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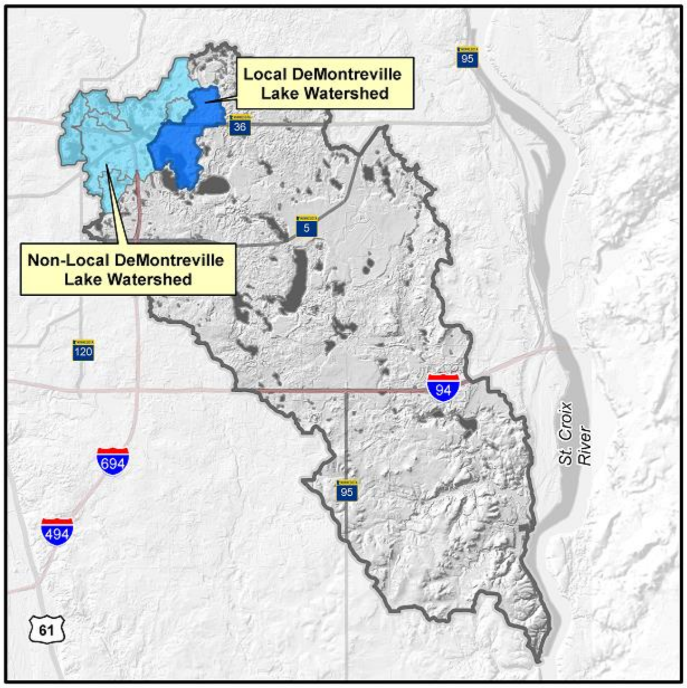
5.7 Lake DeMontreville Watershed Management Plan

5.7.1 General Information



Lake DeMontreville Local Watershed Information	
Tributary Area (acres)	1,108 (local; 4,412 total)
DNR-Designated Basins within Watershed	82-0370W, 82-0373W, 82-0101P
Downstream Watershed	Lake Olson
Lake DeMontreville Information	
DNR Designation	82-0101P
Surface Area (acres)	159.8 at El. 927.4
Approximate Mean Depth (feet)	8
Approximate Maximum Depth (feet)	24
Approximate Volume Below Discharge Elevation (acre-feet)	1,137
Discharge Elevation	928.35
Outlet Type	Stop-log Weir at Lake Olson
MDNR Ordinary High Water Level (OHW)[1]	929.3
100-Year Flood Level	931.5
VBWD "Allowable Fill" (cubic yards/lineal foot of shoreline) (See Section 4.7.)	1.7
VBWD Water Quality Priority Category	High

[1] Elevations in NGVD29 datum

Lake DeMontreville is located in the northwest corner of the City of Lake Elmo. Lake DeMontreville is about 160 acres in area and has a maximum depth of approximately 24 feet.

The local Lake DeMontreville watershed is about 1,108 acres and includes portions of the Cities of Grant, Pine Springs, and Lake Elmo. Because Long Lake (see Section 5.5) and Capaul's Pond (see Section 5.6) discharge into Lake DeMontreville, the total Lake DeMontreville watershed is about 4,412 acres. Therefore, in addition to the cities already listed, the lake receives drainage from portions of White Bear Lake, Maplewood, North St. Paul, Oakdale, and Mahtomedi. Figure 5.7-1 shows the local Lake DeMontreville watershed.

The Metropolitan Council considers Lake DeMontreville a "priority lake" because of its multiple recreational uses and public access. People heavily use Lake DeMontreville for a wide variety of recreational activities. These uses include swimming, fishing, powerboating, waterskiing, canoeing, sailing, and other activities.

A public access and boat launch with parking was constructed in 1983 on the northwest shore of Lake DeMontreville, off DeMontreville Trail (County Road 13). Since Lake DeMontreville and Lake Olson are joined by a channel, the boat launch also provides public access to Lake Olson. The number of individuals accessing the lake is limited by the 17 parking spaces at the public access. However, residents report that more than 17 vehicles park at the public access. Fishing from the shore near the access is also popular. In 2002, the MDNR improved the public access with financial assistance from the VBWD.

According to available Minnesota Department of Natural Resources' (MDNR) creel surveys, fishing intensity has slightly decreased, while boating intensity has increased, over the last 25 years. The MDNR creel surveys of Lake DeMontreville determined summer fishing intensity to be 105 hours/acre in 1980, 78 hours/acre in 1991, and 97 hours in 1999. The 1980 value was over two times the Metro Region median. . Winter fishing intensity was 43.5 hours/acre in 1999. Recreational boating intensity increased 67 percent from 12.4 hours per acre in 1980 to 20.6 hours per acre in 1991. Recreational boating intensity was not assessed in the 1999 creel survey.

Although the lake does not have a public swimming beach, the lake is heavily used for swimming. Residents maintain private swimming beaches, which receive heavy usage during the summer months, and organized swimming lessons have been offered at the lake in the past.

Area parks and trails further increase public use of the lake. DeMontreville Park is located northeast of the lake on Highlands Trail North. The park contains ball fields and soccer fields, in addition to space for passive recreational activities. Also located near the lake is the DeMontreville Wildlife Area. This is a wildlife park with trails to enable people to enjoy the natural surroundings and view the wildlife. The MDNR's Gateway Trail passes between Long Lake and Lake DeMontreville, about a quarter mile from the northwest edge of Lake DeMontreville.

The local and total watershed of Lake DeMontreville covers portions of several communities. The local Lake DeMontreville watershed within the City of Grant currently includes agricultural, undeveloped, or very low density residential housing land uses. This area contains many wetlands. The Grant land use plan calls for the area to be developed into rural or large-lot residential housing. Land use in areas of the Cities of Pine Springs and Lake Elmo draining to Lake DeMontreville is primarily residential. Any undeveloped land in Pine Springs and Lake Elmo of the Lake DeMontreville watershed appears planned to be developed into low-density residential housing. Existing (2010) and future anticipated (2030) land use conditions for the Lake DeMontreville watershed are shown on Figure 5.7-2**.**

Except for the public access, the Lake DeMontreville shoreline is in private ownership and largely developed. However, most of the eastern shoreline of Lake DeMontreville is owned by religious groups, which developed the properties as retreat centers and monasteries (shown as institutional land use in Figure 5.7-2). As a result, the amount of development on the east shore is minimal and there are large areas of open space. Large numbers of waterfowl and wildlife have been sighted on or near Lake DeMontreville, especially near this open space area.

5.7.2 Water Quality Management Plan

Lake DeMontreville meets the Minnesota Pollution Control Agency (MPCA) criteria for shallow lakes by a narrow margin (littoral area >80 percent), and may be classified as a shallow lake by the

MPCA. However, the VBWD has classified Lake DeMontreville a High Priority waterbody according to the VBWD's waterbody classification system (see Section 4.1 – Water Quality) due to its excellent water quality, maximum depth, and littoral area close to the MPCA criterion. This classification is consistent with the priority given to Lake DeMontreville in the 1995 VBWD Plan and the 2005 VBWD Plan.

Due to potential uncertainty in its MPCA classification as deep or shallow, the VBWD has assessed Lake DeMontreville relative to deep lake water quality standards (see Table 5.7-1). Lake DeMontreville is not included among the list of impaired waters in Minnesota, and currently meets the MPCA's water quality standards for deep lakes, which are more stringent than for shallow lakes.

Upstream waters, such as Long Lake and Echo Lake, can impact the water quality of Lake DeMontreville. Likewise, Lake DeMontreville's water quality can impact downstream water bodies, such as Lake Olson.

The VBWD has a non-degradation water quality policy which sets "action triggers" for all of its major waterbodies. Section 4.1 – Water Quality discusses the action triggers in more detail. Action triggers for VBWD lakes consider the following water quality parameters (summer average) relative to MPCA water quality standards and prior water quality data (i.e., trend analysis):

- Secchi disc depth
- Total phosphorus
- Chlorophyll *a*

5.7.2.1 Water Quality Implementation Plan

Specific water quality implementation tasks for Lake DeMontreville include the following.

1. The VBWD will monitor the water quality of Lake DeMontreville and perform the actions discussed in Section 4.1 – Water Quality for High Priority water bodies.

   The VBWD will evaluate the average summertime water quality (total phosphorus, chlorophyll a, and Secchi disc transparency) and compare it to applicable water quality standards (Table 4.1-1) and applicable action triggers (described in Section 4.1.7.5). Currently, the water quality in Lake DeMontreville meets deep lake water quality standards.

2. The VBWD will evaluate and implement the appropriate recommendations, as necessary, for Lake DeMontreville that are listed in the draft August 2000 report, *Tri-Lakes (Lakes DeMontreville, Olson and Jane), Long, Echo, Mud (Acorn) and Silver Lakes, Watershed and Lake Management Plan, Volume I; Lake and Watershed Conditions, Water Quality Analysis, Improvement Options and Recommendations* (Tri-Lakes Watershed and Lake Management Plan) and the draft January 2009 report *Water Quality Assessment of DeMontreville, Eagle Point, and Horseshoe Lakes* (2009 Water Quality Assessment). The Tri-Lakes Watershed and

Lake Management Plan evaluated a number of water quality management practices to estimate their cumulative effect on the water quality of Lake DeMontreville. The management practices evaluated in the report include:

- Wet detention of stormwater runoff
- Prefabricated stormwater treatment units
- Stormwater alum treatment plant
- In-lake alum treatment
- General best management practices

The 2009 Water Quality Assessment further recommended the following management strategies for Lake DeMontreville:

- Developing a plan for implementation of watershed infiltration practices
- Managing invasive aquatic plant species
- Implementing alum treatment of the lake sediment to reduce internal phosphorus loading
- Monitoring of water quality to assess the condition of the lake

Because Lake DeMontreville is located downstream of Long Lake, management practices implemented for Long Lake may benefit Lake DeMontreville. The specific management tasks recommended for Long Lake are discussed in Section 5.5. For Lake DeMontreville, the VBWD will consider implementing the following:

a. More intense monitoring to better estimate how much phosphorus is entering the lake, and ultimately, determine the feasibility and cost-effectiveness of improvement options identified through the Tri-Lakes Watershed and Lake Management Plan.

b. Evaluating the feasibility of enhanced treatment and small scale stormwater BMPs within the watershed tributary to Lake DeMontreville. The VBWD's BMP cost-share program may provide opportunities for private landowners to implement water quality improvements. Collectively, many small residential BMPs may have a significant impact on the cumulative phosphorus loading to Lake DeMontreville.

c. If necessary, the VBWD will cooperate with the MDNR and others to reduce internal loading in Lake DeMontreville. This may include an in-lake aluminum sulfate (alum) treatment of Lake DeMontreville. In-lake alum provides a long-term control of the phosphorus release of lake sediments (see Section 4.1 – Water Quality). An in-lake treatment could be effective for up to ten years, depending upon how well the watershed nutrient sources have been reduced. When alum is applied to shallow lakes, the improved water clarity usually results in increased (and often undesired) aquatic plant growth. This can be exacerbated by the presence of aquatic invasive plant species. The VBWD will need to consider improved water clarity versus increased aquatic plant growth before moving forward with alum application projects on these lakes.

a. Management of macrophytes (aquatic plants) of the lake. Treatment of areas containing dense, monospecific growths of Eurasian watermilfoil with an aquatic herbicide (2,4-D, Triclopyr, or low concentrations of Aquathol® K) is recommended to protect Lake DeMontreville's native plant community. The VBWD will cooperate with the City of Lake Elmo and other entities in support of macrophyte management efforts. VBWD efforts may include

   - point-intercept surveys of aquatic vegetation
   - preparation of lake vegetation management plans (LVMP)
   - completion of Invasive Aquatic Plant Management (IAPM) Permit applications
   - design of herbicide treatment programs
   - participation in meetings with MDNR staff
   - other technical analysis

3. The VBWD will continue to implement its Rules and Regulations (2013, as amended) in the Lake DeMontreville watershed. The VBWD Rules address water quality performance standards for development and redevelopment projects, as well as required vegetated buffers around VBWD lakes, streams, and wetlands. The VBWD Rules and Regulations are included in this Plan as Appendix A-4.5.

5.7.2.2 Water Quality Issues and History

The Tri-Lakes Watershed and Lake Management Plan estimated that Lake DeMontreville's water quality would decrease slightly when the tributary watershed becomes fully developed. The three most significant sources of phosphorus loading to Lake DeMontreville are internal loading, atmospheric loading and upstream loading from Long Lake. This means it may be necessary to effectively manage the phosphorus loading to Long Lake to maintain or improve the water quality of Lake DeMontreville.

The Tri-Lakes Watershed and Lake Management Plan found that Lake DeMontreville receives approximately 31 percent of its annual phosphorus load due to release from its bottom sediments during an average year. Extensive monitoring of the lake indicates that phosphorus released by the bottom sediments builds up in the bottom waters of the lake and is (1) slowly released into the upper waters of the lake during the course of the summer, and/or (2) it is delivered to the upper waters during fall turnover. Phosphorus released by the sediments is present in a form that can be quickly utilized by algae, leading to intense algal blooms. Especially severe algae blooms occurred during late summer of 1989 and 1990. Lake DeMontreville has been treated regularly with an algaecide (copper sulfate) since the 1970s, excluding the period 1978 through 1990. From 1991 through the present, the lake has been treated with copper sulfate during the summer of most years to control algae. The Lake DeMontreville/ Lake Olson Association coordinates and funds the treatments.

As noted in the 1995 VBWD Plan and 2005 VBWD Plan, problems with aquatic vegetation have necessitated chemical treatment in private beach areas around the lake. Heavy growths of curlyleaf pondweed occur during June and growths of northern milfoil occur during July through August. The lake has been chemically treated at various times to control weeds. Treatments have been completed by a professional, and coordinated by the Lake DeMontreville/Olson Association. The MDNR allows a maximum of 10% of the lake's littoral area to be treated.

In the mid-2000s, water quality in Lake DeMontreville met action triggers established for the lake in the 2005 VBWD Plan. The VBWD performed three years of supplemental water quality monitoring (see Section 4.1 – Water Quality) in 2005, 2006, and 2007. The results of this monitoring are presented in the 2009 Water Quality Assessment. The VBWD performed additional water quality modeling of Lake DeMontreville. The results 2009 Water Quality Assessment are summarized in Appendix A-5.7 and identify the primary sources of phosphorus loading (in decreasing order) as internal loading from sediment, upstream loading from Long Lake (except in dry years), local watershed loading, loading from curlyleaf pondweed, and precipitation.

Following the publication of the 2009 Water Quality Assessment, water quality monitoring was conducted in two areas (one shallow and one deep) during 2009 to assess the potential internal and external phosphorus loading sources. Phosphorus in the lake was slightly higher in the North Basin (shallow area), indicating phosphorus from curlyleaf pondweed and sediment sources in shallower areas have negative effects on lake water quality. Macrophyte surveys were also conducted to determine the extent of curlyleaf pondweed growth in the lake. Survey results showed that curlyleaf pondweed is widespread, supporting the water quality data that seem to suggest the plant is negatively affecting water quality in mid- to late-summer when the plant dies back, causing the release of phosphorus from both the plant and sediment surface. Late in 2009, the VBWD applied for grants to implement water quality improvement projects at Lake DeMontreville and Eagle Point Lake, but none of the grant applications was funded.

At the end of 2008, the VBWD directed its engineer to prepare concept plans for a project to stabilize a ravine north of Lake DeMontreville and reduce sediment loading to the Lake. The DeMontreville Ravine stabilization project was designed, bid and constructed in 2009. The design consisted of bank grading, installation of a series of boulder riffle grade-controls, construction of a sedimentation basin at the downstream end, and revegetation. The managers solicited comments from the MDNR and Board of Water and Soil Resources (BWSR) and held a public hearing on the project in August 2009. The VBWD contractor began construction in mid-October and completed the majority of work in early December 2009. In April 2010, the construction on the ravine was complete and trees and shrubs were planted. The VBWD continued to maintain the vegetation from 2011 through 2013.

5.7.2.3 Water Chemistry Data

Water quality sampling has been conducted on Lake DeMontreville since 1971, and annually since 2003. While the VBWD has collected most of the data, the Metropolitan Council collected data in 1980, 1984 and 1991 and the Tri-Lakes Improvement Association collected samples in 1981. Some of water quality sampling done on Lake DeMontreville has been through the Metropolitan Council's Citizen-Assisted (lake) Monitoring Program (CAMP) and partially funded by the VBWD. Citizen volunteers have collected Secchi disc transparency data from the lake each summer since 1971 as part of the MPCA's Citizen Lake Monitoring Program (CLMP). Water quality samples are typically analyzed for total phosphorus and chlorophyll a, which Secchi disc transparency is measured in the field at the time of sampling (see Appendix A-4.1 – Water Quality Background Information).

The most recent 10-year average summer water quality data is presented relative to applicable MPCA and VBWD water quality standards in Table 5.7-1 and illustrated in Figure 5.7-3. Additional water quality information is presented in Appendix A-5.7.

Table 5.7-1 Summary of Lake DeMontreville summer average water quality

Parameter	Units	10-year Average (2004-2013)	Trend in Average	MPCA Standard[1]
Total Phosphorus	ug/L	27.2	None	40
Chlorophyll *a*	ug/L	12.3	None	14
Secchi Disc Depth	m	2.8	None	1.4

[1] The VBWD applies MPCA deep lake water quality standards based on existing water quality and the potential for Lake DeMontreville to be classified as a deep lake by the MPCA.

The 10-year averages of summer average total phosphorus, chlorophyll a, and Secchi disc transparency are within the applicable water quality standards (see Table 5.7-1). Maximum values of observed within the last 10 years have exceed the applicable standards 4 times for chlorophyll a, with a maximum values of approximately 20 ug/L observed in 2007 and 2010. Summer average total phosphorus and Secchi disc transparency have met the applicable water quality standards throughout the past 10 years. The most recent 10-years of data identify no statistically significant trends in total phosphorus, chlorophyll *a*, or Secchi disc transparency.

In 1993, the VBWD trained a volunteer to collect samples from the stream which carries water from Grant to Lake DeMontreville. Stream samples were collected at various times during the spring through fall period of 1993 and analyzed for phosphorus, nitrogen, and total suspended solids. Ongoing monitoring has not been performed at this location

5.7.2.4 Biological Data

Several types of biological data have been compiled and evaluated for Lake DeMontreville, in addition to physical and chemical parameters. Macrophyte (aquatic plant), phytoplankton (non-rooted floating plants – algae), zooplankton (microscopic aquatic animals), and fisheries data provide insight into the ecological quality of Lake DeMontreville.

5.7.2.4.1 Fisheries

Table 5.7-2 shows the results of the 2011 fisheries survey.

