

__ Goal F: [Other] describe: _____

9. Type of Plan (See Directions for definitions)

__ Operational Management

_X_ Pilot Management

10. Control Methods (describe if appropriate)

[**map required** - marked with areas where control of plants is anticipated – See Step 21]

Mechanical control: _____

Herbicide:

Products: ___Endothall_____

Rate(s) of application: 1 ppm large area, 1.5 ppm spot treatments (maximum concentration)

Timing of application: _50-60° F water temperatures, early spring when water temperatures are expected to increase (see Appendix 3 for treatment guidelines)

Other: _____

11. Habitat Restoration Plans (describe if appropriate)

See Appendix 4

12. Alternate treatment standards (describe if appropriate)

[**map required** - marked with areas where control of plants is anticipated – See Step 21]

N/A

13. Conditions of operations and permits (this section must be filled out if the plan describes how APM permits will be issued or variances that will be allowed)

Residents on Rush and Julia lakes will receive a variance to the 15% maximum chemical treatment limit of the littoral zone as well as a variance to the 100 foot maximum shoreline property treatment. Residents of Rush and Julia lakes will be allowed to treat their entire shoreline for early season curly-leaf pondweed.

Signatures shall be required for any treatment occurring within 125 feet of an individual's property. Resident's signatures shall be valid from 2006 through 2008, and 2009 through 2010 for early season curly-leaf pondweed treatments. Should any property ownership change, a signature shall be required by the new property owner for any treatment to occur adjacent to that property. That property owner's signature shall be valid for early season curly-leaf pondweed treatments through 2008 or 2010, whichever occurs first.

Any subsequent chemical treatments within the same season shall be subject to inspection and shall be granted no more than 50 shoreline feet, or half their lake frontage whichever is less, by 50 feet lakeward plus a 15 foot channel to open water. Offshore treatment of native vegetation shall not be permitted. Should native submersed macrophytes rebound to a large extent causing recreational nuisances, this limitation will be revisited. These treatments for macrophytes other than curly-leaf pondweed, shall require a separate permit and shall require annual signatures for such treatment. No permit fee will be assessed to those already having paid a permit fee for early season curly-leaf pondweed control.

Curly-leaf pondweed treatment acreage (offshore and near shore combined) is estimated to be, but not limited to, 42 acres for each lake. Areas of high use shall be the first treatment priority.

Monitoring data and plant survey results shall be submitted to the DNR's Aquatic Plant Management (APM) office in Saint Paul prior to the end of that treatment year. Results must be compiled and submitted in a manner that is readily reviewable by APM staff. This data must be received before a permit will be issued for the following year.

See Appendix 3 for treatment guidelines. See Appendix 5 for treatment history.

14. Variance(s) allowed and justification(s) (check all that apply)

_X_ a. Application of pesticides to control submerged vegetation along more than 100 feet of shoreline per site belonging to an individual riparian property owner (M.R. 6280.0350, Subpart 4, A), (list justification below)

_X_ b. Application of pesticides to control aquatic macrophytes that are not dense growths (M.R. 6280.1000, Subp. 5). (list justification below)

_X_ c. Application of pesticides to control dense growths (M.R. 6280.1000, Subp. 5) of aquatic macrophytes that do not interfere with watercraft use, swimming, or other traditional recreational uses (M.R. 6280.0250, Subpart 2, A, (2))

_X_ d. Application of pesticides to control submerged vegetation in more than 15 percent of the littoral area (M.R. 6280.0350, Subp. 4, A). (list justification below)

__ e. Application of pesticides to control aquatic macrophytes in natural environment lakes established pursuant to part 6120.3000 (M.R. 6280.0250, Subp. 4, E.). (list justification below)

__ f. Application of pesticides to control submerged or floating aquatic macrophytes after 1 August deadline (M.R. 6280.0450, Subp. 2). (list justification below)

__ g. Mechanical control of pesticides to control aquatic macrophytes in more than 50 percent of the littoral area (M.R. 6280.0350, Subp. 3, B). (list justification below)

Justifications (identify which variance and provide the rational for all items checked above):

To reduce curly-leaf pondweed recreational nuisances and limit turion production in an attempt to achieve long term nuisance control for all checked Minnesota Rules.

15. Responsibilities

Individual Landowners (list)

Responsible for paying for their own near shore treatment areas. Individual property owners' riparian rights extend 125 feet lakeward.

Lake Association (list)

Responsible for plant surveys, lake monitoring, organizing permit request for offshore treatment, submitting reports of annual activities and ongoing monitoring results. Commercial applicator is responsible for providing details of where chemicals were applied, size of treatment area, and target concentration of each treatment area. Monitoring data should be submitted electronically to the DNR Aquatic Plant Management office in St. Paul at the end of that treatment year.

DNR (list)

Responsible for reviewing permit requests, inspecting sites (if necessary), and issuing permits

16. Monitoring (this section must be filled out for Pilot Management plans)

Point intercept vegetation surveys are required twice a year at the provided coordinates in Appendix 6. Sampling protocol outlined in Appendix 7.

Monitoring required?

_X_ YES (See Appendix 7)
___ NO

17. Duration of plan

The plan will be effective upon approval by the DNR.

The plan will remain in effect until: _1 January 2011_____.

18. This plan was prepared by:

_Joel Stiras_____ Minnesota Department of Natural Resources
[Name - print]

_Wendy Crowell_____ Minnesota Department of Natural Resources
[Name - print]

_____ Minnesota Department of Natural Resources
[Name - print]

Working in cooperation with:

_Kenzie Phelps_____ _Briggs Lake Chain Association_____
[Name - print] [Organization]

_Charlene Langowski_____ _Briggs Lake Chain Association_____
[Name - print] [Organization]

_Walt Munsterman_____ _Briggs Lake Chain Association_____
[Name - print] [Organization]

19. Signatures of Approval

_____ Minnesota Department of Natural Resources _____
[Signature] Regional Fisheries Manager or designee [Date]

20. Signatures of Agreement

_____ _____ _____
[Signature] [Organization} [Date]

_____ _____ _____
[Signature] [Organization} [Date]

Attachments - Supporting documentation

21. (<u>REQUIRED</u>) A map(s) of the lake on which are marked:

1. Depth contours of the lake,

2. Current distribution and abundance of Eurasian watermilfoil, if it is present
   Range of depths at which the milfoil is matted, and
   Maximum depth of growth of milfoil.

3. Current distribution and abundance of native submersed aquatic plants,

   For native submersed aquatic plants, the results of the inspection must include a description of the dominant species, relative abundance, and maximum depth. This information may indicate where invasive submersed plants might become abundant in the future.

4. Current distribution and abundance of curly-leaf pondweed, if it is present,
   Range of depths at which the curly-leaf is matted, and
   Maximum depth of growth of curly-leaf

5. Current distribution and abundance of waterlilies,
   [Avoid damaging them if treat nearby milfoil with herbicide]

6. Areas where control of plants is proposed or allowed or both

7. Locations of cabins, homes, resorts, camps, restaurants, or other buildings along shore,

8. Locations of public and private water accesses or any other boat ramps, including public or private marinas,

9. Locations of mooring areas for boats,

10. Locations of public swimming beaches, and

11. Locations of any other activities or uses that might be affected by aquatic plants that interfere with use.

(<u>OPTIONAL</u> items on map): Check with DNR to see if any of these items are required

Assessment of use – Identify these areas and mark them on the map

Areas of intense use
   Navigational channels used by many boaters, maximum levels of traffic; near-shore areas adjacent to public water accesses or public swimming beaches, commercial boat marinas, etc

Areas of moderate use
   Moderate to low speed boating, intermediate levels of traffic

Areas of low use

Nearshore areas (< 150 feet lakeward) adjacent to privately owned lakeshore where owners swim or boat out to deep waters