Table 5.7-2 Summary of 2011 MDNR Fishery Survey for Lake DeMontreville

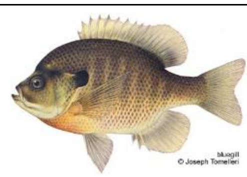
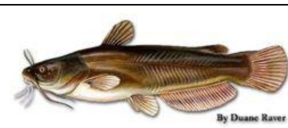
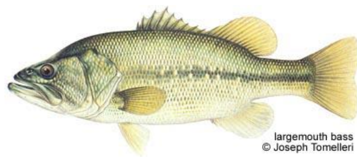
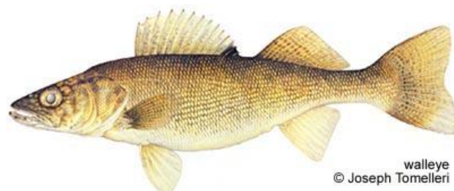
Fish Species	**Numbers**	**Photograph** (Not to Scale)
Bluegill	129	
Hybrid Sunfish	27	
Pumpkinseed Sunfish	27	
Yellow Perch	54	
Yellow Bullhead	27	
Northern Pike	63	
Black Crappie	68	

Table 5.7-2 Summary of 2011 MDNR Fishery Survey for Lake DeMontreville

Fish Species	**Numbers**	**Photograph** (Not to Scale)
White sucker	5	
Black Bullhead	3	
Largemouth Bass	8	
Walleye	3	

No winterkills have been reported since 1960. It appears that winterkills are more frequent when water levels drop to the range of Elevation 922 to 924.

The MDNR classified Lake DeMontreville as a Class 36 lake, in accordance with the MDNR's *An Ecological Classification of Minnesota Lakes with Associated Fish Communities (1992)*. For this fisheries-use class, the water transparency (as measured by Secchi disc) should be 2.1 meters (6.9 feet) or greater. Poorer water transparencies will result in less than ideal water quality conditions for the lake's fishery. As shown in Figure 5.7-3, Lake DeMontreville's summer average Secchi disc transparency depths have not always achieved this MDNR goal. Since 1998, however, summer average Secchi disc transparency has exceeded 2.1 meters in all years the lake has been monitored except 2007 (1.7 meters).

The Minnesota Department of Health (MDH) has issued fish consumption advisories for fish caught from Lake DeMontreville. Pregnant women and children under age 15 should limit consumption of crappie to 1 meal/week and northern pike to 1 meal/month. The general population should consume no more than 1 meal/week of northern pike. These advisories are for mercury.

See Section 4.2 (Water Quality Background Information) for information about the importance of fisheries and other biological data.

See Appendix B-5.7 for more information about the Lake DeMontreville fisheries. The MDNR's LakeFinder website includes the most current data on fish stocking and surveying in Silver Lake and is available at: http://www.dnr.state.mn.us/lakefind/index.html

5.7.2.4.2 Macrophytes (Large Aquatic Plants)

Macrophyte surveys were conducted in 1998, 1999, 2002, and 2005, 2006, 2007, 2008, 2010, 2011, and 2012 at Lake DeMontreville. Point intercept surveys of curlyleaf pondweed were also performed in 2009, 2012, 2013 and 2014. The VBWD collects macrophyte data to identify the conditions of plant growth throughout the lake. Macrophytes are the primary producers in the aquatic food chain, converting the basic chemical nutrients in water and soil into plant matter through photosynthesis, which becomes food for all other aquatic life. Macrophytes can negatively impact the recreational use of a waterbody and are critical to the ecosystem as fish and wildlife habitat.

Appendix C-5.7 includes the June 1998, August 1998, June 1999, August 1999, June 2002, August 2002, June 2005, and August 2005, June 2007, August 2007, June 2008, August 2008, June 2010, August 2010, June 2011, August 2011, and June 2012 macrophyte survey information as well as point intercept surveys of invasive species performed in 2013 and 2014.

In all the macrophyte surveys, a healthy, diverse plant community was found throughout the lake wherever the water depth was less than 10 feet. Included in the 20 to 31 individual species observed between the 1998 and 2014 surveys were two clean water species, pipewort (*Eriocaulon spp.*), and Illinois pondweed (*Potamogeton illinoensis*). The presence of these species indicates good water transparency, since they are not able to grow in turbid water (Borman, 1997). Pipewort did not appear in the 2010 or 2011 surveys despite good water quality, though Illinois pondweed continued to appear in all years the survey was conducted.

Despite the favorable attributes of the lake's plant community, the growth of four undesirable exotic (non-native) species is of concern, including:

- Curlyleaf pondweed (*Potamogeton crispus*)
- Purple loosestrife (*Lythrum salicaria*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Yellow iris (*Iris pseudacorus*), is of concern.

Curlyleaf pondweed (CLP) was observed during the 1998, 1999, 2002, and 2005 June surveys and during the 1999 and 2005 August surveys.CLP was observed in the majority of macrophyte surveys conducted on Lake DeMontreville between 2005 and 2015. CLP also appeared in June 2007, June 2008, June and August 2010, and June and August 2011. It is now a consistent presence in the lake and may be difficult to completely eradicate. Once a lake becomes infested with curlyleaf pondweed, this plant typically replaces native vegetation, thereby increasing its coverage and density. However, in Lake DeMontreville, CLP is not “acting invasively”, meaning it occurs alongside the lake’s native plant community and is not forming large, high-density beds.

CLP occurrence in Lake DeMontreville declined in 2013 and, again, in 2014. Both declines are attributed to thick snow cover and late ice-out that created unfavorable growth conditions for CLP during the winter months. The decline from a 49 percent frequency in 2012 to a 42 percent frequency in 2013 is not statistically significant. However, the decline from 42 percent in 2013 to 10 percent in 2014 is considered statistically significant.

Purple loosestrife (*Lythrum salicaria*) was first observed growing at the northeast end of the lake during August of 2002. Like curlyleaf pondweed, this plant typically eventually replaces native vegetation and rapidly becomes the sole emergent species. Purple loosestrife can be effectively managed through the use of leaf-eating beetles, which reduce plant growth and seed production by feeding on the leaves and new shoots. The Washington Conservation District provided beetles to a shoreline resident of Lake DeMontreville and the resident released the beetles in the infested area. The 2005 survey did not note any purple loosestrife so it appeared that beetle release was successful. After going undetected for several years, purple loosestrife was observed at the Lake DeMontreville boat launch in 2014, where four plants were removed by the VBWD’s consultant..

Eurasian watermilfoil (EWM) is currently a problematic invasive plant in Lake DeMontreville. Eurasian watermilfoil (*Myriophyllum spicatum*) appeared in all macropphyte surveys conducted on the lake within the last 10 years. In 2013 the number of survey points containing EWM had increased by a factor of 9 over the number from 2012, a statistically significant difference which indicates the plant is spreading rapidly throughout the lake. EWM occurred in approximately one third of all sample locations in the 2013 and 2014 point intercept surveys. Several large EWM beds were observed, including a canopied bed (plants growing to the lake’s surface) at the northern end of the lake.

In 2014, the VBWD provided technical assistance to help the Lake DeMontreville/Olson Association manage EWM. The VBWD’s consultant initially designed an herbicide treatment plan that involved treating a larger area and adding sufficient herbicide to effectively manage the EWM in the lake. However, budget constraints prevented the Lake DeMontreville/Olson Association from implementing this plan and a smaller area that fell within their budget was selected for treatment. On June 6, 4.3 acres were treated with 2,4-D (see Appendix C-5.7). The treatment dose was 4 parts per million. A post-treatment aquatic plant survey completed by Endangered Resource Services, LLC on June 28 indicated the treatment reduced EWM frequency to 19 percent (see Appendix C-5.7). The decline from 34 percent to 19 percent is a statistically significant decline. However, the Lake DeMontreville/Olson Association indicated that the EWM reduction was temporary. Plant levels rebounded to pre-treatment levels by late August, resulting in the worst EWM growth observed to date. Apparently, the treatment killed EWM plants but not the root crowns, which were able to grow new plants.

The Lake DeMontreville treatment results were consistent with current EWM research. A whole-lake 2,4-D concentration of about 0.3 ppm must be attained and sustained for about 3 days to kill the EWM root crowns and attain lasting EWM control. In Lake DeMontreville, the VBWD estimated that the whole lake 2,4-D concentration after mixing would be 0.04 ppm based upon lake volume and the gallons of herbicide applied. This low concentration killed the plants, but left viable root crowns that enabled EWM to rebound to pre-treatment levels.

Some yellow iris plants (*Iris pseudacorus*) were observed at the boat landing in 2013. In August 2013, the managers approved the removal the yellow iris from the Lake DeMontreville boat landing area during the spring of 2014. On June 10, 2014, the VBWD's consultant completed hand harvesting of two invasive species from an area near the Lake DeMontreville boat launch. Barr removed a total of 30 yellow iris and 4 purple loosestrife plants.

The VBWD will continue to provide technical assistance to entities seeking to manage aquatic invasive species.

5.7.2.4.3 Phytoplankton (Non-Rooted, Floating Plants - Algae) and Zooplankton (Microscopic Aquatic Animals)

The VBWD has performed phytoplankton and zooplankton surveys at Lake DeMontreville in 1998, 1999, 2002, 2005 and 2007. Appendix D-5.7 and Appendix E-5.7 show the survey results.

Phytoplankton derive energy from sunlight and use nutrients dissolved in lake water. They provide food for several types of animals, including zooplankton, which in turn are eaten by fish. A phytoplankton population in balance with the lake's zooplankton population is ideal for fish production. An inadequate phytoplankton population reduces the lake's zooplankton population and adversely impacts the growth of the lake's fishery. However, excess phytoplankton, especially blue-green algae, can interfere with recreational use of a lake and is considered problematic.

Although diverse, Lake DeMontreville's phytoplankton community is dominated by blue-green algae during the mid through late summer period. In the surveys from 1998 to 2007, blue green algae generally comprised half of the phytoplankton community in mid-summer and up to 85 percent of the community by late summer. Dominance by blue-green algae is undesirable because they are often inedible to zooplankton due to their large size. Furthermore, blue-green algae generally float on the waters' surface where they are particularly objectionable to lake users. Blue-green algae are best managed by reducing the lake's phosphorus concentration. Increases in the lake's phosphorus concentration would likely cause increased growth of blue-green algae, although above a certain level shading becomes the controlling factor.

The lake's zooplankton community is diverse and fairly stable in size. The survey results show three common types present (rotifera, copepoda, and cladocera) and peak seasonal populations of approximately 1 million individuals per square meter. The zooplankton community in Lake DeMontreville provides food for the lake's panfish community, but it is unable to control the lake's algae community due to their small size. Because fish predation generally determines the numbers of large- and small-bodied zooplankters in a lake, increasing the numbers of large-bodied zooplankters is unrealistic. Because zooplankton grazing will not control the lake's phytoplankton community, phosphorus loading to the lake solely determines Lake DeMontreville's algae community. Hence, phosphorus management will provide the best management measures for the lake's phytoplankton community.

5.7.3 Water Quantity Management Plan

Lake DeMontreville is connected to Lake Olson; thus, water levels on both lakes must be jointly managed. See the Lake Olson Watershed Management Plan, Section 5.8, for the water quantity goals and implementation plan for both Lakes DeMontreville and Olson.

5.7.3.1 Drainage Patterns and Outlet Information

Runoff from the local watershed enters Lake DeMontreville from culverts at various points along the lakeshore. The Long Lake outlet stream enters the north shore of Lake DeMontreville, about 200 feet west of the east intersection of Highlands Trail and DeMontreville Trail. Another stream enters the north shore of Lake DeMontreville, approximately 2,000 feet east of the Long Lake outlet stream. This stream carries water from the tributary watershed northeast of the lake, including about 350 acres in the City of Grant.

A navigable surface water channel connects Lake DeMontreville and Lake Olson. As a result, the water level of Lake DeMontreville is controlled by the Lake Olson outlet. The Lake Olson outlet control elevation is typically set at Elevation 928.35. The MDNR's Ordinary High Water (OHW) for Lake DeMontreville is at Elevation 929.3 (the same as Lake Olson, NGVD29 datum). The MDNR previously set the OHW for Lake Olson and Lake DeMontreville at Elevation 930 in 1984, when the Lake Olson runout elevation was at Elevation 929.7. The VBWD lowered the Lake Olson runout elevation as part of Project 1007. In 2007, the MDNR re-evaluated the OHW of the Lake DeMontreville and Lake Olson based on field inspection of trees adjacent to the lakes and water level data collected since the lowering of the outlet. Based on these data, the MDNR established the new OHW at Elevation 929.3. See the Lake Olson Watershed Management Plan section (Section 5.8) for information about water levels, the outlet, and the channel between Lakes DeMontreville and Olson. The exact elevation at which the two water bodies would become separated is not known, but residents have reported that the channel between the lakes dried up in 1969, when the water level of Lake Olson was approximately Elevation 925.

The City of Lake Elmo institutes a no-wake restriction on Lake DeMontreville when water levels exceed Elevation 929.7 as specified in City ordinance (as of the writing of this Plan). This elevation is higher than the MDNR's OHW level is Elevation 929.3. The restriction is lifted after water levels remain below Elevation 929.7 for three consecutive days.

Following the floods in summer 2014, the City of Lake Elmo requested the installation of a vortex-inducing device on Catch Basin 47 at the downstream end of DeMontreville Ravine to keep the grate clear of debris and allow more efficient flow from the ravine into the catch basin. As of the writing of this Plan, the VBWD plans to install a vortex-inducing device at Catch Basin 47, located at the north end of Lake DeMontreville (see Figure 5.7-1).

5.7.4 References

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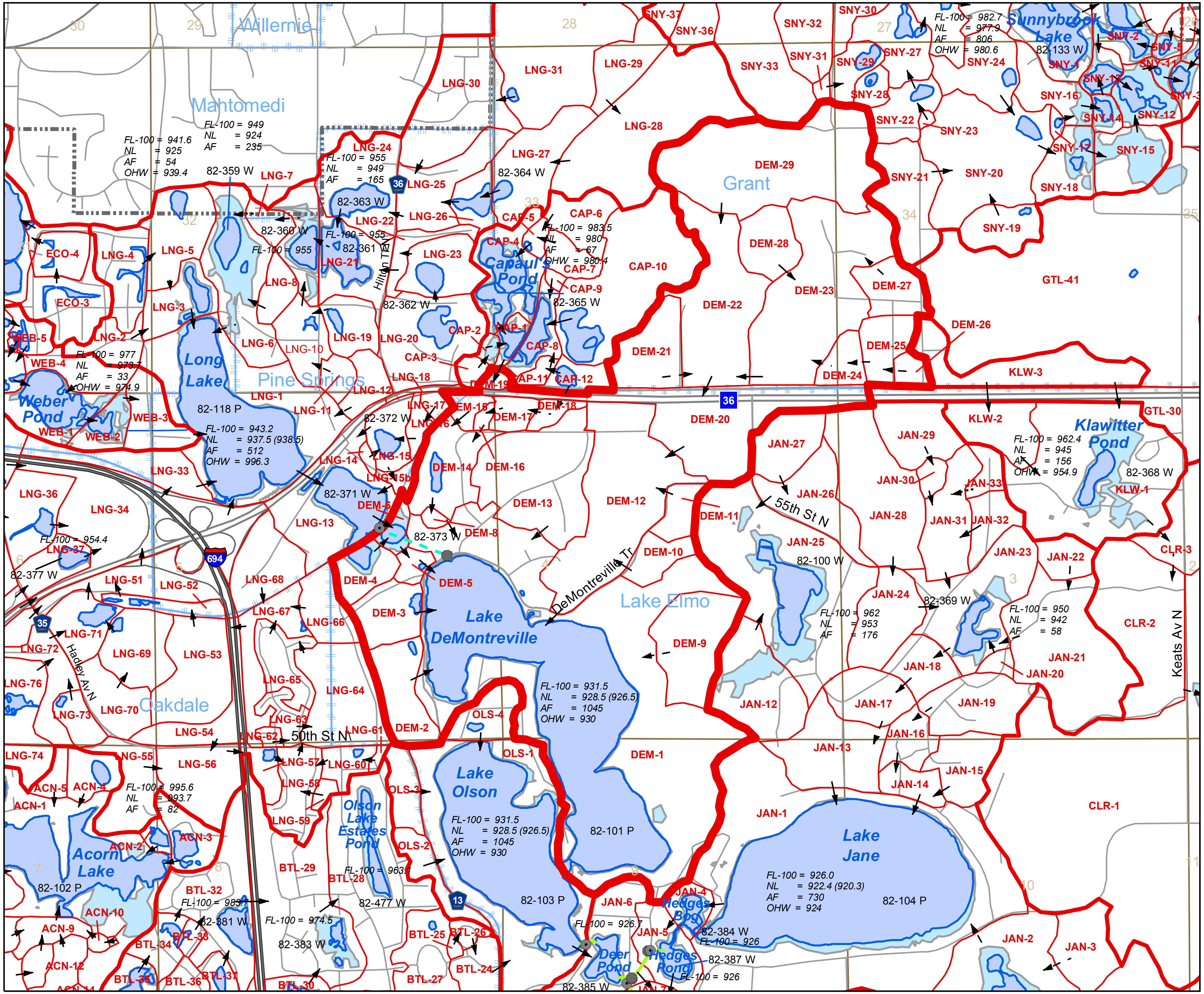
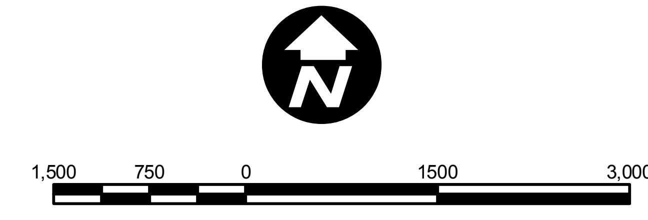




LEGEND

- Lake DeMontreville Watershed
- Major Watershed Divide
- Subwatershed Divide
- DEM-1 Subwatershed Designation
- 82-101P DNR Protected Waters Designation
- Subwatershed Contributing Runoff
- Overflow Path from Landlocked Watershed (Non-Contributing Subwatershed)
- Overflow Path from Semi-Landlocked Watershed
- Lakes, Ponds, Wetlands, Approximate Normal Water Surface Level
- Lakes, Ponds Wetlands, Approximate 100 Year Flood Surface Level
- 100 Year Flood Level
- NL Normal Level
- AF Acre Feet of Storage at 100 Year Flood Level
- OHW DNR Established Ordinary High Water Elevation