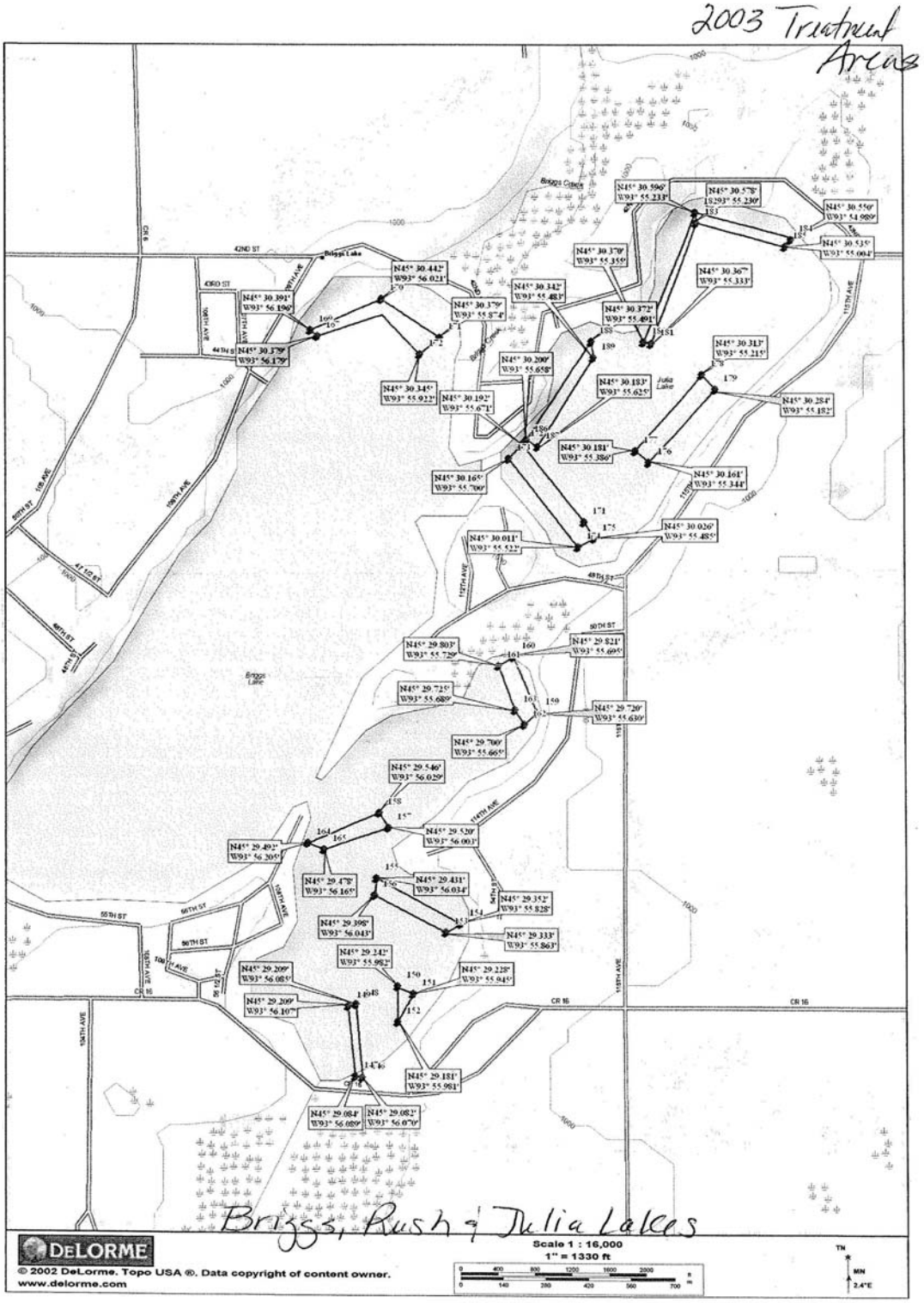
Areas for resource-based use

Nature-watching, fishing, hunting, trapping, etc

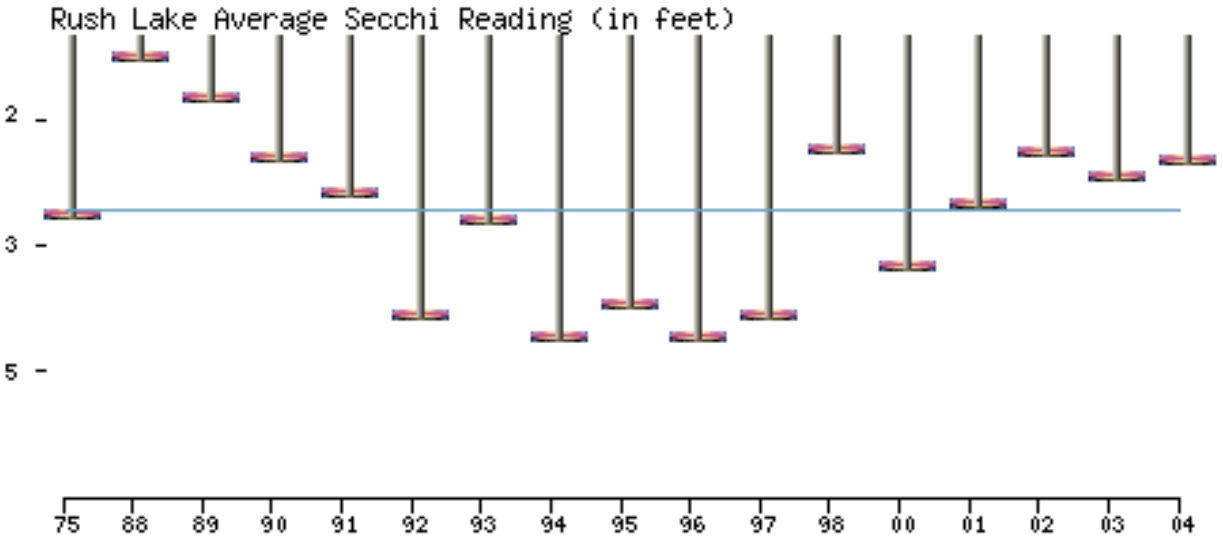
Estimated size in acres or hectares of areas with target species proposed for control.

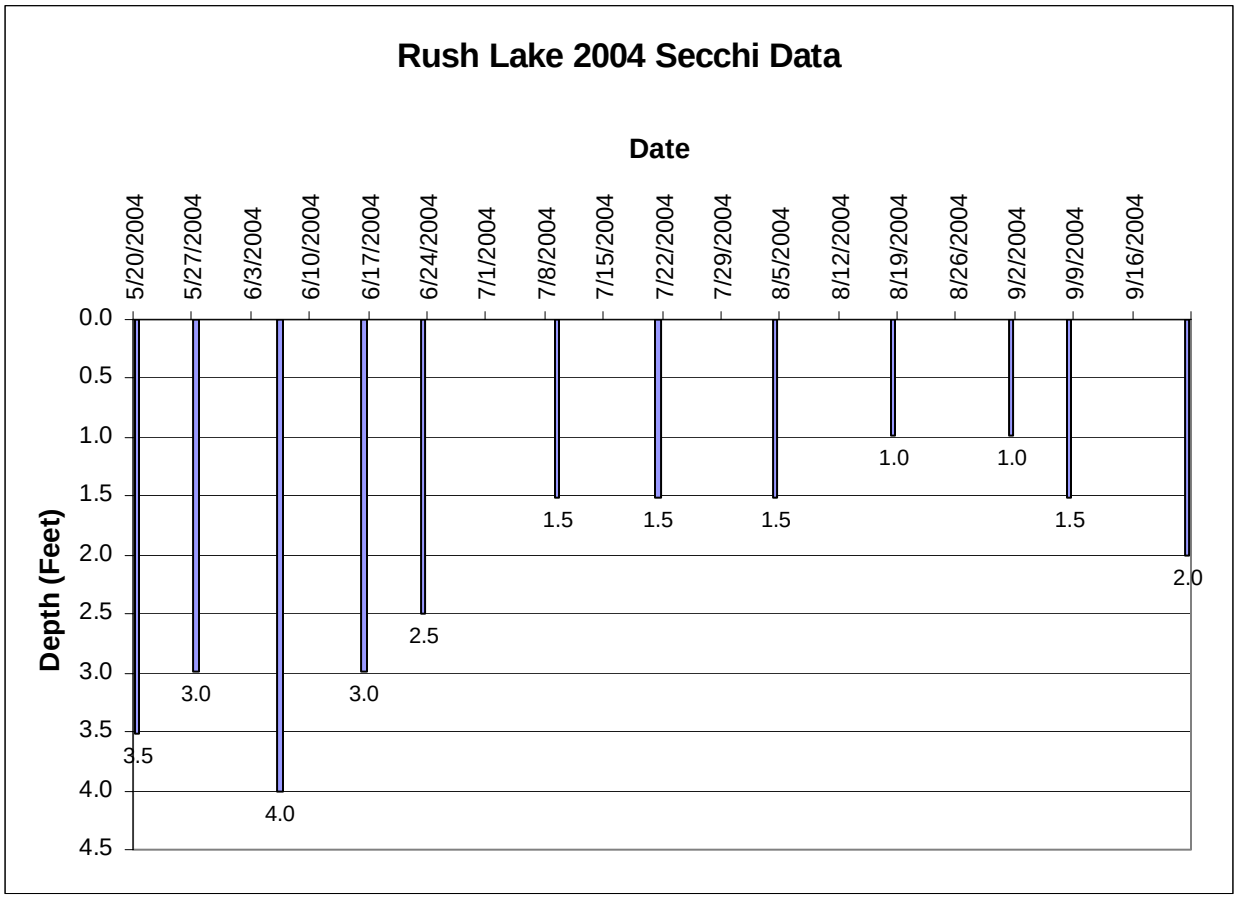
For areas with target species where control might be proposed, estimated size in acres or hectares of areas in near-shore areas, i.e., within 150 feet of privately owned shoreline and also off-shore areas, i.e., more than 150 feet lakeward of privately owned shoreline. or adjacent to publicly owned shoreline, e.g., a Public Water Accesses or public swimming beach.