Project 1007

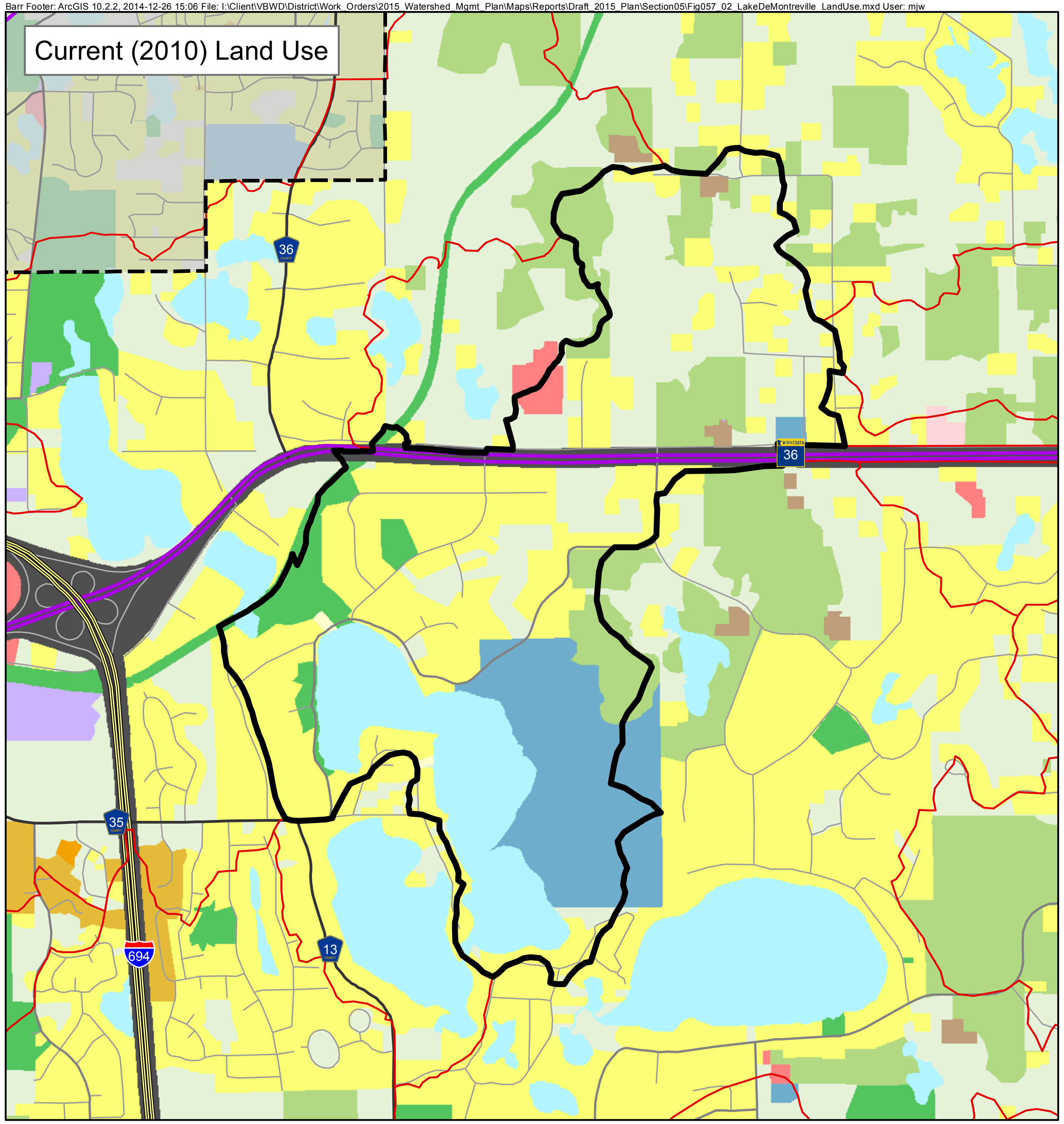
- Catch Basin
- Manhole Cover
- Open Channel
- Pipe
- MN-DOT Pipe
- Section Lines
- VBWD Legal Boundary
- Municipal Boundary

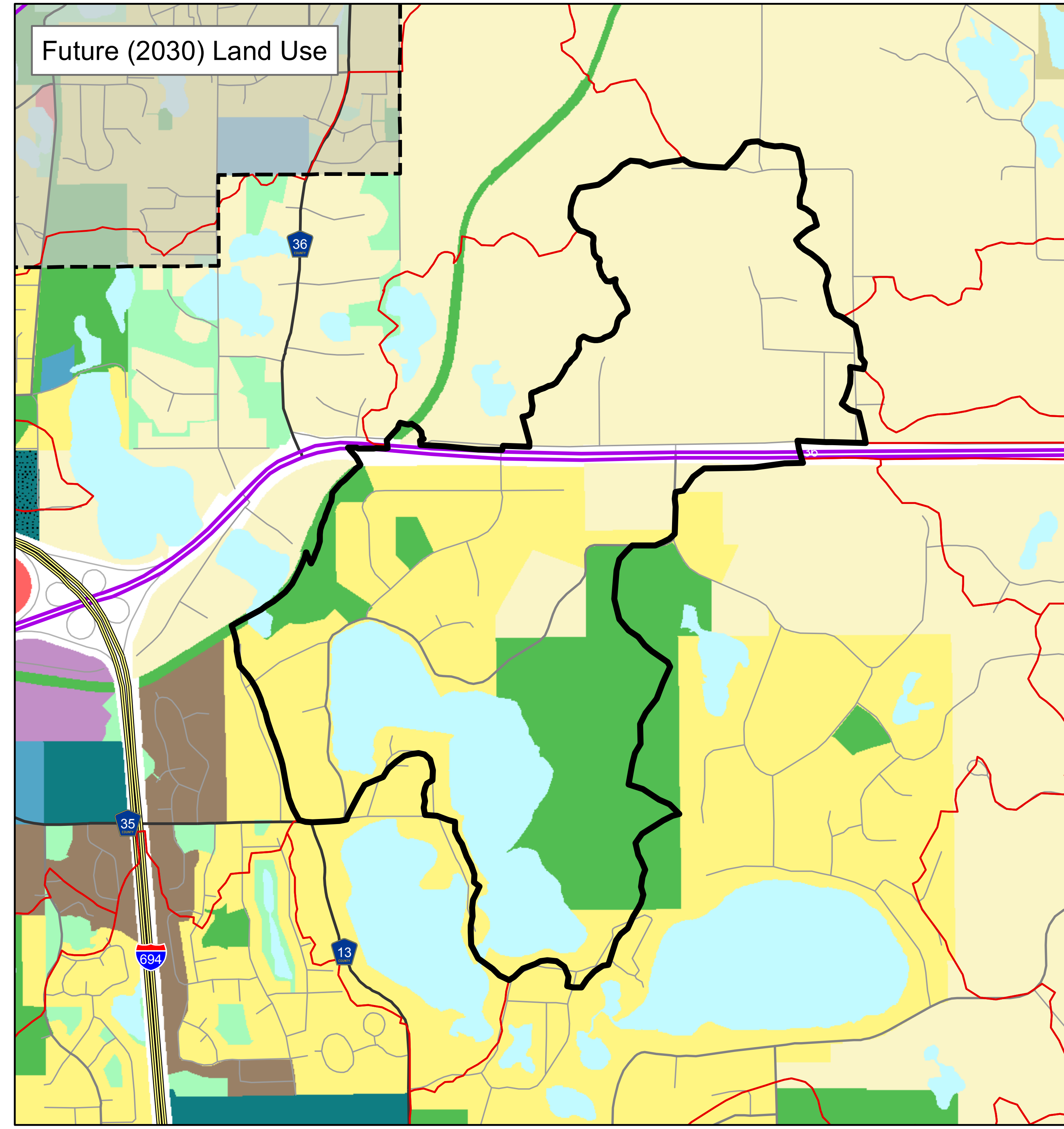
Landlocked: Basin does not overflow using VBWD simplified method for calculating its 100-year flood level or using a more detailed analysis, such as the 1% probability flood level.

Semi-Landlocked: Basin does not overflow in the 100-year 24-hour rainfall total or the 100-year 10-day snowmelt event, but does overflow when calulating its 100-year flood level based on the VBWD simplified method or the 1% probablility flood level.

Figure 5.7-1

LAKE DeMONTREVILLE WATERSHED
Valley Branch Watershed District





Current (2010) Land Use
- Farmstead
- Seasonal/Vacation
- Single Family Detached
- Manufactured Housing Park
- Single Family Attached
- Multifamily
- Retail and Other Commercial
- Office
- Mixed Use Residential
- Mixed Use Industrial
- Mixed Use Commercial and Other
- Industrial and Utility
- Extractive
- Institutional
- Park, Recreational or Preserve
- Golf Course
- Major Highway
- Railway
- Airport
- Agricultural
- Undeveloped
- Water
- DeMontreville Lake Subwatershed
- Major Subwatershed Boundary
- VBWD Legal Boundary

Future (2030) Land Use
- Agricultural
- Rural or Large-Lot Residential
- Single Family Residential
- Multifamily Residential
- Commercial
- Industrial
- Institutional
- Mixed Use
- Multi-Optional Development
- Park and Recreation
- Open Space or Restrictive Use
- Rights-of-Way (i.e., Roads)
- Railway (inc. LRT)
- Airport
- Vacant or Unknown
- Open Water
- DeMontreville Lake Subwatershed
- Major Subwatershed Boundary
- VBWD Legal Boundary

N

Feet

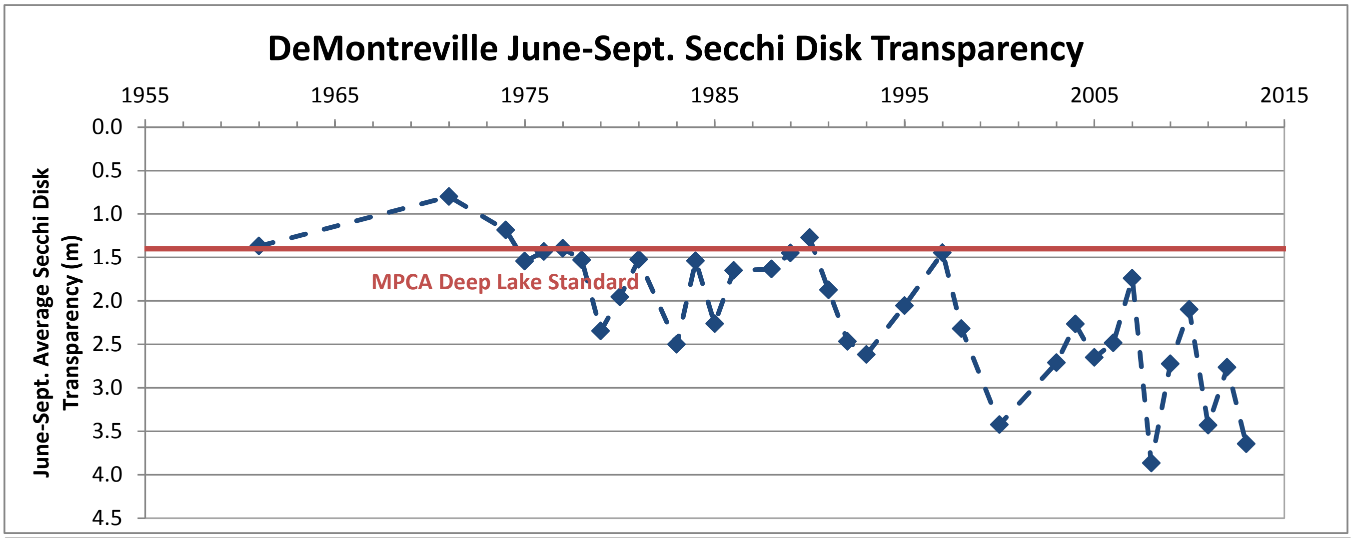
2,000 0 2,000 4,000

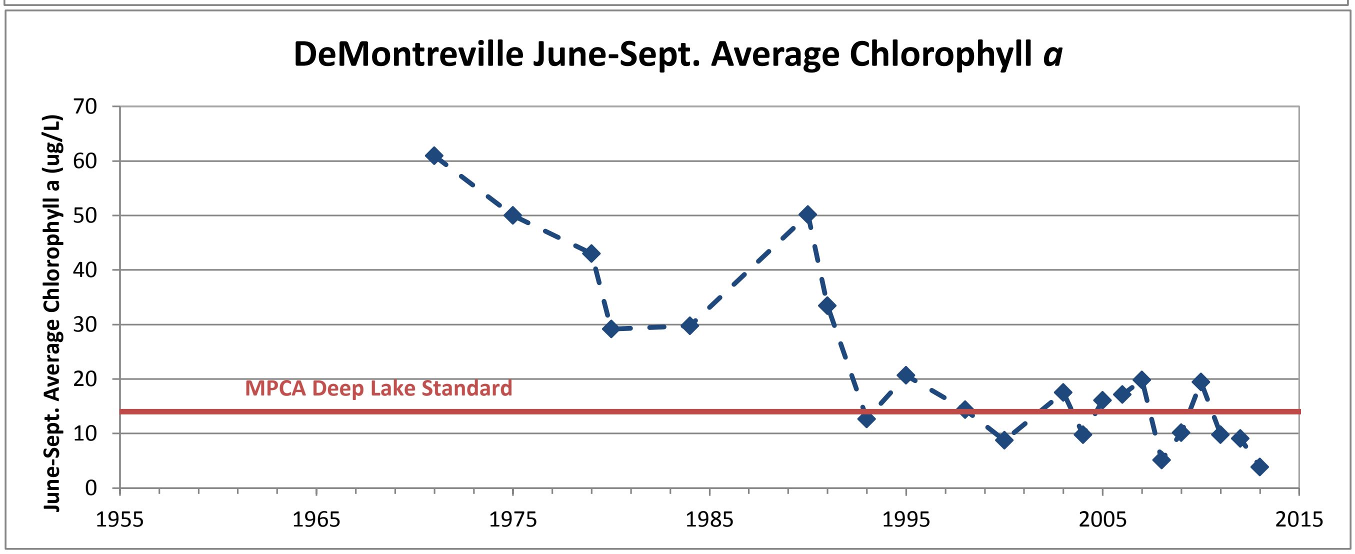
1 inch = 2,000 feet

Source: Metropolitan Council 2010

Figure 5.7-2

DEMONTREVILLE LAKE WATERSHED
CURRENT (2010) AND FUTURE (2030) LANDUSE
2015-2025 Watershed Management Plan
Valley Branch Watershed District





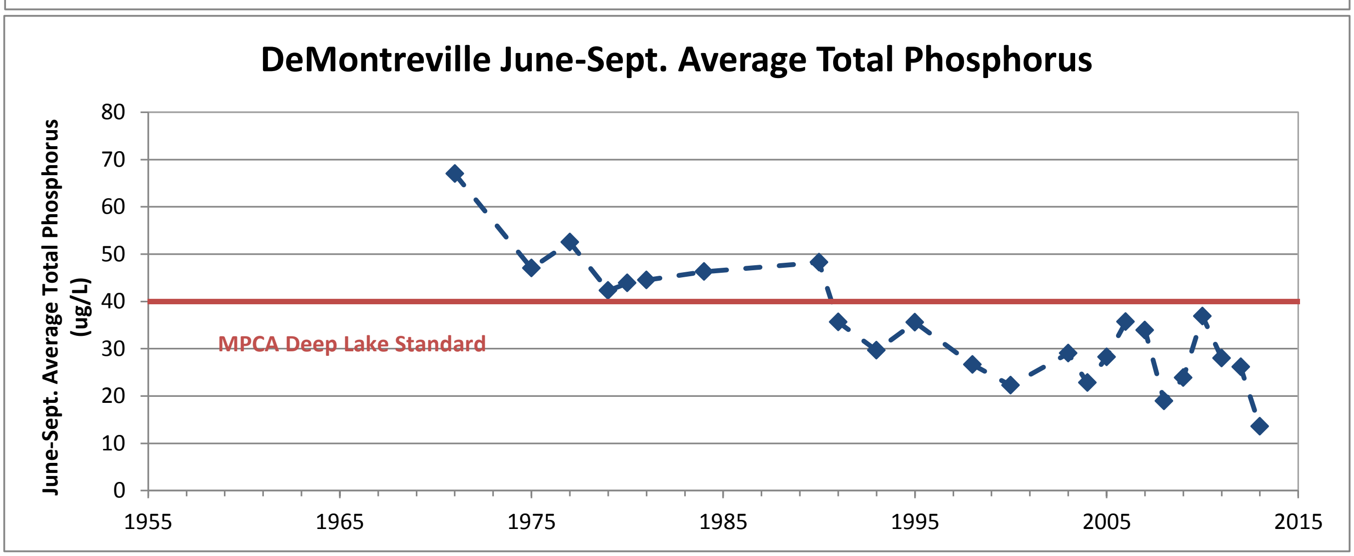


Figure 5.7-3

Lake DeMontreville Water Quality
2015 - 2025 Waterhsed Management Plan
Valley Branch Watershed District

Appendix A-5.7 Additional Water Quality Information

Appendix A-5.7 Additional Water Quality Information

Additional General Information

Lake DeMontreville has a stable thermocline throughout the summer, with thermal stratification noted at about 20 feet. This means that dissolved phosphorus in the lower waters of the lake keeps from mixing with the upper waters.

MINLEAP Modeling

The Minnesota Lake Eutrophication Analysis Procedure (MINLEAP) is intended to be used as a screening tool for estimating lake conditions and for identifying “problem” lakes. MINLEAP is particularly useful for identifying lakes requiring “protection” versus those requiring “restoration” (Heiskary and Wilson, 1990). In addition, MINLEAP modeling by has been done in the past to identify Minnesota lakes which may be in better or worse condition than they “should be” based on their location, watershed area and lake basin morphometry (Heiskary and Wilson, 1990).

Results of MINLEAP modeling done by the VBWD in 2000 for Lake DeMontreville suggests that the lake should experience “worse” water quality than is currently observed. Using the direct watershed area (without upstream lake watersheds), MINLEAP predicts a growing season mean total phosphorus concentration of approximately 47 µg/L versus 14–38 µg/L (observed from 2004 to 2013); a chlorophyll *a* concentration of approximately 18 µg/L versus 4–20 µg/L (observed from 2004 to 2013); and summer average transparency of 1.4 meters versus 1.7–3.9 meters (observed from 2004 to 2013). The predicted phosphorus concentration has a standard error of 17 µg/L, which means that the MPCA’s water quality standard for total phosphorus is within the range of what is realistically attainable for Lake DeMontreville. The MINLEAP model is better suited for predicting realistic phosphorus concentrations in lakes that are not influenced by other upstream lakes.

Vighi and Chiaudani Method

Vighi and Chiaudani (1985) developed another method to determine the phosphorus concentration in lakes that are not affected by anthropogenic (human) inputs. As a result the phosphorus concentration in a lake resulting from natural, background phosphorus loadings can be calculated from information about the lake’s mean depth and alkalinity or conductivity. Alkalinity is considered more useful for this analysis because it is less influenced by the modifying effect of anthropogenic inputs.

Based on the Vighi and Chiaudani method, and using the long term average alkalinity values from the deep basin of Lake DeMontreville, the predicted phosphorus concentration from natural, background loadings should be 25 µg/L. This predicted phosphorus concentration is somewhat lower than the VBWD’s water quality goal for Lake DeMontreville and indicates that this goal is attainable, given the appropriate phosphorus loadings.

2009 Water Quality Assessment

In 2008, Barr Engineering Company completed a study of Lake DeMontreville's water quality for the VBWD Managers. The study evaluated the potential benefit of internal and external phosphorus loading reductions on lake water clarity, including an evaluation of the influence of varying climatic conditions, and provided recommendations to improve the lake's water quality.