21. Briggs, Rush, and Julia lakes, Sherburne County (DOW Numbers 71014600, 71014700, and 71014500). Areas treated with herbicide to control curly-leaf pondweed, 2003.

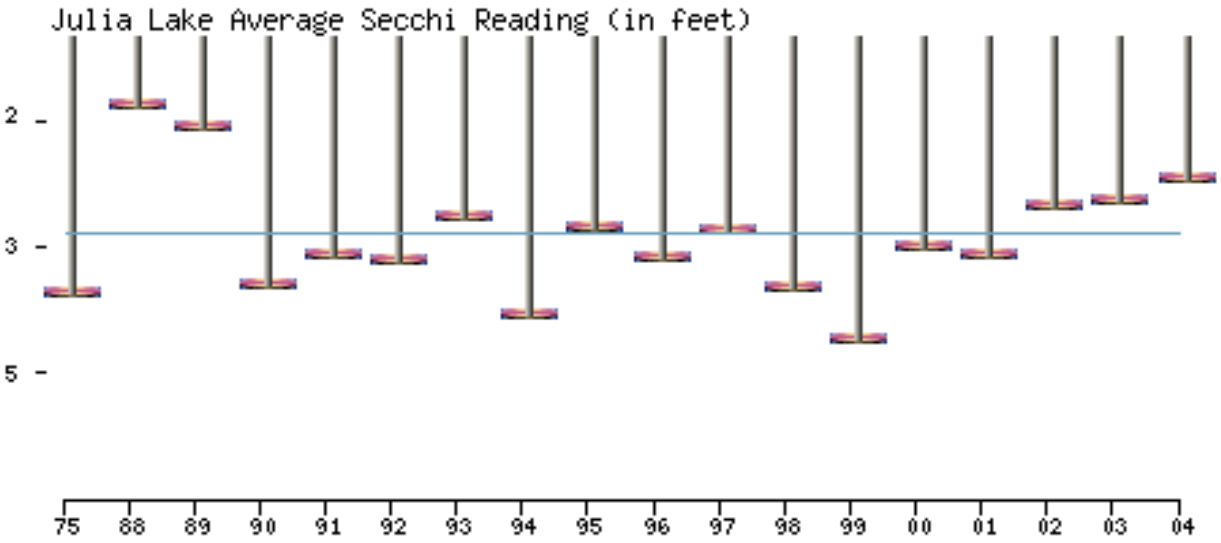


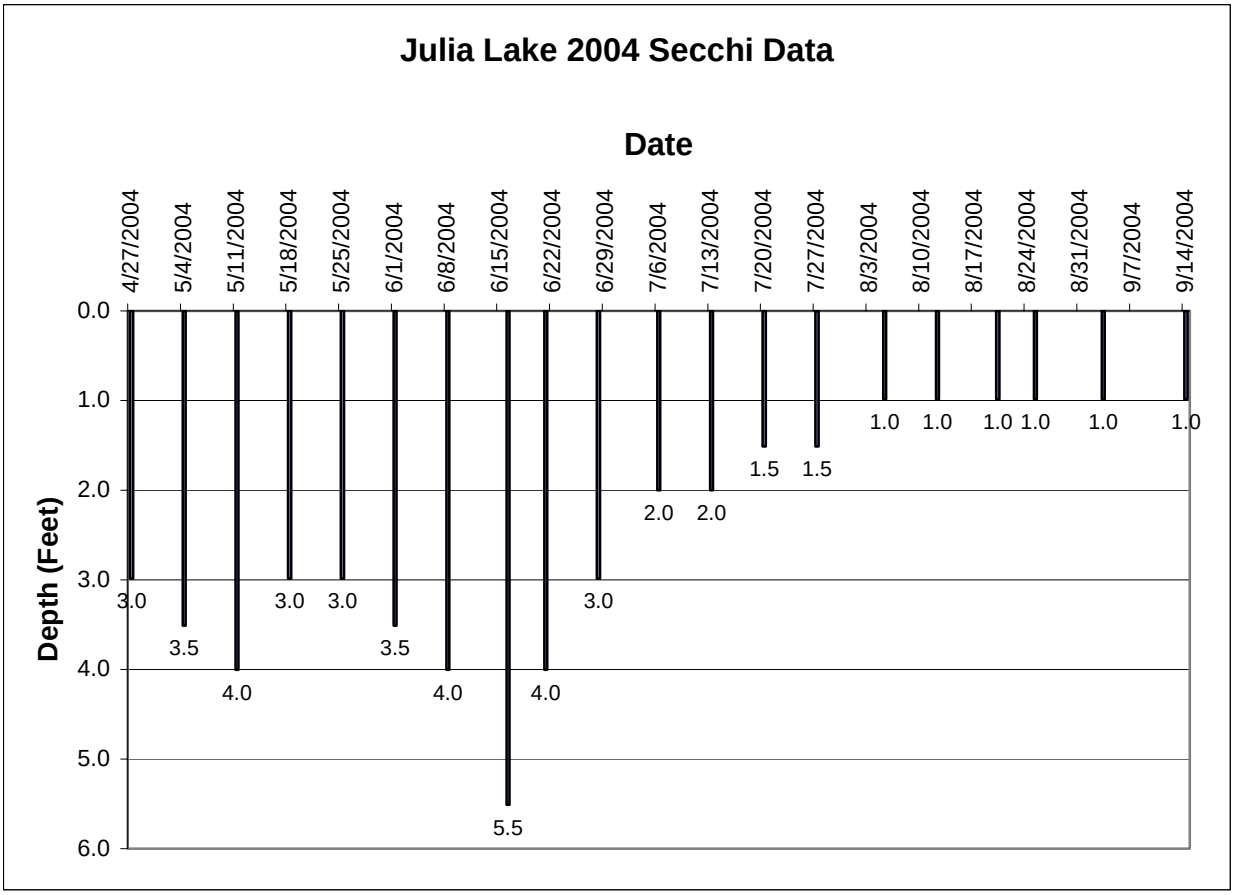
Appendix 1. Average secchi depth for Rush and Julia lakes.





Appendix 1. Average secchi depth for Rush and Julia lakes (continued).





Appendix 2. Aquatic Plants of Julia (71014500) and Rush (71014700) Lakes (Sherburne County). July 21 and 24, 2003.

Frequency = percent of sites in which species occurred
p = present in lake but not in sample sites

			Julia samples	Rush samples
Life Form	**Common Name**	**Scientific Name**	**Frequency**	
SUBMERGED-ANCHORED These plants grow primarily under the water surface. Upper leaves may float near the surface and flowers may extend above the surface. Plants are often rooted or anchored to the lake bottom.	Coontail	*Ceratophyllum demersum*	8	3
	Muskgrass	*Chara sp.*	18	3
	Canada waterweed	*Elodea canadensis*	0	2
	Bushy pondweed	*Najas flexilis*	8	2
	Curly-leaf pondweed	*Potamogeton crispus*	1	1
	Narrowleaf pondweed	*Potamogeton sp.*	1	0
	Sago pondweed	*Stuckenia pectinata*	1	p
	Wild celery	*Vallisneria americana*	p	0
	Horned pondweed	*Zannichellia palustris*	1	0
FLOATING These plants are rooted in the lake bottom and have leaves that float on the water surface. Many have colorful flowers that extend above the water	White waterlily	*Nymphaea odorata*	1	1
Total number of species located during survey			9	7

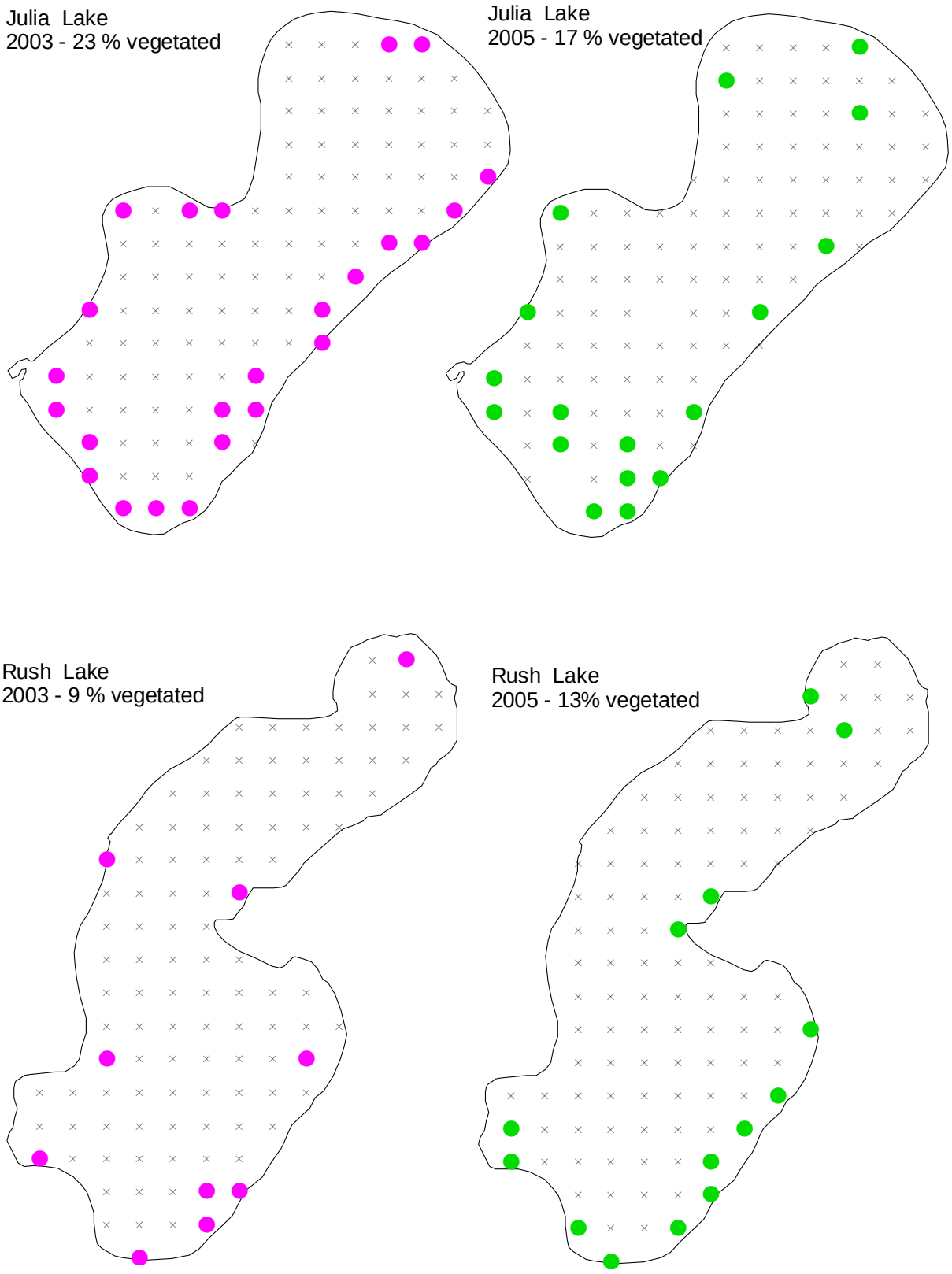
V = voucher specimen collected
Highlite = non-native species

Appendix 2 (continued). Vegetation sampled in Julia and Rush lakes in 2003 and 2005

	Julia		Rush	
	July 2003	Aug 2005	July 2003	Aug 2005
Percent of sites with vegetation	23	17	9	13
Percent occurrence of individual species				
Coontail	8	6	3	2
Chara	18	4	3	2
Canada waterweed	0	7	2	2
Bushy pondweed	8	9	2	9
Curly-leaf pondweed	1	0	1	0
Narrowleaf pondweed	1	0	0	0
Sago pondweed	1	0	<1	0
Wild celery	<1	0	0	0
Horned pondweed	1	0	0	0
Water stargrass	0	0	0	1
White waterlily	1	0	1	<1

Draft 3 Oct 2005 D. Perleberg, MnDNR Ecological Services

Appendix 2 (continued). Vegetation sampled in Julia and Rush lakes in 2003 and 2005



Appendix 2 (continued). Early season vegetation samples in Julia and Rush lakes in 2004 and 2005.

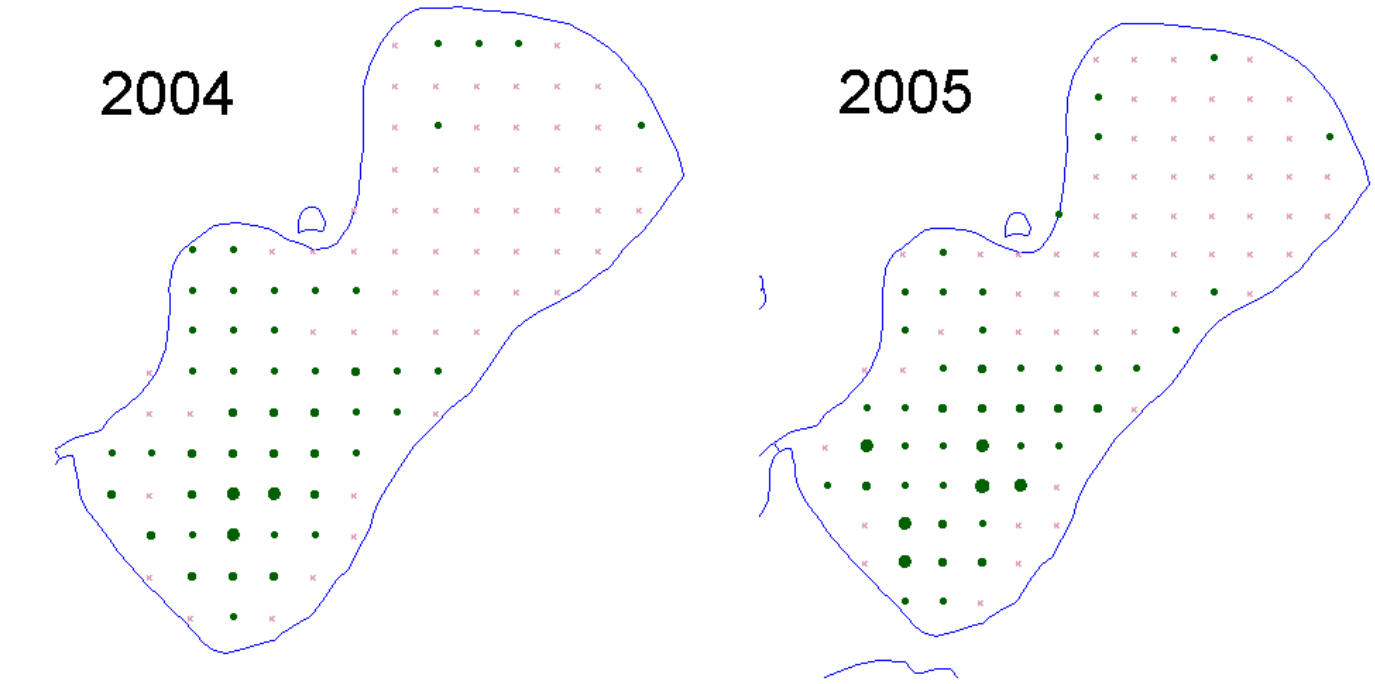
Wendy Crowell October 5, 2005
Julia and Rush lakes in Sherburne County

	Julia		**Rush**	
	May 2004	May 2005	May 2004	May 2005
Percent of sites with vegetation	61%	60%	80%	62%
Percent occurrence of individual species				
Coontail	7%	7%	3%	4%
Chara	13%	15%	1%	7%
Canada waterweed	0%	4%	0%	2%
Curly-leaf pondweed	45%	43%	78%	49%
Narrowleaf pondweed	0%	0%	1%	1%
Horned pondweed	3%	1%	1%	5%
Water stargrass	1%	0%	0%	1%
White waterlily	0%	0%	3%	1%

Appendix 2 (continued). Early season vegetation samples in Julia Lake in 2004 and 2005.