Internal Loading (Sediment)

Lake DeMontreville sediment contains elevated concentrations of phosphorus, which can be released into the water column at a rapid rate when the sediment becomes anoxic (oxygen depleted). Oxygen is consumed when bacteria and other organisms feed on algae and dead plant matter in the water and sediment. Once the sediment becomes anoxic, phosphorus can be released into the water column. Phosphorus continues to increase in the deeper water of the lake (due to release from anoxic sediment) during the summer months and can mix with the surface water through diffusion, minor mixing events in the summer, and when the lake turns over completely in late summer or early fall. The increase in phosphorus at the surface of the lake feeds algae and can cause blooms and lower water clarity during the summer and fall.

Sediment cores were collected in May 2008 and analyzed for mobile phosphorus to determine the phosphorus distribution across the lake. Maximum potential internal phosphorus loading could then be estimated based on the different forms of phosphorus in the sediment. In Lake DeMontreville, internal loading ranges from nearly 0 mg/m^2/day in the south end of the lake to approximately 5 mg/m^2/day in the deep hole. The north bay of the lake may also be impacted by up to 3 mg/m^2/day of internal phosphorus loading. Although not shown on the map, phosphorus in the sediment of Lake Olson was low and internal loading does not likely contribute a major portion of the phosphorus load to the lake.

Internal Loading (Curlyleaf Pondweed)

Curlyleaf pondweed contributes to internal phosphorus loading in two ways. After dieback during late June and early July, phosphorus stored in the plant is released as the plant senesces (breaks down). The process of plant matter decay uses up oxygen in the water column, potentially increasing the release of phosphorus from the sediment. Curlyleaf pondweed was present in lighter densities in the lake when it was discovered during a macrophyte survey conducted in 1998. The survey in June 2007 showed that the plant is present across the lake at very high densities. At the current density of infested areas within the lake, Curlyleaf pondweed can contribute phosphorus up to a rate of 2 mg/m^2/day during senescence in mid-summer.

External Loading

Stormwater runoff from the local watershed mostly enters from culverts at various points along the lakeshore. Outflow from Long Lake enters Lake DeMontreville at the northern end of the lake along with another small stream that transports runoff from watershed areas northeast of the lake, mainly from the City of Grant. Phosphorus loading from the direct watershed varies from year to year but is not considered elevated in relation to the watershed size.

Lake Olson is directly connected to Lake DeMontreville via a navigable channel between the two water bodies. Thus, the level of DeMontreville is controlled by the outlet elevation of Lake Olson, approximately 928.35 feet.

Water Quality Modeling

Lake water quality was modeled with a DYRESM-CAEDYM model, developed by the Centre for Water Research, at the University of Western Australia. Stormwater runoff volumes and concentrations of phosphorus in the watershed runoff were estimated using an urban watershed catchment model called P8 to predicted total phosphorus for years 2002 and 2007. In both years, the model accurately predicts a slight increase in phosphorus concentrations at the surface from April through mid-July, followed by a sharp increase in phosphorus concentrations in August and September. This increase is caused mainly by diffusion of phosphorus from the deeper water along with minor mixing during storm events.

The modeled increase in phosphorus at the surface of the lake starting in late June and continuing through the end of summer is attributed to both Curlyleaf pondweed decay in late June to early July and the release of phosphorus from sediment under anoxic conditions. Due to breakdown of organic matter by microbes in the lake water and sediment, the oxygen in the deeper water of the lake is consumed and the water becomes anoxic (i.e., oxygen depleted). Under these conditions, phosphorus in the sediment becomes mobile, diffusing into the lake water. Phosphorus continues to build in the deeper water during the warm summer months, mixing partially during the summer and feeding algae at the surface. In late summer, when the lake surface cools and the thermocline (lake stratification) breaks down, phosphorus rich deep water completely mixes with water near the surface of the lake, resulting in a late summer algal bloom.

Modeled external loading of phosphorus was higher in 2002 than 2007 as a result of more flow coming from the watershed and Long Lake. During 2002, external phosphorus loading was a substantial portion (65%) of the phosphorus load and drove water quality conditions in the lake. During the 2007 season, internal loading was nearly 60% of the total phosphorus load to the lake. Even though overall phosphorus loading (external and internal loading combined) to the lake was similar between the two years water quality was worse in 2007 mainly due to higher internal phosphorus loading.

The effect on Lake DeMontreville water quality resulting from Alum treatments of Long Lake and Lake DeMontreville was estimated using the DYRESM-CAEDYM model. Three management scenarios were considered: 1) Alum treatment of Long Lake only, 2) Internal load reduction (by alum treatment and macrophyte management) in Lake DeMontreville only, and 3) Alum treatment of Long Lake and Lake DeMontreville internal load reduction.

Long Term Phosphorus Management Strategies

Rainwater gardens were evaluated for reducing phosphorus runoff from portions of the Lake DeMontreville watershed. Rainwater gardens are designed to capture runoff from nearby impervious surfaces and facilitate infiltration into the ground. Rainwater gardens are typically shallow depressions (less than two feet) and are planted with a variety of plants that tolerate brief periods (48 hours or less) of inundation. Contaminants, including phosphorus, settle out in the rainwater gardens or are filtered by the soil as the runoff infiltrates. Rainwater gardens can be an attractive addition to the neighborhood landscaping.

Several neighborhoods in the Lake DeMontreville watershed currently feature wide, curbed roads and paved driveways that direct runoff into storm sewers or ditches which convey runoff to Lake DeMontreville with little or no treatment of phosphorus or other pollutants. A P8 model was used to estimate the potential removal of phosphorus from stormwater runoff from the neighborhood using rainwater gardens. For the purposes of this analysis, it was assumed that enough rainwater gardens were installed to capture the first one inch of rainfall from 2.5 acres of impervious surface, or 0.21 acre-feet of runoff.

The amount of phosphorus that could potentially be removed from installation of rainwater gardens is approximately 6% of the current total external phosphorus loading to Lake DeMontreville. Although the potential removal is a small portion of the total phosphorus loading to Lake DeMontreville on an annual basis, rainwater gardens, when properly maintained, can be an effective tool for long term reduction of phosphorus loading to Lake DeMontreville. In addition, if land use changes occur in the future, infiltration practices can minimize any impact development may have on Lake DeMontreville and other downstream lakes.

Recommended Management Actions

The recommendations below are made to not only maintain water quality in Lake DeMontreville, but also to increase water clarity and quality in the late summer months by reducing algal blooms. This can be accomplished through reductions of internal and external phosphorus loading to the lake, including:

- External local watershed load reduction
- Long lake road reduction
- Management of the invasive macrophyte Curlyleaf pondweed
- Reduction of internal sediment phosphorus loading using alum

Appendix B-5.7 Additional Fishery Information

Appendix B-5.7 Additional Fishery Information

Since Lake DeMontreville is connected by a navigable channel to Lake Olson, the Minnesota Department of Natural Resources (MDNR) manages both lakes identically, with largemouth bass the primary species and bluegill the secondary species. The lake's native fish population reproduced well in the past, and is currently reproducing well.

The MDNR stocked Lake DeMontreville with walleye in 2001 and 2005. The MDNR also periodically removes sunfish to stock other lakes. Lake DeMontreville was stocked repeatedly until 1975, mainly with northern pike. A 1979 survey found good spawning conditions for panfish and only fair northern pike spawning conditions. A wetland area adjacent to the northwest shore was previously used by the DNR and local citizens as a cooperative rearing pond for northern pike. During rebuilding of DeMontreville Trail, the water level control structure for the spawning area was removed. As a result, the wetland area is no longer maintained by the DNR, but is used by fish for spawning, except in drought years.

The MDNR's 2002 fishery survey identified the following:

- Panfish are in high population.
    - Bluegills are the most abundant species. The average length is 4.95 inches, with some exceeding 7 inches.
    - Pumpkinseed and hybrid sunfish were sampled with moderate abundance. They each had individuals in excess of 7 inches.
- Black crappie, overall, were sampled in average numbers. The average size sampled was less than 7 inches.
- Northern pike numbers are down when compared to previous years, but still considered average for this type of lake. The average size caught was 23.7 inches and 3.35 pounds.
- Both black and brown bullheads were caught in low abundance. Yellow bullheads were sampled in average abundance.
- Yellow perch were found in moderate abundance.
- One walleye was also sampled. In 2001, the DNR began stocking walleye fry in every other odd year.
- Largemouth bass were moderately abundant in low numbers due to the type of gear that was used.

- Electrofishing was not conducted during the 2002 assessment due to equipment failures.

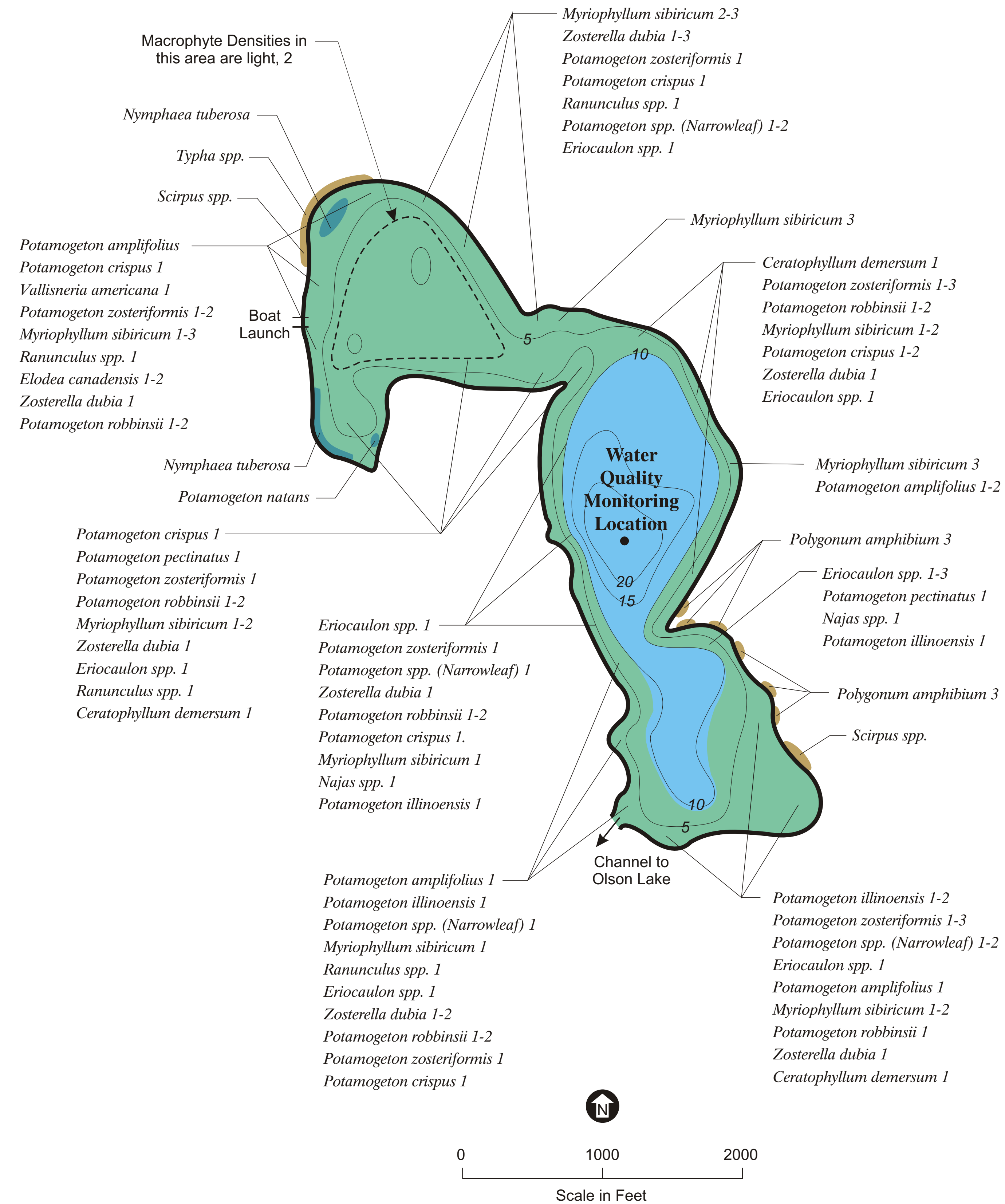
The MDNR's 2012 fishery survey identified the following:

- Bluegills continue to be present in above average abundance and small size. The average bluegill sampled in 2011 was 4.75 inches in length.
- Black crappies were sampled during the spring trap netting in larger than average size for what is typical for this lake. Over 30% of the black crappies sampled exceeded 10 inches.
- Northern pike continue to be found in high abundance. The average size sampled was 21.7 inches and 2.5 pounds.
- A small number of largemouth bass were sampled during the survey but averaged over 14 inches in length.
- A remnant population of walleye still exists since stocking was terminated after 2005.

Appendix C-5.7 Additional Macrophyte Information

- No macrophytes found in water > 9-10 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Portions of lake shoreline treated with "Reward" herbicide
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

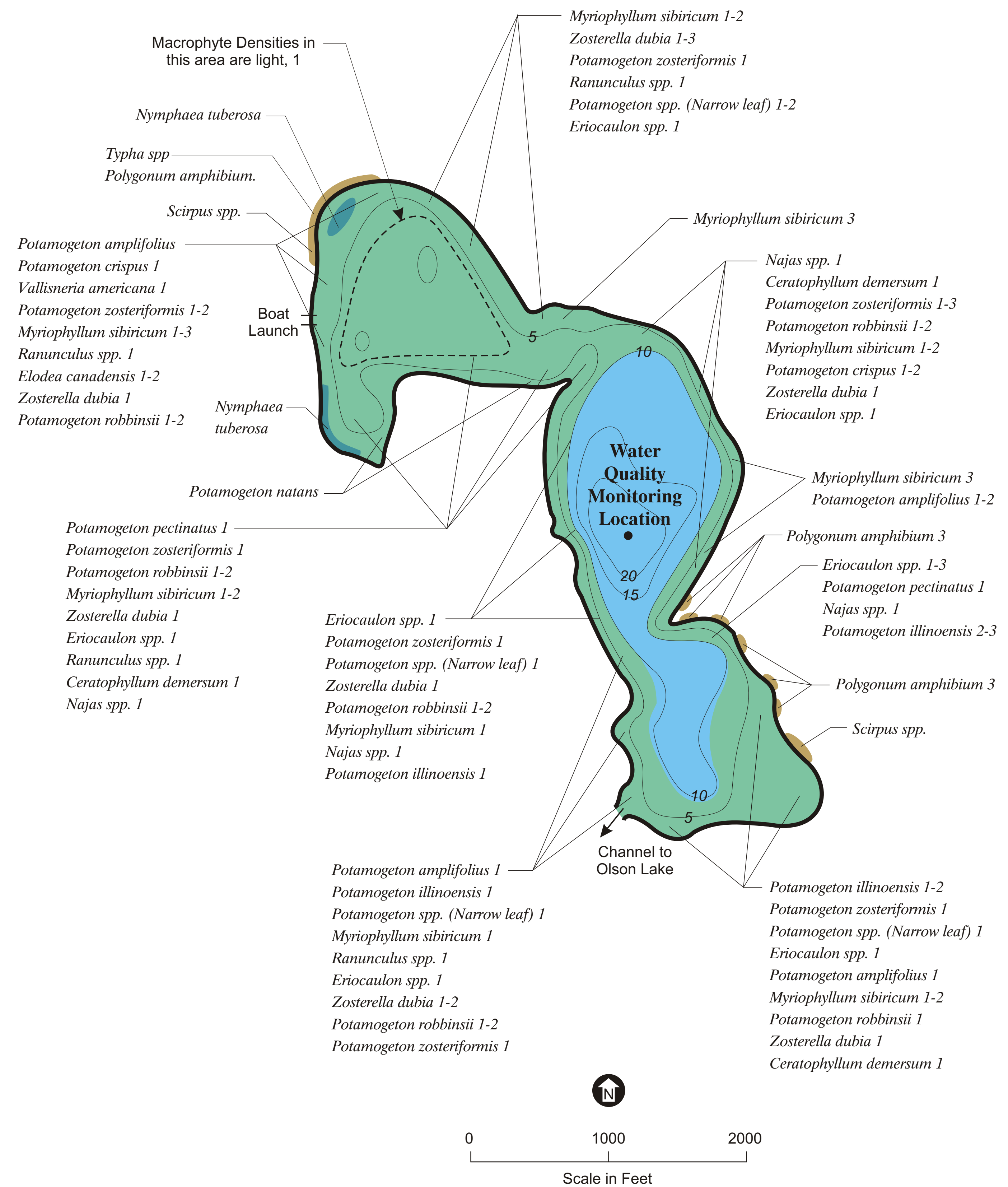
	Common Name	Scientific Name
Submerged Aquatic Plants:	Large-leaf pondweed	*Potamogeton amplifolius*
	Curlyleaf pondweed	*Potamogeton crispus*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton spp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	White water buttercup	*Ranunculus spp.*
	Elodea	*Elodea canadensis*
	Pipewort	*Eriocaulon spp.*
	Floating leaf pondweed	*Potamogeton natans*
	Bushy pondweed and naiad	*Najas spp.*
	Illinois pondweed	*Potamogeton illinoensis*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
Emergent:	Bulrush	*Scirpus spp.*
	Cattail	*Typha spp.*
	Water smartweed	*Polygonum amphibium*
No Aquatic Vegetation Found:		



LAKE DEMONTREVILLE
MACROPHYTE SURVEY
JUNE 17, 1998

- No macrophytes found in water > 9-10 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Portions of lake shoreline treated with "Reward" herbicide
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

	Common Name	Scientific Name
Submerged Aquatic Plants:	Large-leaf pondweed	*Potamogeton amplifolius*
	Curlyleaf pondweed	*Potamogeton crispus*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton spp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	White water buttercup	*Ranunculus spp.*
	Elodea	*Elodea canadensis*
	Pipewort	*Eriocaulon spp.*
	Floating leaf pondweed	*Potamogeton natans*
	Bushy pondweed and naiad	*Najas spp.*
	Illinois pondweed	*Potamogeton illinoensis*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
Emergent:	Bulrush	*Scirpus spp.*
	Cattail	*Typha spp.*
	Water smartweed	*Polygonum amphibium*
No Aquatic Vegetation Found:		

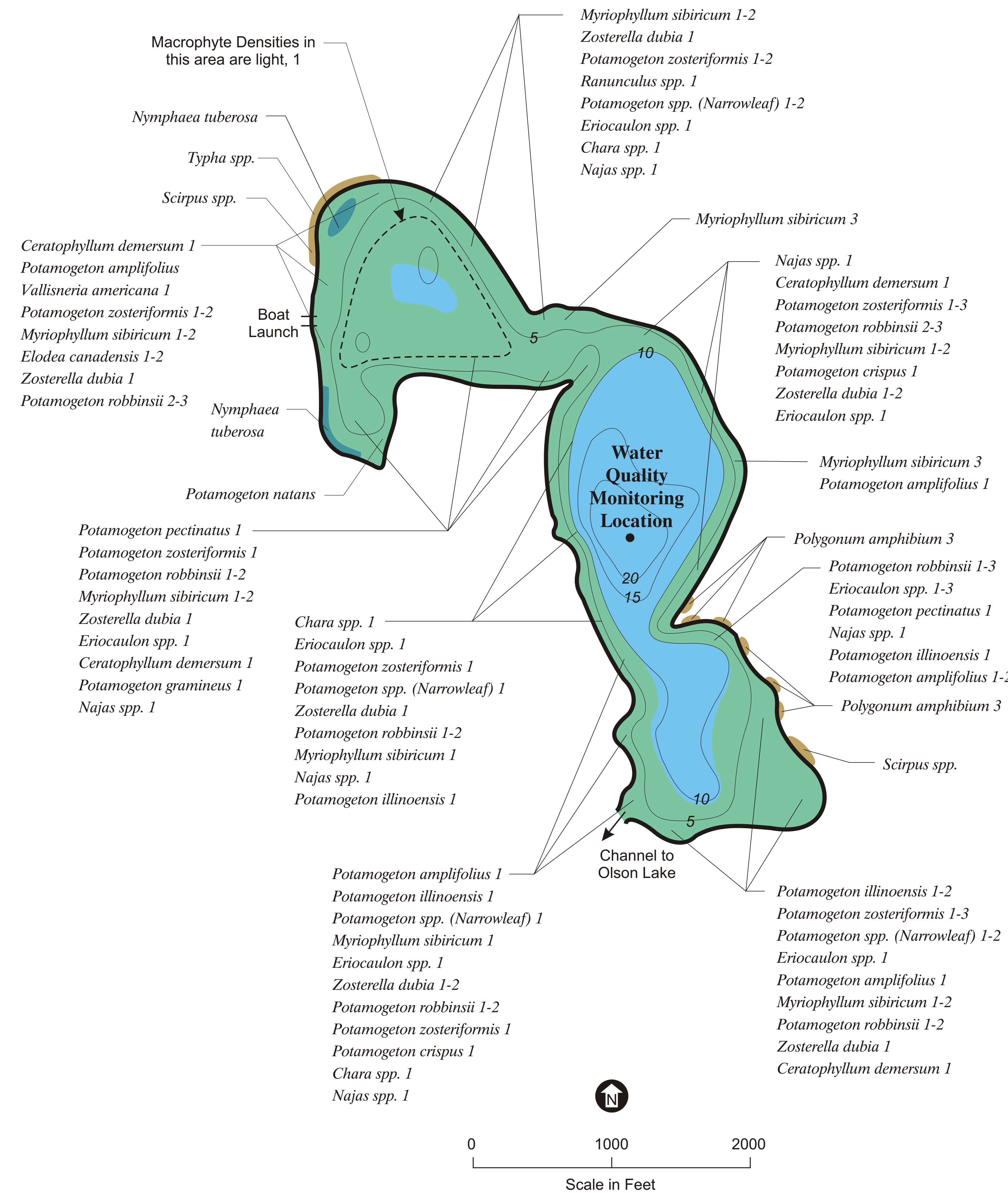


LAKE DEMONTREVILLE
MACROPHYTE SURVEY
AUGUST 18, 1998

P:23/82/207/LAKEMAPS/DEMONTREVILLE/1998/AUGUST1998.CDR RLG 03-25-04

- No macrophytes found in water > 9-10 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

	Common Name	Scientific Name
Submerged Aquatic Plants:	Large-leaf pondweed	*Potamogeton amplifolius*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton spp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	Elodea	*Elodea canadensis*
	Pipewort	*Eriocaulon spp.*
	Floating leaf pondweed	*Potamogeton natans*
	Bushy pondweed and naiad	*Najas spp.*
	Illinois pondweed	*Potamogeton illinoensis*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
Emergent:	Bulrush	*Scirpus spp.*
	Cattail	*Typha spp.*
	Water smartweed	*Polygonum amphibium*
No Aquatic Vegetation Found:		

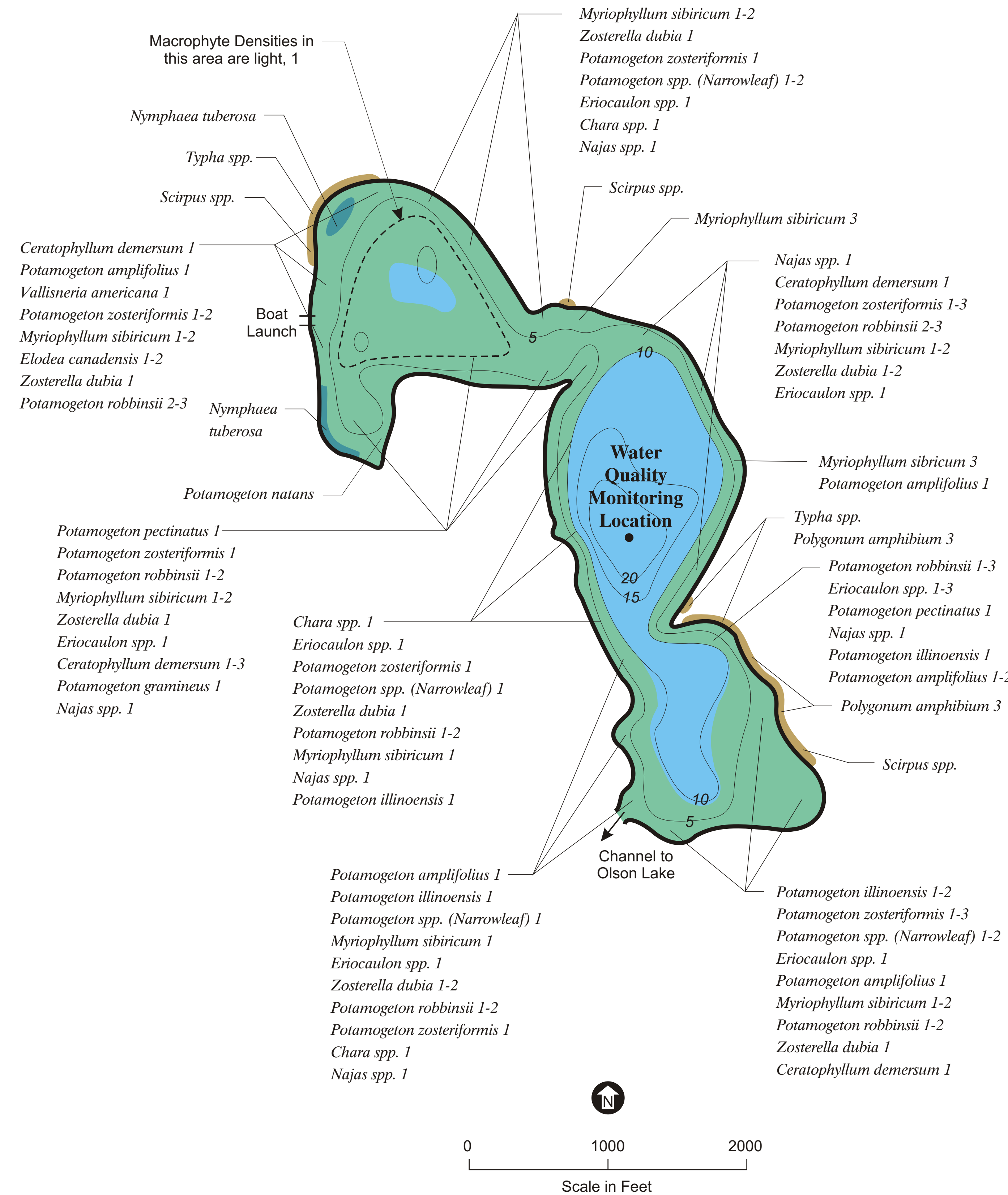


LAKE DEMONTREVILLE
MACROPHYTE SURVEY
JUNE 24, 1999

P:23/82/207/LAKEMAPS/DEMONTREVILLE/1999/JUNE1999.CDR RLG 03-25-04

- No macrophytes found in water > 9-10 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Portions of lake shoreline treated with "Reward" herbicide
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

	Common Name	Scientific Name
Submerged Aquatic Plants:	Variable pondweed	*Potamogeton gramineus*
	Large-leaf pondweed	*Potamogeton amplifolius*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton spp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	Elodea	*Elodea canadensis*
	Pipewort	*Eriocaulon spp.*
	Floating leaf pondweed	*Potamogeton natans*
	Bushy pondweed and naiad	*Najas spp.*
	Illinois pondweed	*Potamogeton illinoensis*
	Muskgrass	*Chara spp.*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
Emergent:	Bulrush	*Scirpus spp.*
	Cattail	*Typha spp.*
	Water smartweed	*Polygonum amphibium*
No Aquatic Vegetation Found:		

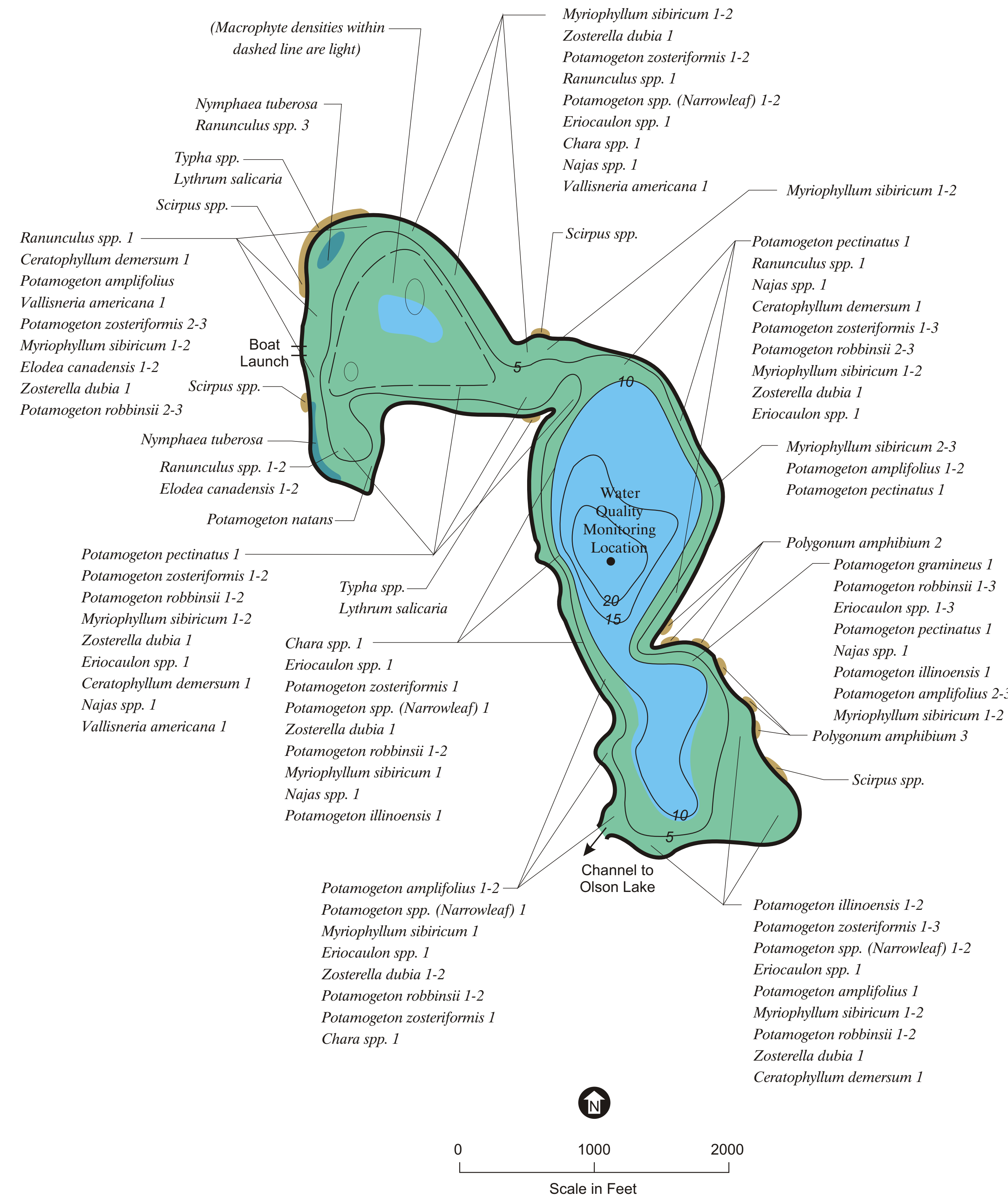


LAKE DEMONTREVILLE
MACROPHYTE SURVEY
AUGUST 26, 1999

P:23/82/207/LAKEMAPS/DEMONTREVILLE/1999/AUGUST1999.CDR RLG 03-25-04

- No macrophytes found in water > 10 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

	Common Name	Scientific Name
Submerged Aquatic Plants:	Variable pondweed	*Potamogeton gramineus*
	Large-leaf pondweed	*Potamogeton amplifolius*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton spp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	White water buttercup	*Ranunculus spp.*
	Elodea	*Elodea canadensis*
	Pipewort	*Eriocaulon spp.*
	Bushy pondweed and naiad	*Najas spp.*
	Illinois pondweed	*Potamogeton illinoensis*
	Muskgrass	*Chara spp.*
	Floating leaf pondweed	*Potamogeton natans*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
Emergent:	Bulrush	*Scirpus spp.*
	Cattail	*Typha spp.*
	Water smartweed	*Polygonum amphibium*
	Purple loosestrife	*Lythrum salicaria*
No Aquatic Vegetation Found:		

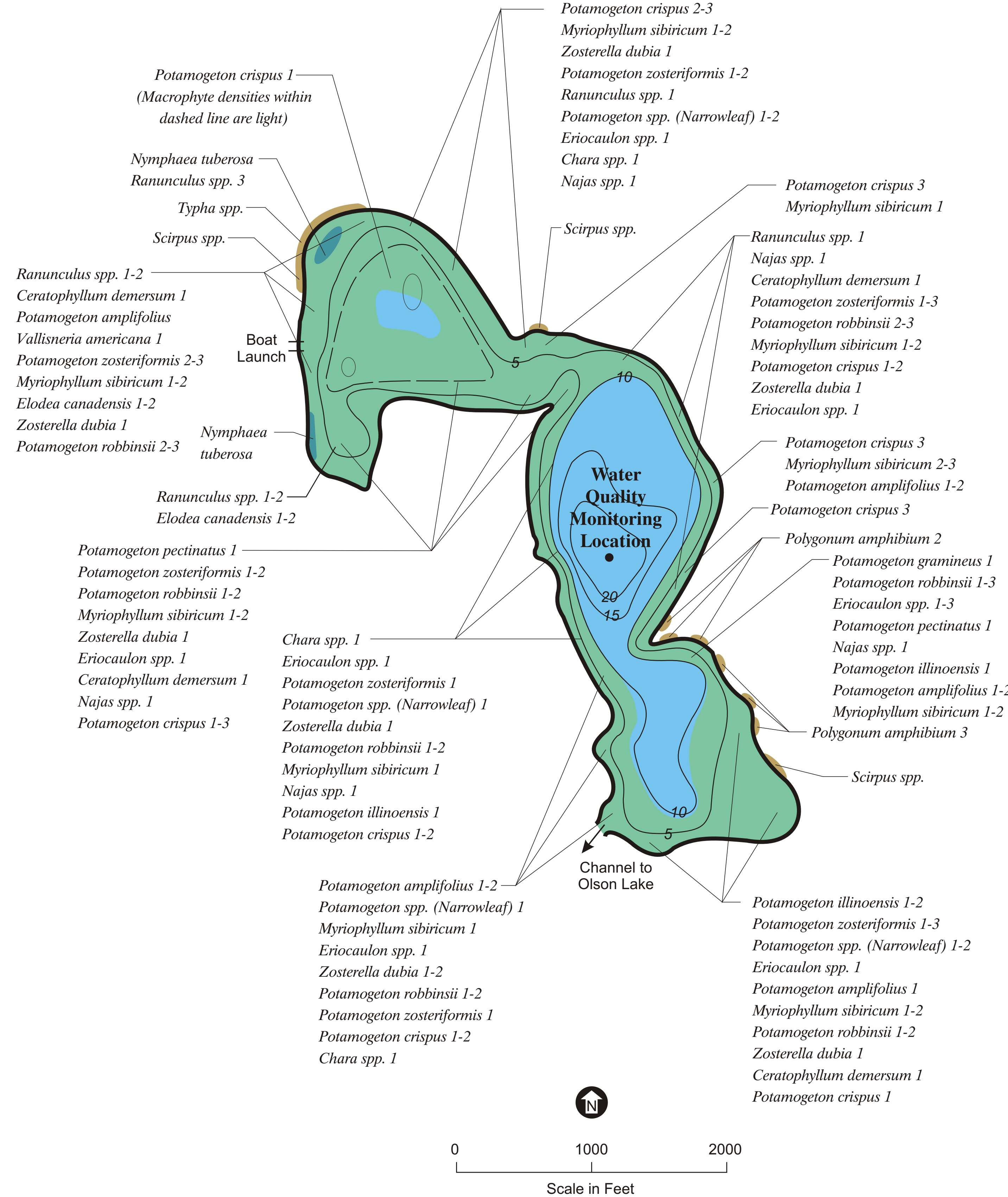


LAKE DEMONTREVILLE
MACROPHYTE SURVEY
AUGUST 23, 2002

P:23/82/207/LAKEMAPS/DEMONTREVILLE/2002/AUGUST2002.CDR RLG 03-16-04

- No macrophytes found in water > 10 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy

	Common Name	Scientific Name
Submerged Aquatic Plants:	Variable pondweed	*Potamogeton gramineus*
	Large-leaf pondweed	*Potamogeton amplifolius*
	Curlyleaf pondweed	*Potamogeton crispus*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton spp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	White water buttercup	*Ranunculus spp.*
	Elodea	*Elodea canadensis*
	Pipewort	*Eriocaulon spp.*
	Bushy pondweed and naiad	*Najas spp.*
	Illinois pondweed	*Potamogeton illinoensis*
	Muskgrass	*Chara spp.*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
Emergent:	Bulrush	*Scirpus spp.*
	Cattail	*Typha spp.*
	Water smartweed	*Polygonum amphibium*
No Aquatic Vegetation Found:		