Julia Lake, Sherburne County
Curly-leaf Pondweed Abundance and Distribution
2004 & 2005

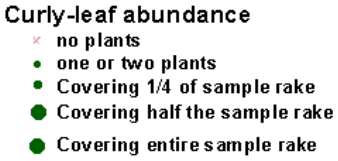
Map: Wendy Crowell, October 4, 2005
Field Work: Wendy Crowell, Christine Powell, May 4, 2005
Wendy Crowell, Nick Proulx, May 6 , 2004

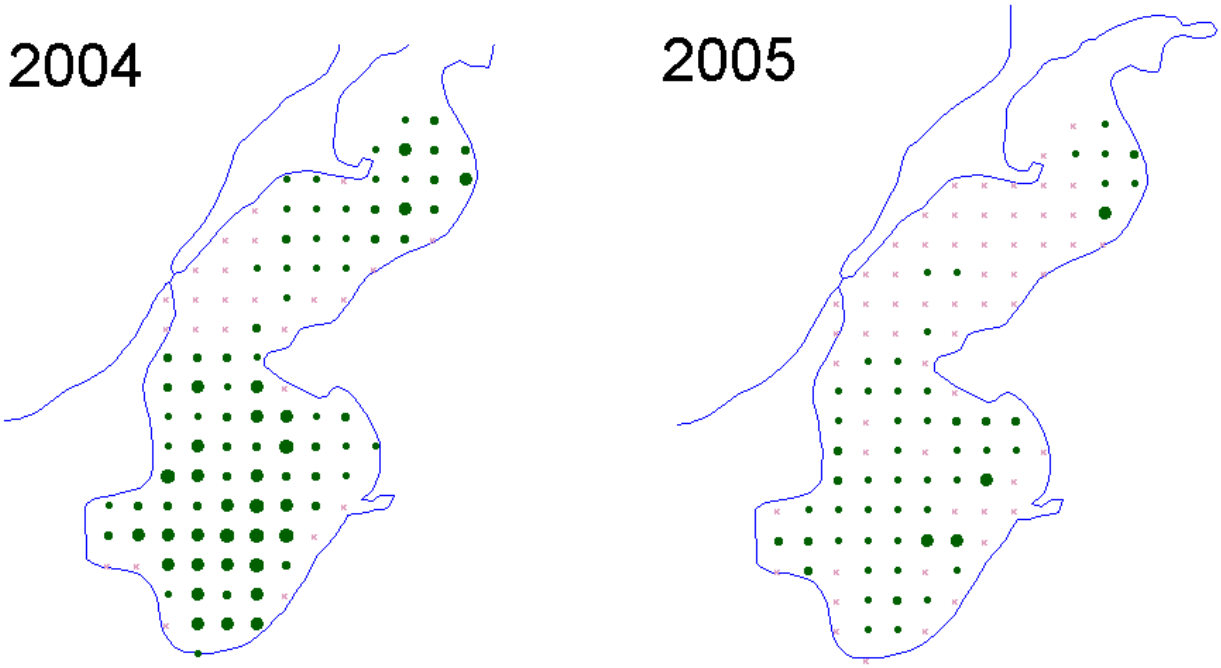


Appendix 2 (continued). Early season vegetation samples in Rush Lake in 2004 and 2005.

Rush Lake, Sherburne County
Curly-leaf Pondweed Abundance and Distribution
2004 & 2005

Map: Wendy Crowell, October 4, 2005
Field Work: Wendy Crowell, Christine Powell, May 4, 2005
Wendy Crowell, Dan Swanson, May 4, 2004





Appendix 2 (continued). Historical vegetation documented in Rush and Julia lakes.

Vegetation found in lake surveys in Rush and Julia lakes, surveyed by Montrose Area Fisheries Office

Rush		Julia			
1982	1993	1982	1993	**Common Name**	**Scientific Name**
		x		Water Plantain	*Alisma triviale*
	x			Sedge	*Carex spp.*
	x	x	x	Coontail	*Ceratophyllum demersum*
	x		x	Muskgrass	*Chara vulgaris*
	x	x	x	Canada Waterweed	*Elodea canadensis*
	x		x	Blue Flag	*Iris versicolor*
	x	x		Lesser Duckweed	*Lemna minor*
		x		Northern Watermilfoil	*Myriophyllum sibiricum*
			x	Bushy Pondweed	*Najas flexilis*
x				Yellow Waterlily	*Nuphar luteum*
		x		Little Yellow Waterlily	*Nuphar microphyllum*
	x			Little White Waterlily	*Nymphaea tetragona*
x	x	x		White Waterlily	*Nymphaea tuberosa*
	x		x	Reed Canary Grass	*Phalaris arundinacea*
x	x	x	x	Curlyleaf Pondweed	*Potamogeton crispus*
			x	Narrowleaf pondweed	*Potamogeton spp.*
	x		x	Flat Stem Pondweed	*Potamogeton zosterformis*
		x		White Water Buttercup	*Ranunculus spp.*
x	x			Arrowhead	*Sagittaria spp.*
	x			River Bulrush	*Scirpus fluviatilis*
	x			Bulrush	*Scirpus spp.*
	x	x		Sago Pondweed	*Stuckenia pectinatus*
x	x			Common Cattail	*Typha latifolia*

Highlite = non-native species

Appendix 3. Considerations When Doing Early – Season Treatments for Curly-leaf Pondweed.

1. Treat when water temperature is between 50 and 60 F. If the water temperature is heading up, then 50 degrees is a good time to treat. If it is 50 and may go down to 45 F then hold off. **This is crucial** to successfully stopping turion production for the summer and to minimize harm to native plants. If done correctly curly-leaf can be killed before native plants emerge, leaving an opening for the natives to take advantage of. If treatments are done later in the spring more natives will be injured, and there is a greater chance that curly-leaf will re-grow and produce turions. Water temperature should be measured at approximately 2- 3 feet depth.
2. Use 1.0 – 1.5 ppm endothall. Use the higher rate when the site is small (one acre or less) or exposed or when there is a desire to reduce nuisance levels of coontail along with the curly-leaf treatment. Generally, try to use a lower rate to minimize damage to non-target plants.
3. Map out nuisance curly-leaf beds in June the year before treatment, so that the treatment can be planned ahead.
4. Before treatment in late April survey the proposed treatment area to determine if the areas do have curly-leaf growth because occasionally areas which have dense curly-leaf one summer will have sparse curly-leaf the following year. Because this is not a frequent occurrence, basing a treatment plan on previous year's survey is worthwhile.
    a. Treatment of the whole curly-leaf population may be considered if
        i. There are some other plants which could fill in after curly-leaf in the summer of treatment **and**
        ii. There is some reason to believe native plants would become established in the lake if curly-leaf was removed.
    b. Treatment of a part of the entire population may be considered if
        i. Curly-leaf appears to be helping improve water clarity in the spring, and is virtually the only plant in the lake **or**
        ii. There are insufficient funds to treat the entire population of curly-leaf **or**
        iii. The whole curly-leaf population is not causing nuisance conditions.
5. Retreat the same areas the following spring for at least 2 years in a row.
6. Monitor the treated area to determine if native plants are re-establishing in the areas

Appendix 4. Restoration Sites.

Briggs Lake Chain Associations
Lake Restoration Projects

Our lake restoration projects have been an on going item for many years around the lakes, many of them are in the planning and design stages, some are being worked on right now, and some are all completed and doing well. Some property owners are still working on their grant applications and some are waiting to hear back to see if they will be receiving a grant to help them with their project. They have all been done under the helpful and watchful eye of our lake restoration committee chairperson which is Barb Tucker. This committee has over seen all of these projects listed below. They have had signs made up to mark each site as to let people know that these homeowners have worked on their shoreline to restore it and preserve it naturally and have done or are doing a lake restoration project. Mark Basiletti from the Sherburne County Soil and Water District has also worked with the association to help educate us, and to show us how to restore the lake shore to help preserve the quality of the water. He has held numerous workshops for us and has been at almost all of these sites to help with the planning and planting. Our committee hopes in 2006 and the coming years to add more sites to the lake restoration projects list. A map of the three lakes is enclosed with the sites numbered and the name and address of the property owner listed and where they are in the process of their lake restoration project.

Lake Julia

Site J-1

Kenzie and MaryAnn Phelps---4480 115th Ave.--Clear Lake, MN 55319
Completed lake restoration project summer of 2005. Mark Basiletti was the consultant on the project. Plants were planted on the shoreline and in the water. The Phelps did receive a grant to help out with the project which was coordinated with the Soil and Water District office.

Site J-2

Roger and Barb Johnson---4560 115th Ave.--Clear Lake, MN 55319
Attended lake restoration classes in 2005 to start their project. They are in the design stage. They applied for a grant to help with their lake restoration project. They have started some plantings and hope to finish in 2006.

Site J-3

Randy and Pat Peterson---11791 42nd Street--Clear Lake, MN 55319
100 feet of shoreline now in a natural state planting was done years ago but new plants will be going in the summer of 2006 to update and upgrade the look. Randy has attended classes on lake restoration.

Appendix 4. Restoration Sites (continued).

Site J-4

MaryJo and Chuck Stanger---11661 42nd Street--Clear Lake, MN 55319
Small native plant area on shoreline.

Site J -5

Bob and Kathy Sass---11281 42nd Street--Clear Lake, MN 55319
The whole shore line was completed in 2004 with native plants in the water and on the shoreline. It has become a excellent example of a natural restored shore line.

Rush Lake

Site R-1

Doug and Susie Brown---5000 114th Ave.--Clear Lake, MN 55319
Attended all the shoreline restoration classes in 2005. Applied for and received a grant. In 2005 started planting native plants on the shoreline. 450 ft of the shoreline is left and will be left natural. Project still in the early stages. Design is started. They are working with Mark Basiletti from the Sherburne County Soil and Water District to be used as a site to hold a planting class at in 2006. More native plants will be planted in 2006 to the buffer area and in the water and on shore.