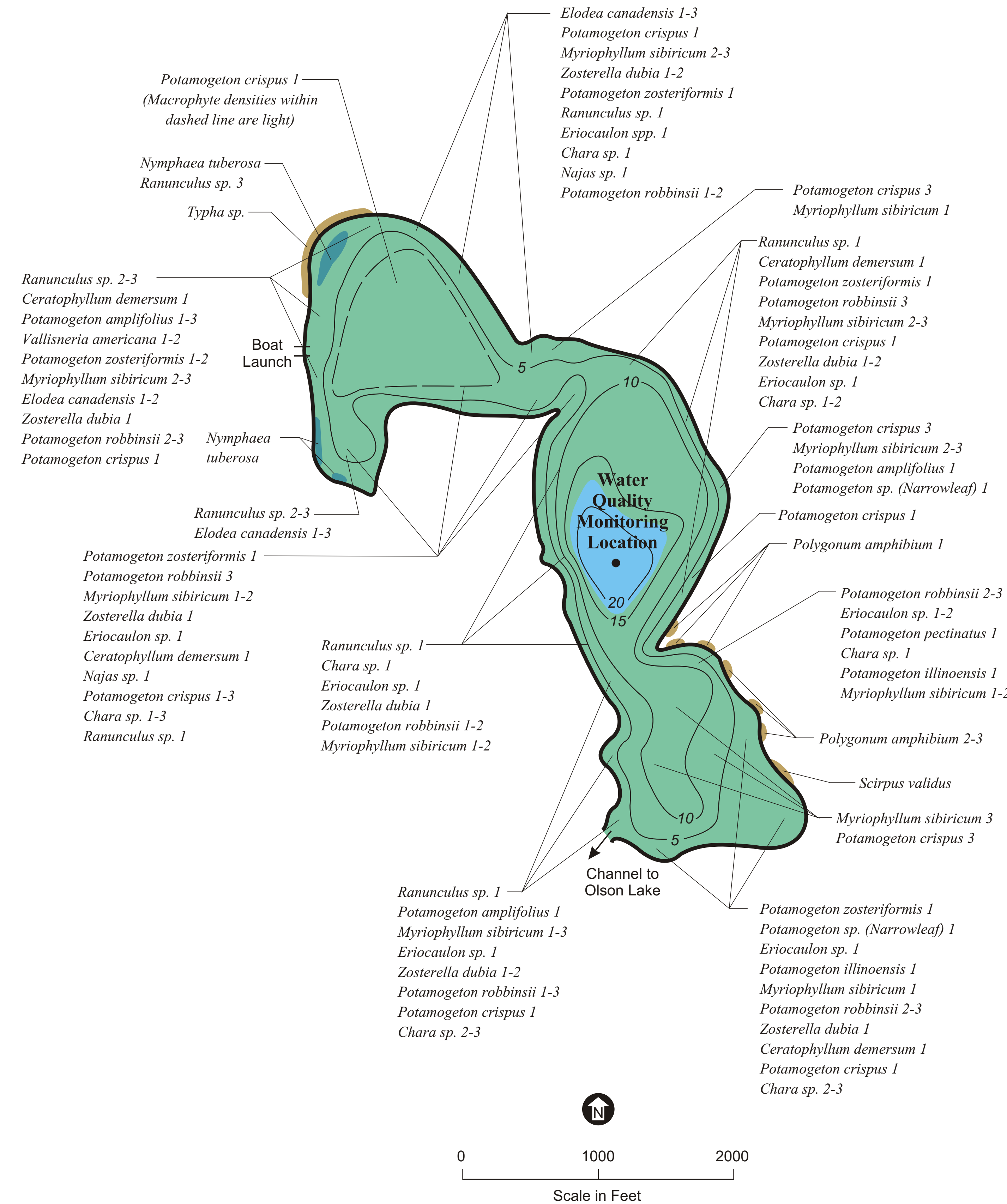


LAKE DEMONTREVILLE
MACROPHYTE SURVEY
JUNE 12, 2002

P:23/82/207/LAKEMAPS/DEMONTREVILLE/2002/JUNE2002.CDR RLG 03-25-04

- No macrophytes found in water > 16 - 17 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy
- *Potamogeton robbinsii* appears to be dying (Sprayed?)
- Macrophytes have algal growth on plant surface
- *Potamogeton crispus* appears to have been sprayed

	Common Name	Scientific Name
Submerged Aquatic Plants:	Illinois pondweed	*Potamogeton illinoensis*
	Large-leaf pondweed	*Potamogeton amplifolius*
	Curlyleaf pondweed	*Potamogeton crispus*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton sp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	White water buttercup	*Ranunculus sp.*
	Elodea	*Elodea canadensis*
	Bushy pondweed and naiad	*Najas sp.*
	Muskgrass	*Chara sp.*
	Pipewort	*Eriocaulon sp.*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
	Water smartweed	*Polygonum amphibium*
Emergent:	Bulrush	*Scirpus sp.*
	Cattail	*Typha sp.*
	Softstem bulrush	*Scirpus validus*
No Aquatic Vegetation Found:		

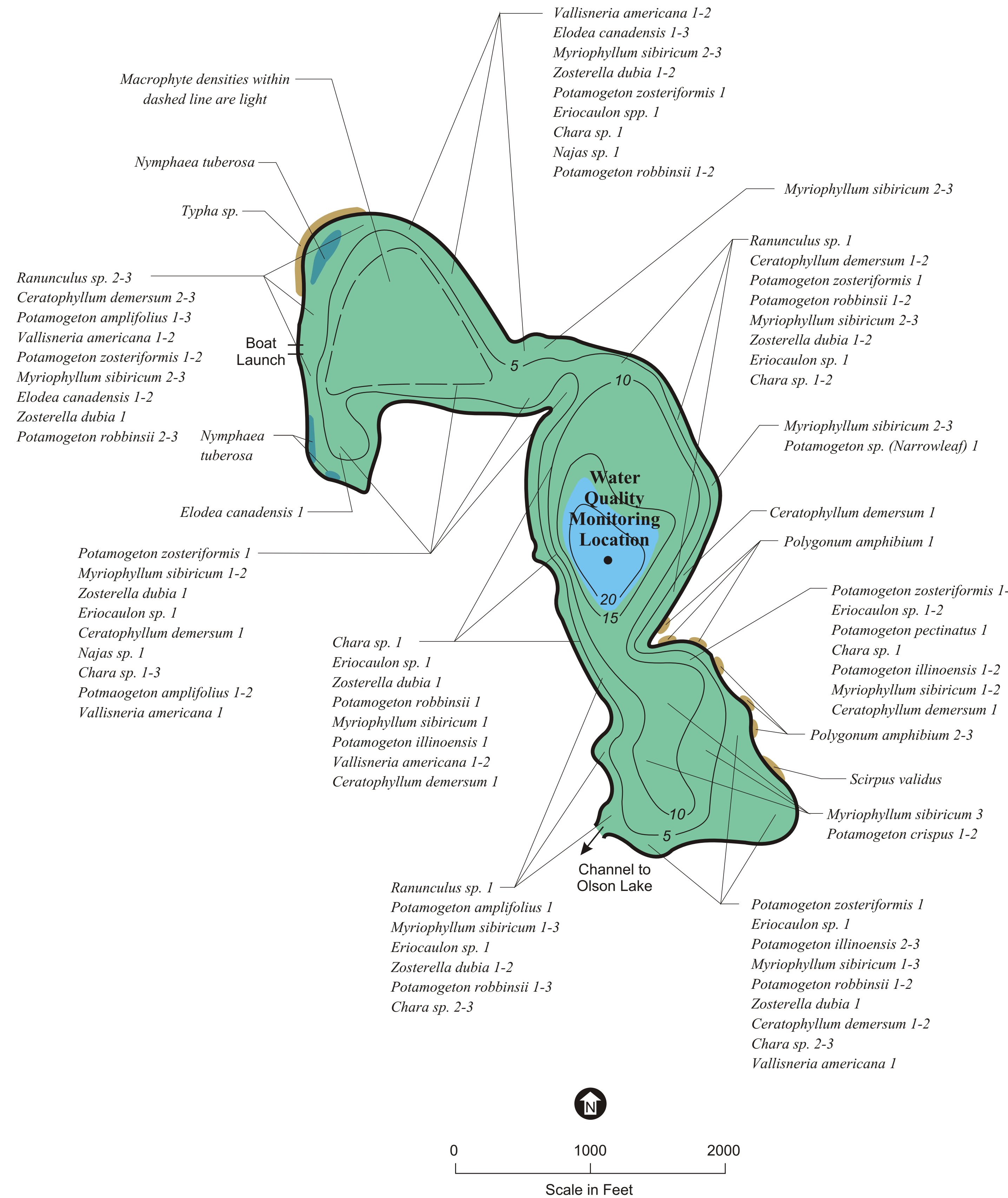


LAKE DEMONTREVILLE
MACROPHYTE SURVEY
JUNE 20, 2005

P:23/82/207/LAKEMAPS/DEMONTREVILLE/2005/JUNE2005.CDR RLG 12-21-05

- No macrophytes found in water > 16 - 17 feet
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy
- *Potamogeton robbinsii* appears to be dying (Sprayed?)
- Macrophytes have algal growth on plant surface
- *Potamogeton crispus* appears to have been sprayed

	Common Name	Scientific Name
Submerged Aquatic Plants:	Illinois pondweed	*Potamogeton illinoensis*
	Large-leaf pondweed	*Potamogeton amplifolius*
	Curlyleaf pondweed	*Potamogeton crispus*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton sp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	White water buttercup	*Ranunculus sp.*
	Elodea	*Elodea canadensis*
	Bushy pondweed and naiad	*Najas sp.*
	Muskgrass	*Chara sp.*
	Pipewort	*Eriocaulon sp.*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
	Water smartweed	*Polygonum amphibium*
Emergent:	Bulrush	*Scirpus sp.*
	Cattail	*Typha sp.*
	Softstem bulrush	*Scirpus validus*
No Aquatic Vegetation Found:		

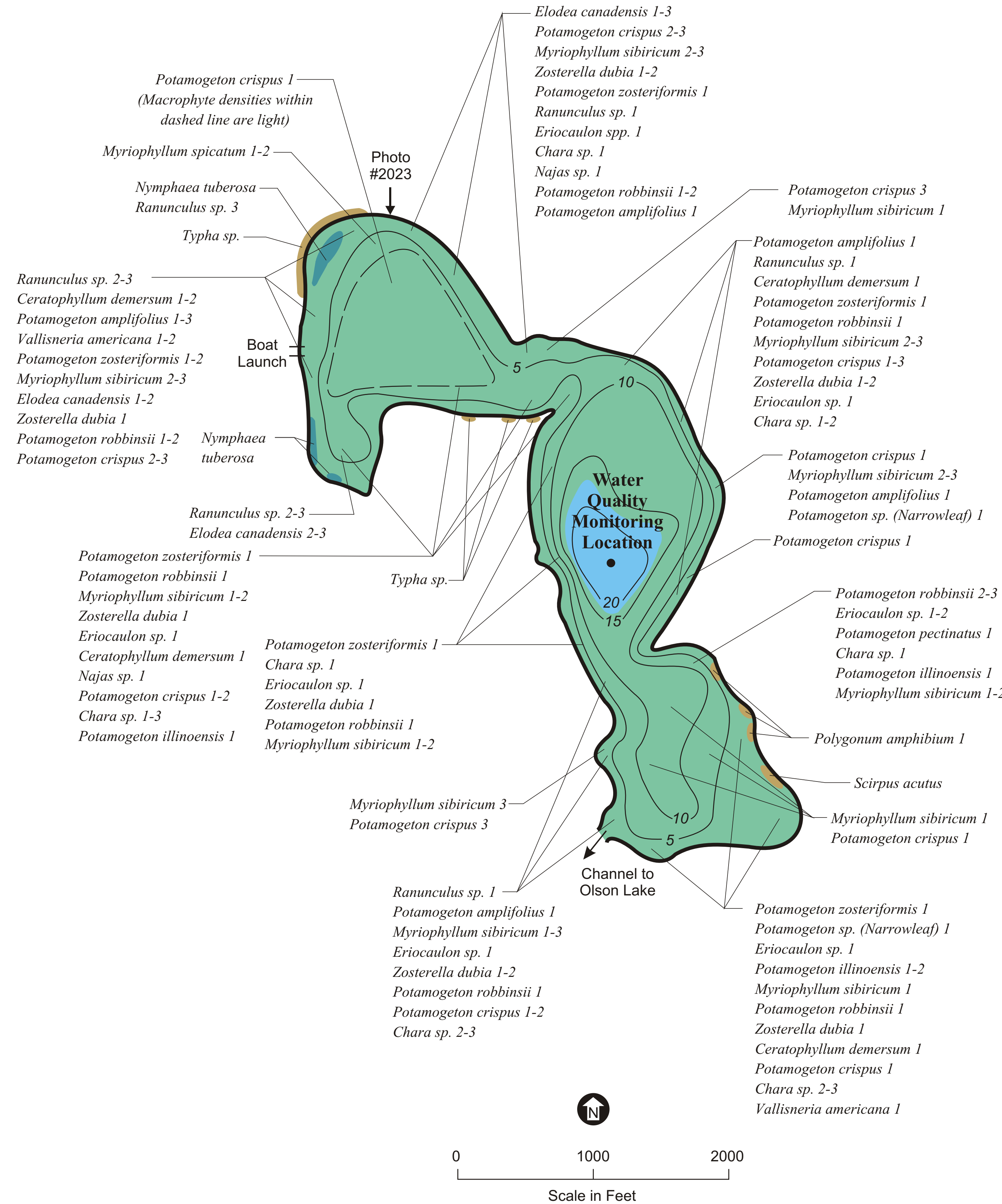


LAKE DEMONTREVILLE
MACROPHYTE SURVEY
AUGUST 16, 2005

P:23/82/207/LAKEMAPS/DEMONTREVILLE/2005/Demontreville AUGUST 2005.CDR RLG 12-21-05

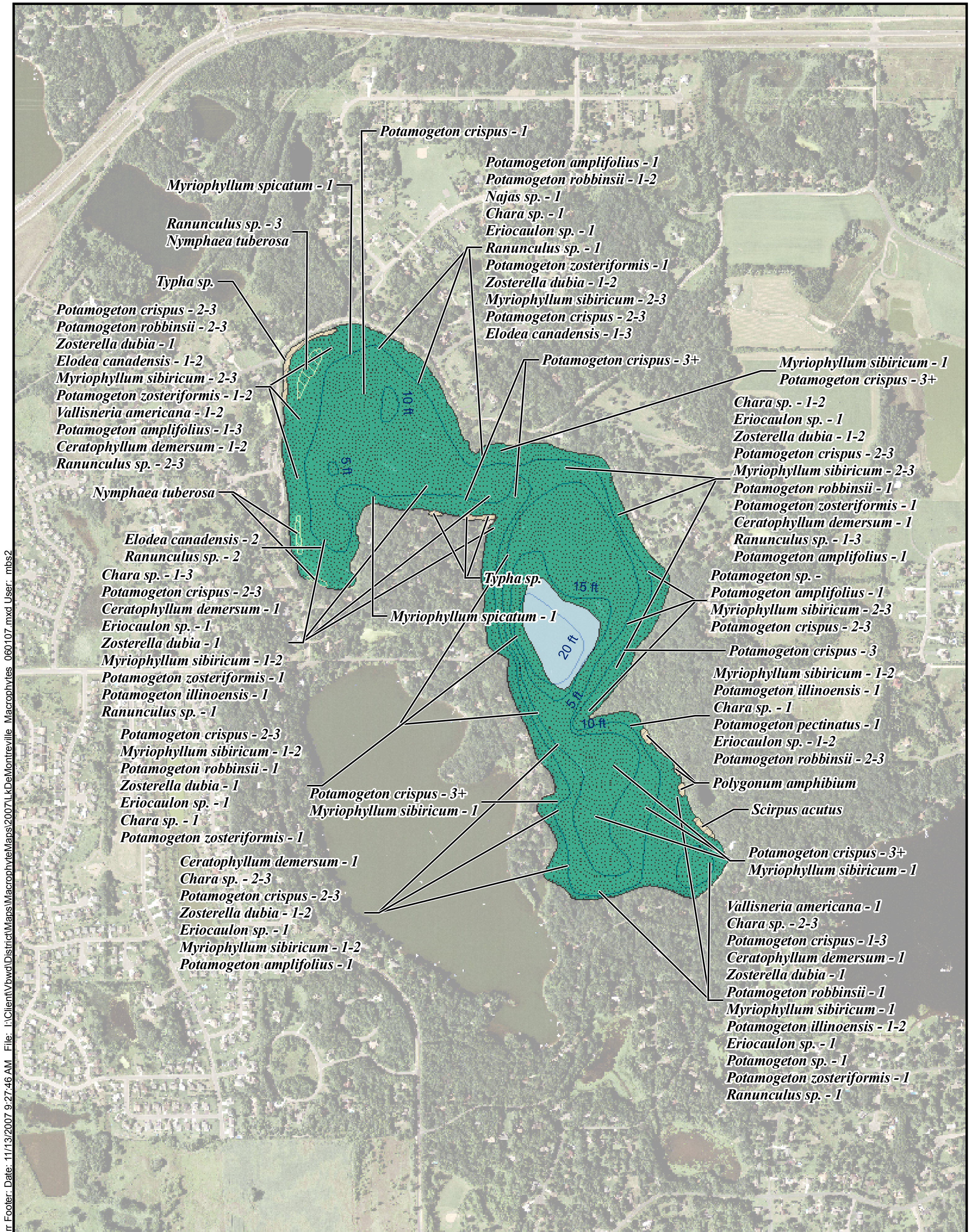
- No macrophytes found in water > 16 - 17 feet
- 12 feet and less, macrophyte densities are greatest
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophyte densities estimated as follows: 1 = light; 2 = moderate; 3 = heavy
- Macrophytes have algal growth on plant surface

	Common Name	Scientific Name
Submerged Aquatic Plants:	Illinois pondweed	*Potamogeton illinoensis*
	Large-leaf pondweed	*Potamogeton amplifolius*
	Curlyleaf pondweed	*Potamogeton crispus*
	Flatstem pondweed	*Potamogeton zosteriformis*
	Sago pondweed	*Potamogeton pectinatus*
	Leafy/Narrowleaf pondweed	*Potamogeton sp.*
	Northern water milfoil	*Myriophyllum sibiricum*
	Eurasian water milfoil	*Myriophyllum spicatum*
	Robbins' pondweed	*Potamogeton robbinsii*
	Water celery	*Vallisneria americana*
	Water stargrass	*Zosterella dubia*
	Coontail	*Ceratophyllum demersum*
	White water buttercup	*Ranunculus sp.*
	Elodea	*Elodea canadensis*
	Bushy pondweed and naiad	*Najas sp.*
	Muskgrass	*Chara sp.*
	Pipewort	*Eriocaulon sp.*
Floating Leaf:	White waterlily	*Nymphaea tuberosa*
	Water smartweed	*Polygonum amphibium*
Emergent:	Bulrush	*Scirpus sp.*
	Cattail	*Typha sp.*
	Hardstem bulrush	*Scirpus acutus*
No Aquatic Vegetation Found:		