Site R-2

Terry and Jan Polsfuss---5314 114th Ave.--Clear Lake, MN 55319
Rain Garden established 2005 -- Lake side of house

Site R-3

Walt and Adele Musterman---5453 114th Ave.--Clear Lake, MN 55319
100 ft Shoreline left natural--Planting started in 2004--Mark Basiletti also working with Walt on the design and planting. Additional planting set for 2006.

Appendix 4. Restoration Sites (continued).

Site R-4

Stan and Wanda Herkenhoff---10898 55th Street--Clear Lake, MN 55319
Attended the classes on Lake Restoration to assess what to do to enhance their shoreline. Working with Mark Basilette on the design and also trying to get a grant to help with the plantings.

Site R-5

Carolyn Carringer---5430 114th Ave.--Clear Lake, MN 55319
Applied for a grant in 2004 -- did not receive one--reapplying for a new grant in 2006. Left planted some native plants along her shoreline--letting whole shoreline go natural.

Briggs Lake

Site B-1

Briggs Creek Restoration project done by the Soil and Water Conservation group headed by Mark Basiletti . To prevent erosion all along the creek going from 42nd Street to Briggs Lake.

Site B-2

Tom and Marilyn Koontz---4397 109th Ave.--Clear Lake, MN 55319
Completed Lake Restoration project summer of 2005. Received grant and help from Mark Basiletti from Soil and Water Conservation group. Native plants in water and on shore line.

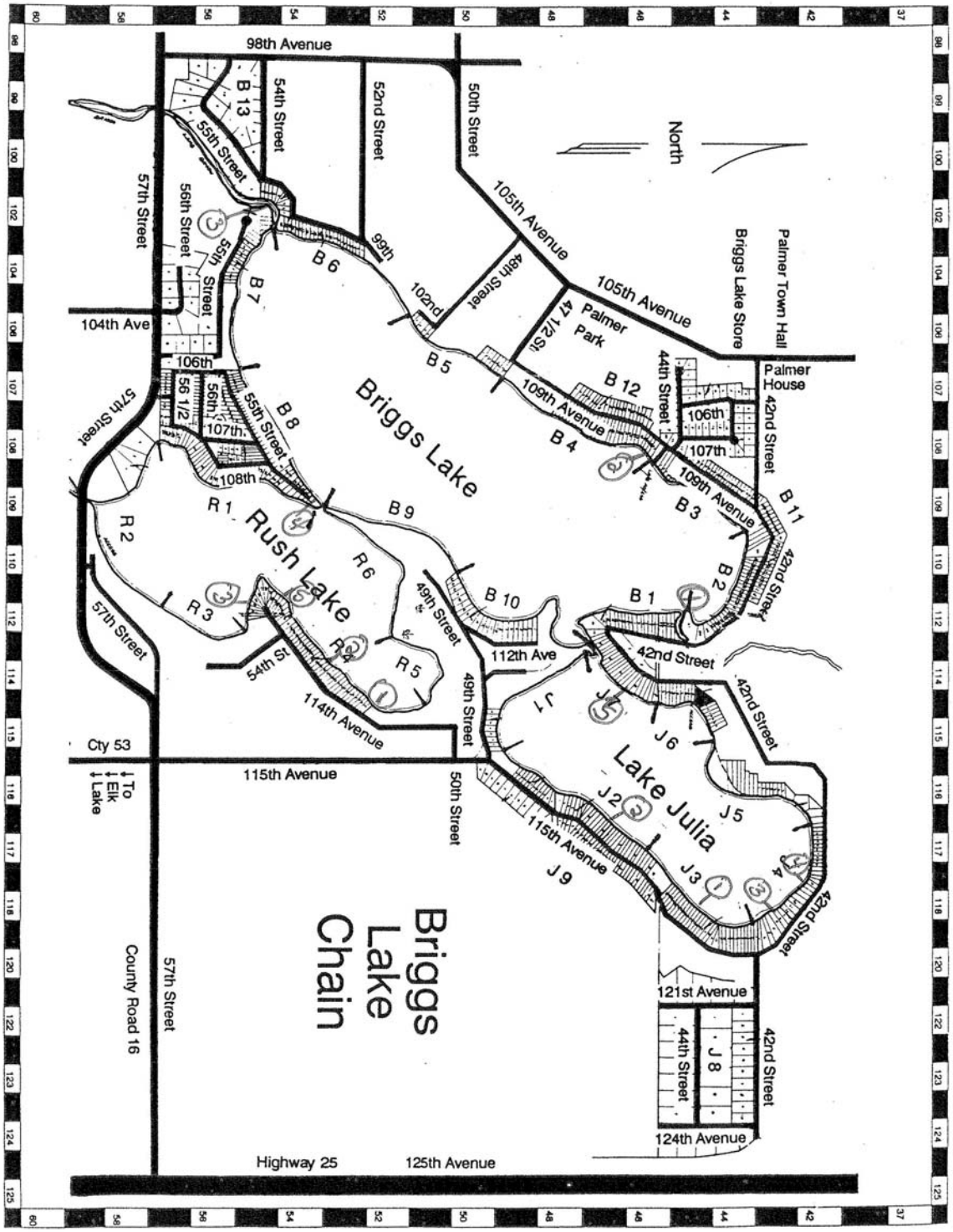
Site B-3

Cam & Kim Mattson---9829 55th Street--Clear Lake, MN 55319
On Briggs Bayou-- Whole shoreline planted with native grasses and plants.

Elk Lake

Elk Lake has additional sites that have been planted and design and planned out. Grants have been received and they all have worked with Mark Basiletti. 2 shorelines are completed--1 in process and one rain garden has been put in.

Appendix 4. Restoration Sites (continued).



Appendix 5. History of control permits issued for Rush and Julia lakes.

Rush

Year	Type of Control	Total Acres	Lakeward Dist. In Ft.	
1988	Lake wide Plankton Algae	142		
1989	Lake wide Plankton Algae	142		
1990	Lake wide Plankton Algae	142		
1991	Mech.&Chem-SV	10.6	100	
1992	Mechanical-SV	41.3	400	
1992	Chemical-SV	1.1	100	
1993	Mechanical-CLP only	41.3	400	
1993	Chemical-SV	?	?	
1994	Mechanical-SV	41.3	400	
1994	Chemical-SV	2.6	150	
1995	Mechanical-CLP only	41.3	400	
1995	Chemical-SV	4	150	
1996	Mechanical-CLP only	54.8	382	
1996	Chemical-SV	4.3	136	
1997	Mechanical-CLP only	54.8	382	
1997	Chemical-CLP only	6.9	136	
1998	Mechanical-CLP only	54.8	382	
1998	Chemical-CLPonly	4.2	136	
1999	Mechanical-CLP only	54.8	382	
1999	Chemical_CLP only	11.6	150	
2000	Chemical-offshore(clp only)&individ.*	32 & 10	125	Exceeded 15% no vari. on record
2001	Chemical-offshore (clp only)&individ.*	32 & 4.8	125	Exceeded 15% no vari. on record
2002	Chemical-offshore (clp only)&individ.*	32 & 3.3	125	Variance granted to exceed 15%
2003	Chemical-offshore (clp only)&individ.*	32 & 2.3	125	Variance granted to exceed 15%
2004	Chemical-offshore (clp only)&individ.*	32 & 3.2	125	Variance granted to exceed 15%
2005	Chemical-offshore (clp only)&individ.*	32 & 2	125	Variance granted to exceed 15%

Julia

Year	Type of Control	Total Acres	Lakeward Dist. In Ft.
1988	Lakewide Plankton Agae		
1989	Lakewide Plankton Agae		
1990	Lakewide Plankton Agae		
1991	Mech.&Chem-SV	7.7	100
1992	Mechanical-SV	30.3	400
1992	Chemical-SV	1.9	100
1993	Mechanical-CLP only	30.3	400
1993	Chemical-CLP only	2.9	?
1994	Mechanical-CLP only	30.3	400

1994	Chemical-SV	7	150	
1995	Mechanical-CLP only	30.3	400	
1995	Chemical-SV	7.7	150	
1996	Mechanical-CLP only	30.3	289	
1996	Chemical-SV(CLP)	8.1	127	
1997	Mechanical-CLP only	30.1	289	
1997	Chemical-CLP only	8.7	127	
1998	Mechanical-CLP only	30.1	289	
1998	Chemical-CLPonly	6.5	127	
1999	Mechanical-CLP only	30.1	289	
1999	Chemical_CLP only	19	150	
2000	Chemical-offshore(clp only)&individ.*****	32 & 9.2	125	Exceeded 15% no vari. on record
2001	Chemical-offshore (clp only)&individ.*****	32 & 7.3	125	Exceeded 15% no vari. on record
2002	Chemical-offshore (clp only)&individ.*****	32 & 7.4	125	variance granted to exceed 15%
2003	Chemical-offshore (clp only)&individ.*****	32 & 4.8	125	variance granted to exceed 15%
2004	Chemical-offshore (clp only)&individ.*****	32 & 5.9	125	variance granted to exceed 15%
2005	Chemical-offshore (clp only)&individ.*****	32 & 6.6	125	variance granted to exceed 15%

***** Since 2000 the treatment at individual properties switched from up to 2 treatments for CLP only to up to 2 treatments for Submerged Vegetation (SV). Not sure why this happened (possibly an error on DNR's part or not) since the water clarity on these lakes is so poor and native plants are scarce. I would think in most cases natives are not at nuisance levels and it would be hard to justify a 2nd treatment for them. It also should be noted that prior to 1996 chemical control at individual properties was for up to 2 treatments for SV. For some reason it was switched to just CLP from 1996 to 1999 and then back to just SV beginning in 2000. Since water quality is so poor and natives are sparse, it would make sense to review all requests for native plant control in the future even if they have been permitted to control natives in the past.