LAKE DEMONTREVILLE
MACROPHYTE SURVEY
JUNE 4, 2006

P:23/82/207/LAKEMAPS/DEMONTREVILLE/2005/Demontreville JUNE 2006.CDR RLG 09-07-06



Submerged Aquatic Plants

Common Name	Scientific Name
Illinois pondweed	*Potamogeton illinoensis*
Robbins' pondweed	*Potamogeton robbinsii*
bushy pondweed and naiads	*Najas sp.*
coontail	*Ceratophyllum demersum*
curlyleaf pondweed	*Potamogeton crispus*
eurasian watermilfoil	*Myriophyllum spicatum*
flatstem pondweed	*Potamogeton zosteriformis*
largeleaf pondweed	*Potamogeton amplifolius*
muskgrass	*Chara sp.*
northern watermilfoil	*Myriophyllum sibiricum*
pipewort	*Eriocaulon sp.*
pondweed	*Potamogeton sp.*
sago pondweed	*Potamogeton pectinatus*
water crowfoot	*Ranunculus sp.*
water stargrass	*Zosterella dubia*
wild celery	*Vallisneria americana*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
white waterlily	*Nymphaea tuberosa*

Emergent Plants

Common Name	Scientific Name
cattail	*Typha sp.*
hardstem bulrush	*Scirpus acutus*
water knotweed	*Polygonum amphibium*

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >16-17'
- Macrophyte densities are greatest at depths 10 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophytes have algal growth on plant surface

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

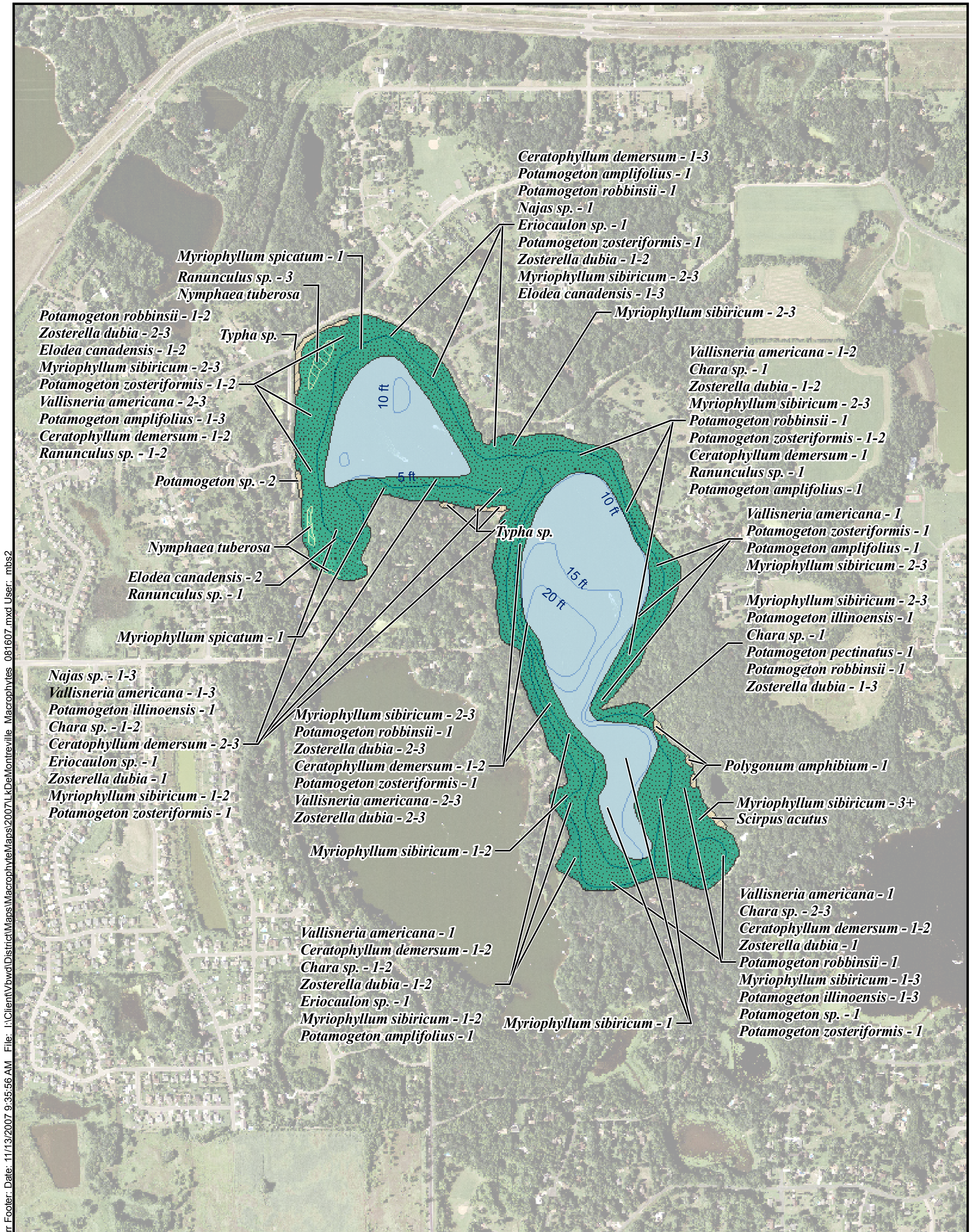
0 500 1,000 1,500 2,000 2,500
Feet

0 100 200 300 400 500
Meters

Imagery Source: 2006 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE SURVEY RESULTS
June 1, 2007
Valley Branch Watershed District



Submerged Aquatic Plants

Common Name	Scientific Name
Illinois pondweed	*Potamogeton illinoensis*
Robbins' pondweed	*Potamogeton robbinsii*
bushy pondweed and naiads	*Najas sp.*
coontail	*Ceratophyllum demersum*
eurasian watermilfoil	*Myriophyllum spicatum*
flatstem pondweed	*Potamogeton zosteriformis*
largeleaf pondweed	*Potamogeton amplifolius*
muskgrass	*Chara sp.*
northern watermilfoil	*Myriophyllum sibiricum*
pipewort	*Eriocaulon sp.*
pondweed	*Potamogeton sp.*
sago pondweed	*Potamogeton pectinatus*
water crowfoot	*Ranunculus sp.*
water stargrass	*Zosterella dubia*
wild celery	*Vallisneria americana*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
white waterlily	*Nymphaea tuberosa*

Emergent Plants

Common Name	Scientific Name
cattail	*Typha sp.*
hardstem bulrush	*Scirpus acutus*
water knotweed	*Polygonum amphibium*

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >10-11'
- Macrophyte densities are greatest at depths 7 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophytes have algal growth on plant surface

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

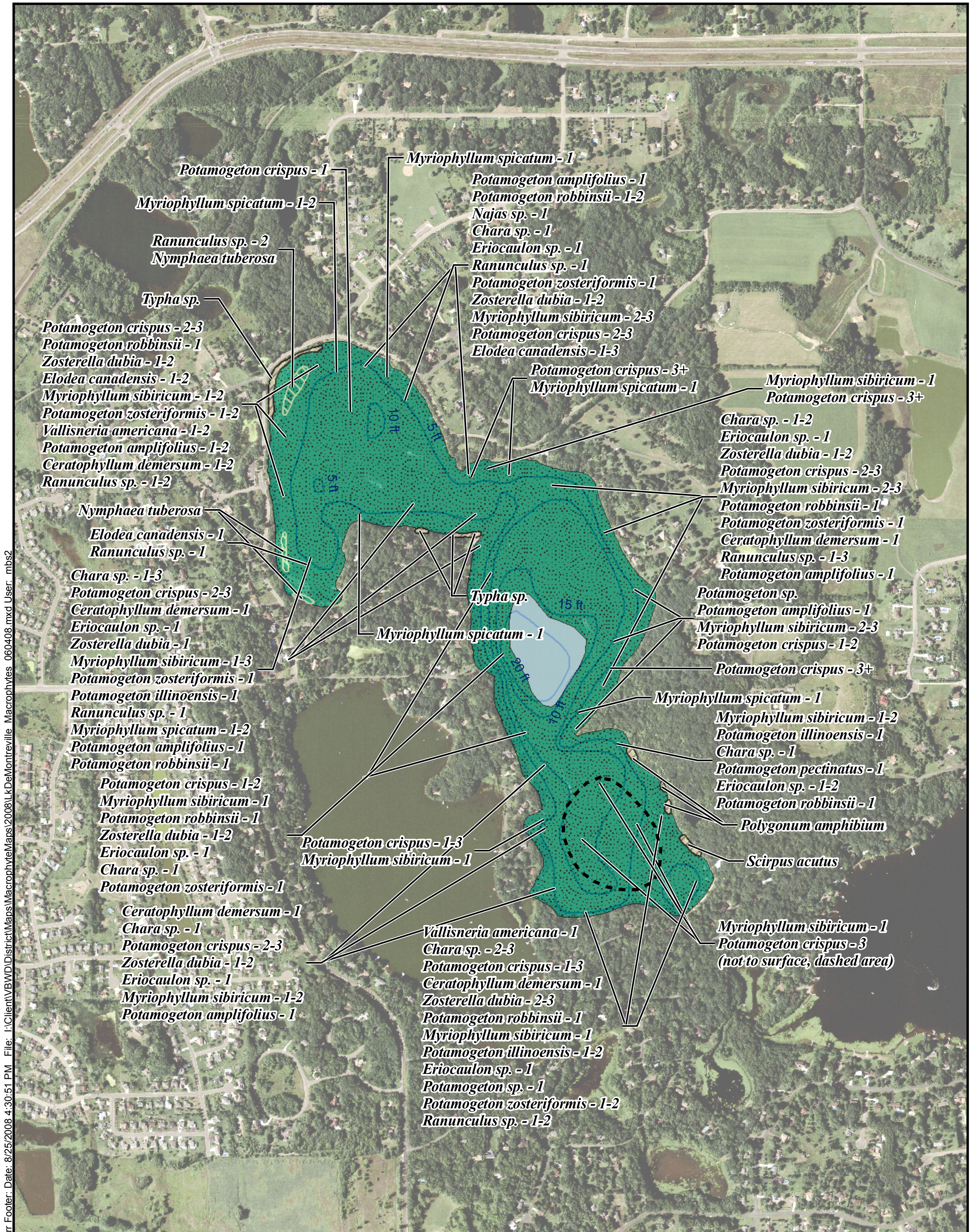
0 500 1,000 1,500 2,000 2,500
Feet

0 100 200 300 400 500
Meters

Imagery Source: 2006 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE
SURVEY RESULTS
August 16, 2007
Valley Branch Watershed District



Submerged Aquatic Plants

Common Name	Scientific Name
Illinois pondweed	*Potamogeton illinoensis*
Robbins' pondweed	*Potamogeton robbinsii*
bushy pondweed and naiads	*Najas sp.*
coontail	*Ceratophyllum demersum*
curlyleaf pondweed	*Potamogeton crispus*
eurasian watermilfoil	*Myriophyllum spicatum*
flatstem pondweed	*Potamogeton zosteriformis*
largeleaf pondweed	*Potamogeton amplifolius*
muskgrass	*Chara sp.*
northern watermilfoil	*Myriophyllum sibiricum*
pipewort	*Eriocaulon sp.*
pondweed	*Potamogeton sp.*
sago pondweed	*Potamogeton pectinatus*
water crowfoot	*Ranunculus sp.*
water stargrass	*Zosterella dubia*
wild celery	*Vallisneria americana*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
white waterlily	*Nymphaea tuberosa*

Emergent Plants

Common Name	Scientific Name
cattail	*Typha sp.*
hardstem bulrush	*Scirpus acutus*
water knotweed	*Polygonum amphibium*

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >16-17'
- Macrophyte densities are greatest at depths 10 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophytes have algal growth on plant surface

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

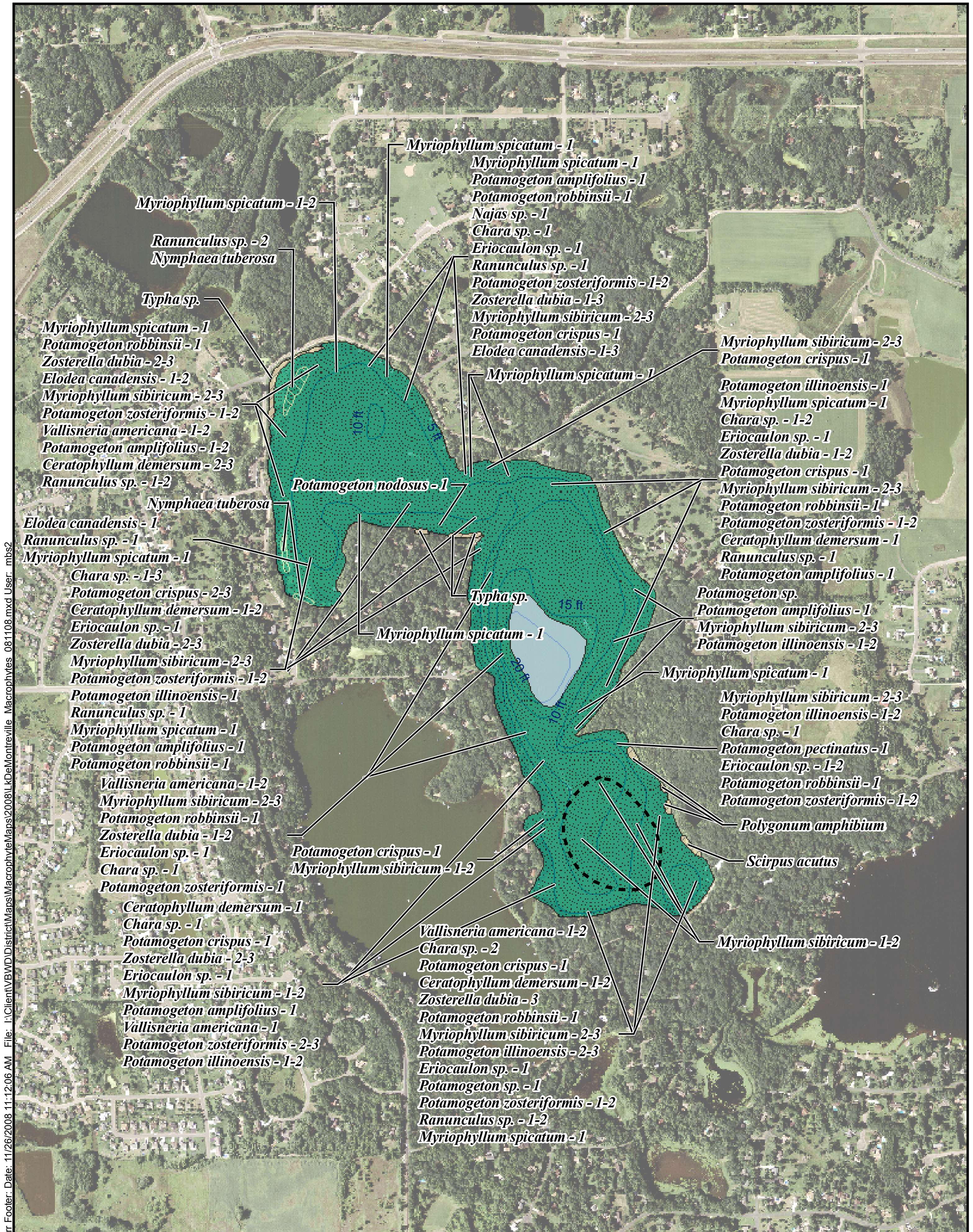
0 500 1,000 1,500 2,000 2,500
Feet

0 100 200 300 400 500
Meters

Imagery Source: 2006 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE SURVEY RESULTS
June 4, 2008
Valley Branch Watershed District



Submerged Aquatic Plants

Common Name	Scientific Name
Longleaf pondweed	*Potamogeton nodosus*
Illinois pondweed	*Potamogeton illinoensis*
Robbins' pondweed	*Potamogeton robbinsii*
bushy pondweed and naiads	*Najas sp.*
coontail	*Ceratophyllum demersum*
eurasian watermilfoil	*Myriophyllum spicatum*
flatstem pondweed	*Potamogeton zosteriformis*
largeleaf pondweed	*Potamogeton amplifolius*
muskgrass	*Chara sp.*
northern watermilfoil	*Myriophyllum sibiricum*
pipewort	*Eriocaulon sp.*
pondweed	*Potamogeton sp.*
sago pondweed	*Potamogeton pectinatus*
water crowfoot	*Ranunculus sp.*
water stargrass	*Zosterella dubia*
wild celery	*Vallisneria americana*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
white waterlily	*Nymphaea tuberosa*

Emergent Plants

Common Name	Scientific Name
cattail	*Typha sp.*
hardstem bulrush	*Scirpus acutus*
water knotweed	*Polygonum amphibium*

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >16-17'
- Macrophyte densities are greatest at depths 10 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophytes have algal growth on plant surface

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

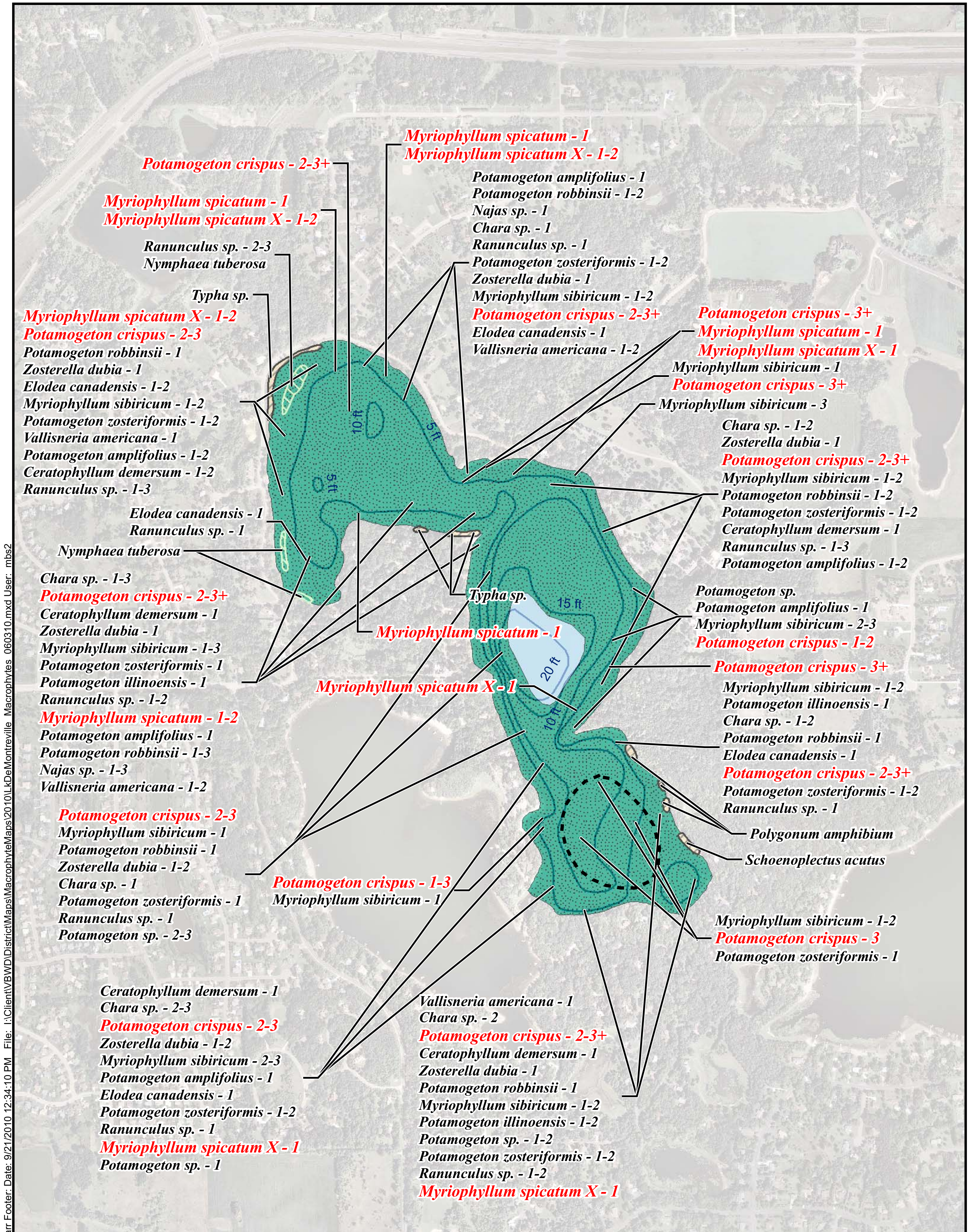
0 500 1,000 1,500 2,000 2,500
Feet

0 100 200 300 400 500
Meters

Imagery Source: 2006 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE
SURVEY RESULTS
August 11, 2008
Valley Branch Watershed District