Appendix 6. Point intercept survey coordinates (UTM, NAD 83, Zone 15) and map.

Julia Lake (71014500)

NAME	XCOORD	YCOORD
1	427507	5039238
2	427507	5039163
3	427582	5039388
4	427582	5039313
5	427582	5039238
6	427582	5039163
7	427582	5039088
8	427582	5039013
9	427657	5039613
10	427657	5039538
11	427657	5039463
12	427657	5039388
13	427657	5039313
14	427657	5039238
15	427657	5039163
16	427657	5039088
17	427657	5039013
18	427657	5038938
19	427732	5039613
20	427732	5039538
21	427732	5039463
22	427732	5039388
23	427732	5039313
24	427732	5039238
25	427732	5039163
26	427732	5039088
27	427732	5039013
28	427732	5038938
29	427807	5039613
30	427807	5039538
31	427807	5039463
32	427807	5039388
33	427807	5039313
34	427807	5039238
35	427807	5039163
36	427807	5039088
37	427807	5039013
38	427807	5038938
39	427882	5039613
40	427882	5039538
41	427882	5039463
42	427882	5039388
43	427882	5039313
44	427882	5039238

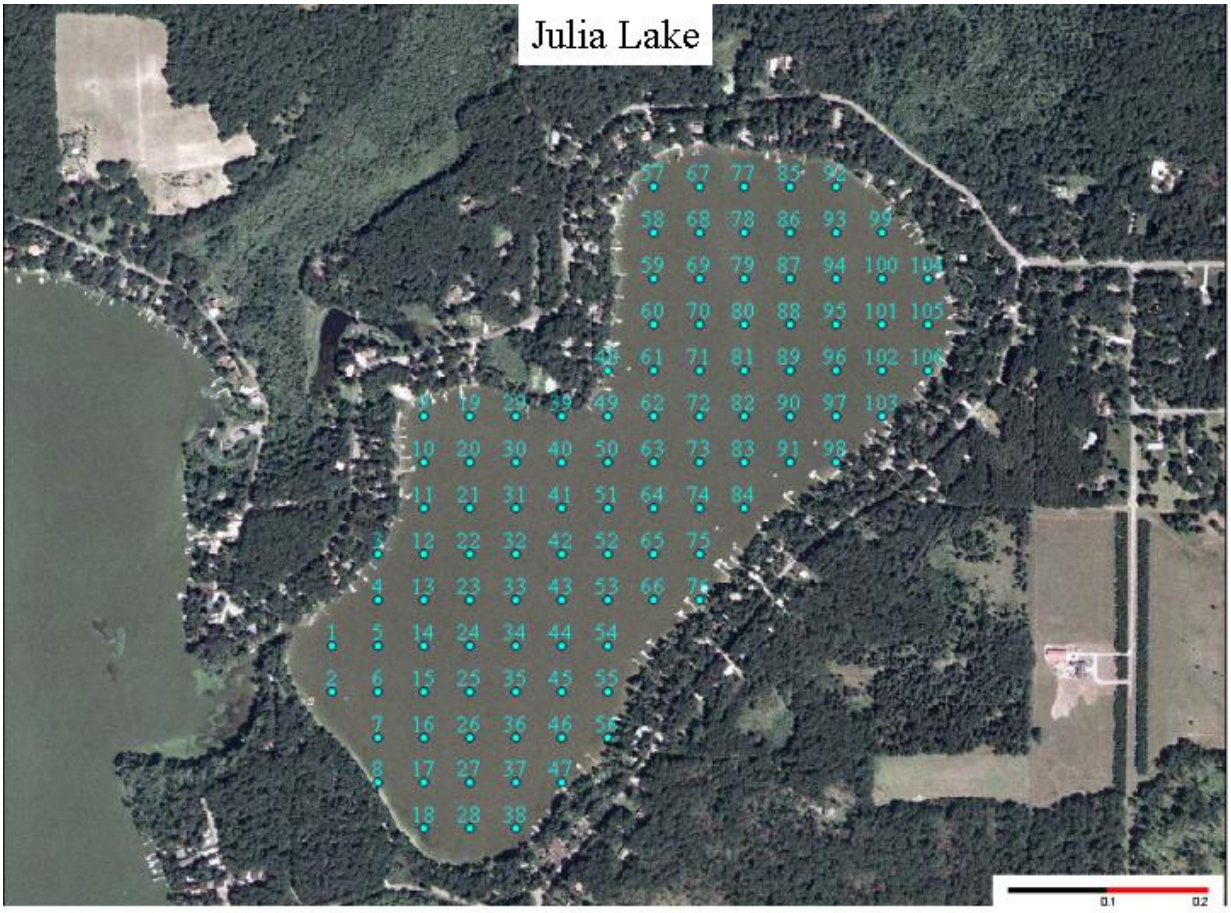
Rush Lake (71014700)

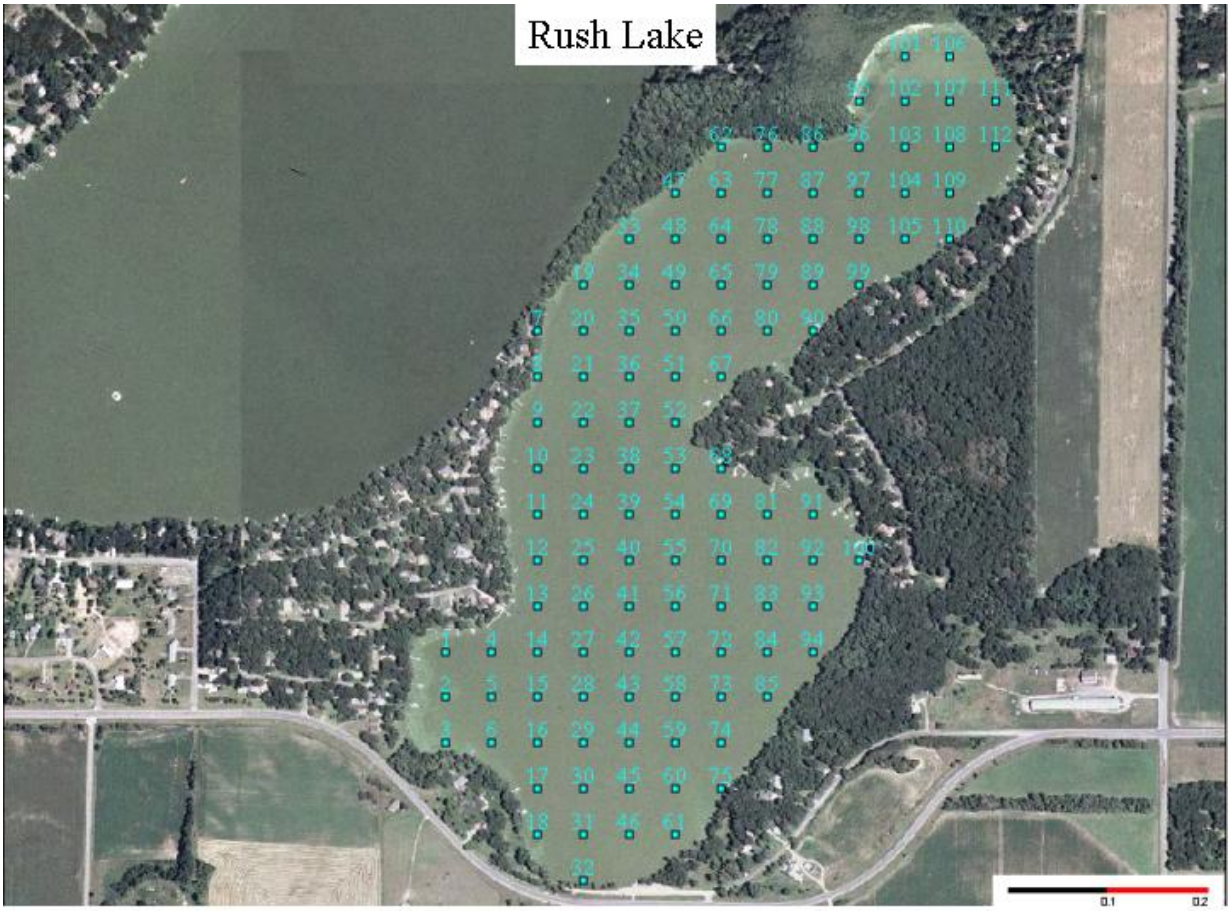
NAME	XCOORD	YCOORD
1	426655	5037575
2	426655	5037500
3	426655	5037426
4	426730	5037575
5	426730	5037500
6	426730	5037426
7	426805	5038100
8	426805	5038025
9	426805	5037950
10	426805	5037875
11	426805	5037800
12	426805	5037725
13	426805	5037650
14	426805	5037575
15	426805	5037500
16	426805	5037426
17	426805	5037351
18	426805	5037276
19	426880	5038175
20	426880	5038100
21	426880	5038025
22	426880	5037950
23	426880	5037875
24	426880	5037800
25	426880	5037725
26	426880	5037650
27	426880	5037575
28	426880	5037500
29	426880	5037426
30	426880	5037351
31	426880	5037276
32	426880	5037201
33	426955	5038250
34	426955	5038175
35	426955	5038100
36	426955	5038025
37	426955	5037950
38	426955	5037875
39	426955	5037800
40	426955	5037725
41	426955	5037650
42	426955	5037575
43	426955	5037500
44	426955	5037426

45	427882	5039163	45	426955	5037351
46	427882	5039088	46	426955	5037276
47	427882	5039013	47	427030	5038325
48	427957	5039688	48	427030	5038250
49	427957	5039613	49	427030	5038175
50	427957	5039538	50	427030	5038100
51	427957	5039463	51	427030	5038025
52	427957	5039388	52	427030	5037950
53	427957	5039313	53	427030	5037875
54	427957	5039238	54	427030	5037800
55	427957	5039163	55	427030	5037725
56	427957	5039088	56	427030	5037650
57	428032	5039987	57	427030	5037575
58	428032	5039912	58	427030	5037500
59	428032	5039838	59	427030	5037426
60	428032	5039763	60	427030	5037351
61	428032	5039688	61	427030	5037276
62	428032	5039613	62	427105	5038400
63	428032	5039538	63	427105	5038325
64	428032	5039463	64	427105	5038250
65	428032	5039388	65	427105	5038175
66	428032	5039313	66	427105	5038100
67	428107	5039987	67	427105	5038025
68	428107	5039912	68	427105	5037875
69	428107	5039838	69	427105	5037800
70	428107	5039763	70	427105	5037725
71	428107	5039688	71	427105	5037650
72	428107	5039613	72	427105	5037575
73	428107	5039538	73	427105	5037500
74	428107	5039463	74	427105	5037426
75	428107	5039388	75	427105	5037351
76	428107	5039313	76	427180	5038400
77	428182	5039987	77	427180	5038325
78	428182	5039912	78	427180	5038250
79	428182	5039838	79	427180	5038175
80	428182	5039763	80	427180	5038100
81	428182	5039688	81	427180	5037800
82	428182	5039613	82	427180	5037725
83	428182	5039538	83	427180	5037650
84	428182	5039463	84	427180	5037575
85	428257	5039987	85	427180	5037500
86	428257	5039912	86	427255	5038400
87	428257	5039838	87	427255	5038325
88	428257	5039763	88	427255	5038250
89	428257	5039688	89	427255	5038175
90	428257	5039613	90	427255	5038100
91	428257	5039538	91	427255	5037800

92	428332	5039987
93	428332	5039912
94	428332	5039838
95	428332	5039763
96	428332	5039688
97	428332	5039613
98	428332	5039538
99	428406	5039912
100	428406	5039838
101	428406	5039763
102	428406	5039688
103	428406	5039613
104	428481	5039838
105	428481	5039763
106	428481	5039688

92	427255	5037725
93	427255	5037650
94	427255	5037575
95	427330	5038475
96	427330	5038400
97	427330	5038325
98	427330	5038250
99	427330	5038175
100	427330	5037725
101	427405	5038550
102	427405	5038475
103	427405	5038400
104	427405	5038325
105	427405	5038250
106	427480	5038550
107	427480	5038475
108	427480	5038400
109	427480	5038325
110	427480	5038250
111	427555	5038475
112	427555	5038400




Rush Lake
0.1
0.2

Appendix 7. Survey Methods and Considerations.

Plant surveys:

1. Frequency: Two surveys shall be done each year. The first should occur approximately one to two weeks before early spring herbicide treatment. The second should occur in mid to late July to correspond to previous surveys. Identify all aquatic plant species found at a systematic set of sample points using visual observations and a grapple made of two metal rake heads tied together on the end of a rope (coordinates supplied in Appendix 5). Boater should arrive at the sampling coordinate and throw the rake about 10 feet from the boat. The rake is then allowed to sink to the bottom before it is retrieved. Plant species should be identified to species if possible, and to genus if not. One voucher specimen of each species found should be collected. Press and mount specimens or mail to Minnesota Department of Natural Resources contact for verification.
    a. Point intercept one throw/ sampling station, minimum of 100 points in the littoral zone (area where plants grow) (Madsen 1999). Points should exceed littoral zone by at least some increment of depth so that there is little question about maximum depth of colonization. Points should be pre-determined using a fixed grid size, and loaded into a GPS unit. Navigate to points using the GPS unit.
    b. Measure depth at each sample point.
    c. An estimate of curly-leaf pondweed abundance at the sample point. Number for curly-leaf pondweed indicates amount of curly-leaf found on the sampling rake. 1 = 1 – 2 plants, 2 = rake ½ covered, 3 = rake ¾ covered, 4 = rake completely covered.

2. Abundance of curly-leaf pondweed or milfoil .
    a. Visually monitor the effects of the aquatic plant control treatment in the summer of treatment, and keep a record of the observations. Record the date, name of observer, and location of observations.

3. Water clarity
    a. Secchi depth measurements shall continue to occur as in previous years according to the Citizen Lake Monitoring Program with the Minnesota Pollution Control Agency.

4. Reporting: Results of monitoring must be provided to the DNR on an annual basis, before February 15th of the following year. Results must include raw tabulated data, summarized data in electronic form, and a written summary and analysis of the data. Raw data must include, in addition to the observed result: the date of observation, name of observer, GPS coordinates of observation, depth of location, and any other comments. All data must include units of measure. For example, is depth measured in feet or in meters? Pressed plant specimens must be available for the DNR to review, but do not necessarily have to be sent to the DNR.

Appendix 7. Survey Methods and Considerations (continued).

Here is an example reporting form for a plant frequency survey. The point number can be written on the data form. When the data is entered into a computer, the GPS coordinates for the point can be listed next to the point number.

Name of observer(s)_____

Date_____ Lake Name _____ County _____

Method: Point intercept survey using a 40-meter grid of GPS points. Plant species observed visually in a one-meter square area, and with a double- headed rake on the end of a rope. Depth measured with an electronic depth finder or depth pole. Number for curly-leaf pondweed indicates amount of curly-leaf found on the sampling rake. 1 = 1 – 2 plants, 2 = rake ½ covered, 3 = rake ¾ covered, 4 = rake completely covered.

	Point number												
Plant species	1	2	3	4	5	6	7	8	9	10	11	12	13
Depth (ft)													
Coontail													
Curly-leaf													
Sago													

Coontail = Ceratophyllum demersum
Curly-leaf = Potamogeton crispus
Sago = Potamogeton pectinatus
When choosing someone to do these types of surveys, consider these key skills needed by anyone who does this work.

1. Ability to identify common and rare aquatic plants to species.
2. Knowledge of design of sampling schemes and statistical analysis.
3. Ability to enter or load the sampling coordinates into a GPS unit for later sampling.
4. Ability to use a boat and GPS to navigate to sampling locations.
5. Ability to identify curly-leaf turions, including large, small, very small, and stick-like.
6. Ability to record data accurately, both on the lake, and in the lab.
7. Ability to report results in a clear and accurate manner. Including summaries of data and raw data.

Key equipment needed by anyone who does this work

1. Boat.
2. Aquatic plant grapple (two rake heads tied together on the end of a rope).
3. Depth finder.

Appendix 7. Survey Methods and Considerations (continued).

4. GPS unit that has options for the same coordinate and datum system that the DNR utilizes (UTM, NAD 83, Zone 15).
5. Secchi disk.
6. Field data sheets.
7. Computer, word processing and spreadsheet software to summarize and tabulate data with the ability to e-mail to the appropriate DNR contact.
8. Plant press (if necessary).

References:

Madsen, J. D. (1999). "Point intercept and line intercept methods for aquatic plant management." *APCRP Technical Notes Collection* (TN APCRP-M1-02). U.S. Army Engineer Research and Development Center, Vicksburg, MS. www.wes.army.mil/el/aqua