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Submerged Aquatic Plants

Common Name	Scientific Name
Illinois pondweed	*Potamogeton illinoensis*
Robbins' pondweed	*Potamogeton robbinsii*
bushy pondweed and naiads	*Najas sp.*
coontail	*Ceratophyllum demersum*
eurasian watermilfoil	***Myriophyllum spicatum***
eurasion watermilfoil cross	***Myriophyllum spicatum X*** ***Myriophyllum sibiricum***
flatstem pondweed	*Potamogeton zosteriformis*
largeleaf pondweed	*Potamogeton amplifolius*
curlyleaf pondweed	***Potamogeton crispus***
muskgrass	*Chara sp.*
northern watermilfoil	*Myriophyllum sibiricum*
pondweed	*Potamogeton sp.*
sago pondweed	*Potamogeton pectinatus*
water crowfoot	*Ranunculus sp.*
water stargrass	*Zosterella dubia*
wild celery	*Vallisneria americana*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
white waterlily	*Nymphaea tuberosa*

Emergent Plants

Common Name	Scientific Name
cattail	*Typha sp.*
hardstem bulrush	*Schoenoplectus acutus*
water knotweed	*Polygonum amphibium*

*Note: Bold red name indicates extremely aggressive/invasive introduced species.

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >16-17'
- Macrophyte densities are greatest at depths 10 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophytes have algal growth on plant surface

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

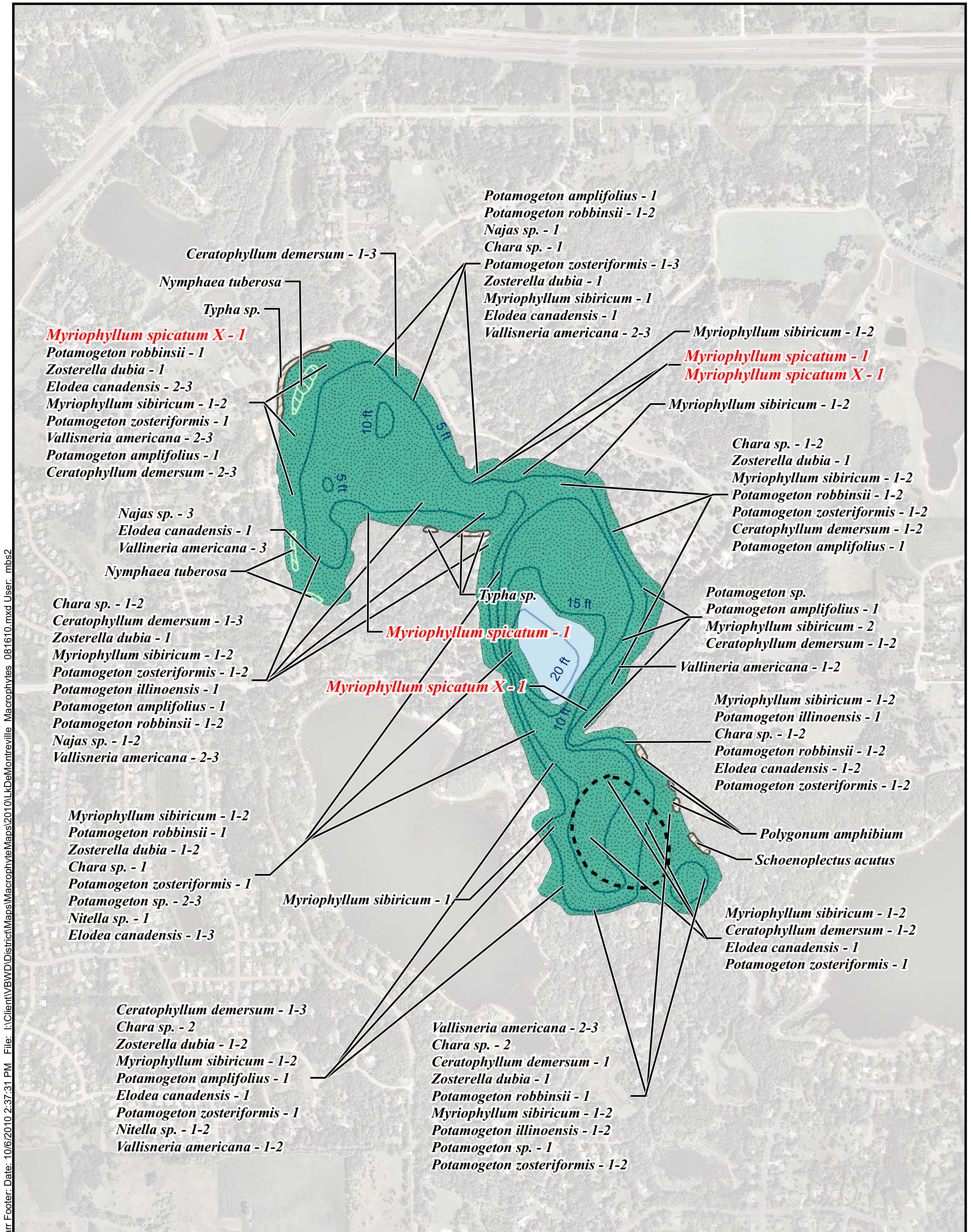
0 1,000 2,000
Feet

0 300 600
Meters

Imagery Source: 2009 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE SURVEY RESULTS
June 3, 2010
Valley Branch Watershed District



Submerged Aquatic Plants

Common Name	Scientific Name
Illinois pondweed	*Potamogeton illinoensis*
Robbins' pondweed	*Potamogeton robbinsii*
bushy pondweed and naiads	*Najas sp.*
coontail	*Ceratophyllum demersum*
eurasian watermilfoil	***Myriophyllum spicatum***
eurasion watermilfoil cross	***Myriophyllum spicatum X Myriophyllum sibiricum***
flatstem pondweed	*Potamogeton zosteriformis*
largeleaf pondweed	*Potamogeton amplifolius*
curlyleaf pondweed	***Potamogeton crispus***
muskgrass	*Chara sp.*
northern watermilfoil	*Myriophyllum sibiricum*
pondweed	*Potamogeton sp.*
sago pondweed	*Potamogeton pectinatus*
water crowfoot	*Ranunculus sp.*
water stargrass	*Zosterella dubia*
wild celery	*Vallisneria americana*
stoneworts	*Nitella sp.*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
white waterlily	*Nymphaea tuberosa*

Emergent Plants

Common Name	Scientific Name
cattail	*Typha sp.*
hardstem bulrush	*Schoenoplectus acutus*
water knotweed	*Polygonum amphibium*

*Note: Bold red name indicates extremely aggressive/invasive introduced species.

FIELD NOTES:
- Macrophyte densities estimated as follows: 1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >16-17'
- Macrophyte densities are greatest at depths 10 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- Macrophytes have algal growth on plant surface
- Low water clarity

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

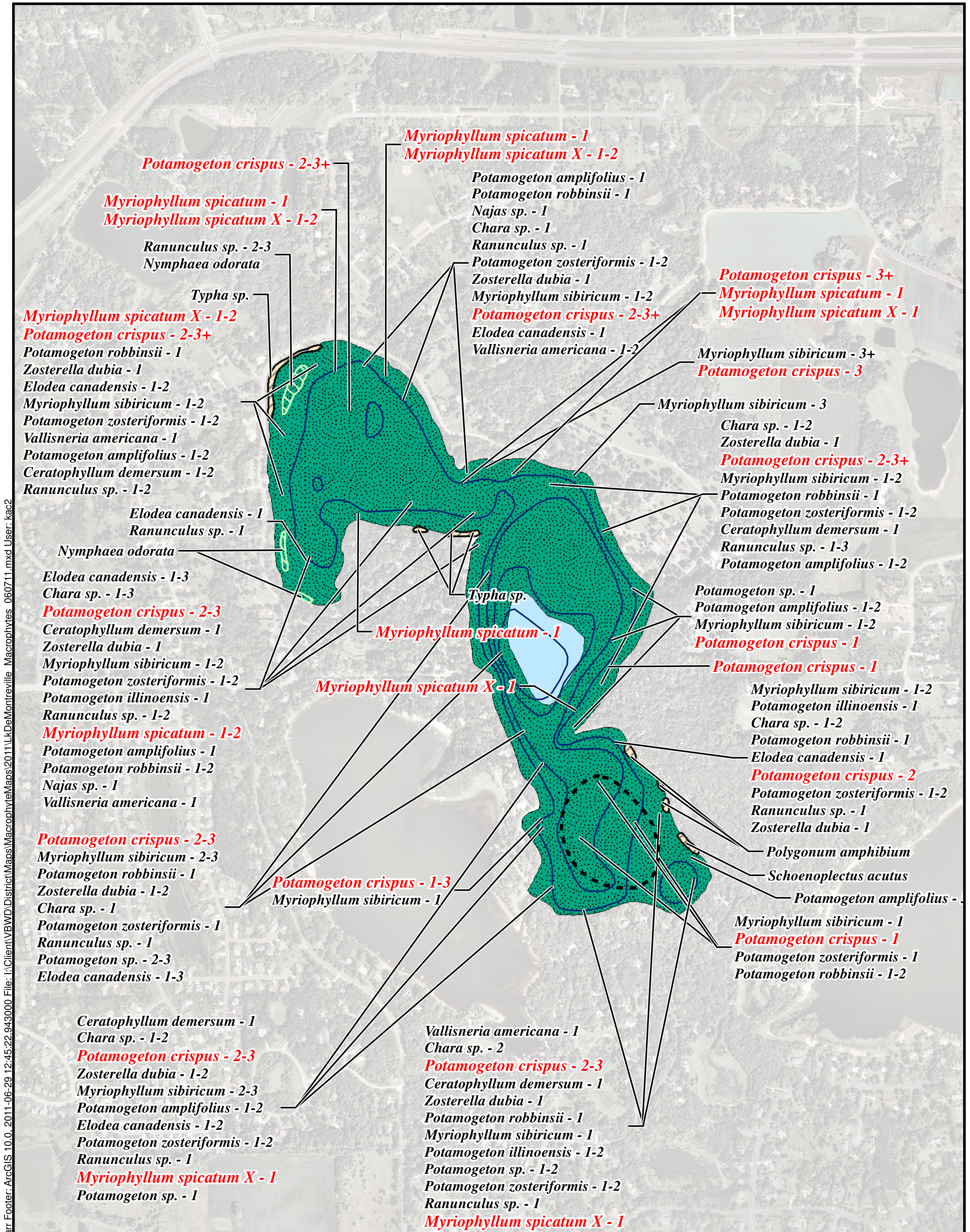
0 1,000 2,000 Feet

0 300 600 Meters

Imagery Source: 2009 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE SURVEY RESULTS
August 16, 2010
Valley Branch Watershed District



Submerged Aquatic Plants

Common Name	Scientific Name
Illinois pondweed	*Potamogeton illinoensis*
Robbins' pondweed	*Potamogeton robbinsii*
Slender naiad	*Najas sp.*
Coontail	*Ceratophyllum demersum*
Eurasian watermilfoil	***Myriophyllum spicatum***
Eurasion watermilfoil cross	***Myriophyllum spicatum X***
	Myriophyllum sibiricum
Flatstem pondweed	*Potamogeton zosteriformis*
Largeleaf pondweed	*Potamogeton amplifolius*
Curlyleaf pondweed	***Potamogeton crispus***
Muskgrass	*Chara sp.*
Northern watermilfoil	*Myriophyllum sibiricum*
Pondweed	*Potamogeton sp.*
Water crowfoot	*Ranunculus sp.*
Water stargrass	*Zosterella dubia*
Wild celery	*Vallisneria americana*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
White waterlily	*Nymphaea odorata*

Emergent Plants

Common Name	Scientific Name
Cattail	*Typha sp.*
Hardstem bulrush	*Schoenoplectus acutus*
Water knotweed	*Polygonum amphibium*

*Note: Bold red name indicates extremely aggressive/invasive introduced species.

FIELD NOTES:
- Macrophyte densities estimated as follows:
  1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >16-17'
- Macrophyte densities are greatest at depths 10 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- High water level

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

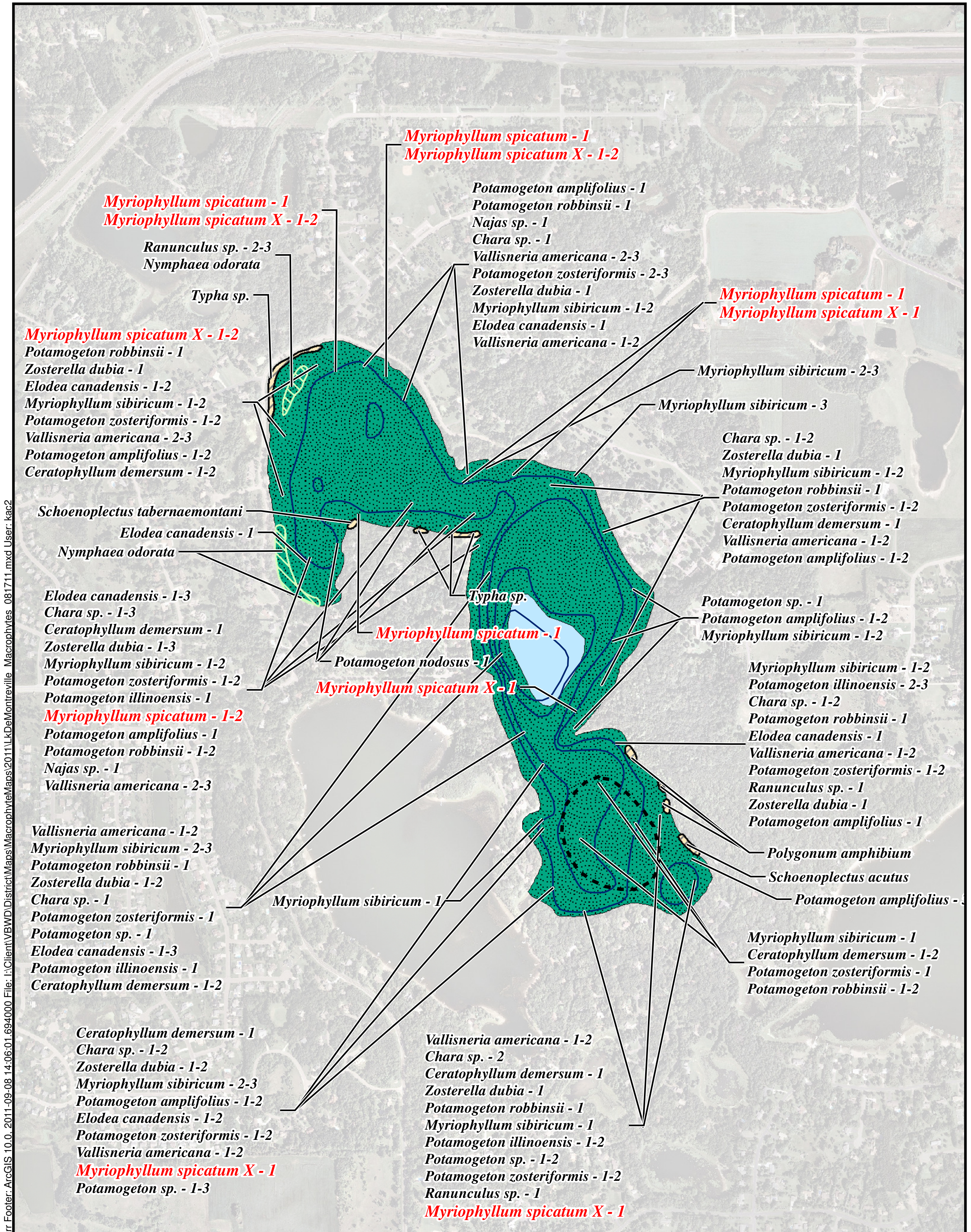
0 1,000 2,000
Feet

0 300 600
Meters

Imagery Source: 2009 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE SURVEY RESULTS
June 7, 2011
Valley Branch Watershed District



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Submerged Aquatic Plants

Common Name	Scientific Name
Illinois pondweed	*Potamogeton illinoensis*
Long-leaf pondweed	*Potamogeton nodosus*
Robbins' pondweed	*Potamogeton robbinsii*
Slender naiad	*Najas sp.*
Coontail	*Ceratophyllum demersum*
Eurasian watermilfoil	***Myriophyllum spicatum***
Eurasian watermilfoil cross	***Myriophyllum spicatum X***
	Myriophyllum sibiricum
Flatstem pondweed	*Potamogeton zosteriformis*
Largeleaf pondweed	*Potamogeton amplifolius*
Curlyleaf pondweed	***Potamogeton crispus***
Muskgrass	*Chara sp.*
Northern watermilfoil	*Myriophyllum sibiricum*
Pondweed	*Potamogeton sp.*
Water crowfoot	*Ranunculus sp.*
Water stargrass	*Zosterella dubia*
Wild celery	*Vallisneria americana*
Canada waterweed	*Elodea canadensis*

Floating Leaf Plants

Common Name	Scientific Name
White waterlily	*Nymphaea odorata*

Emergent Plants

Common Name	Scientific Name
Cattail	*Typha sp.*
Hardstem bulrush	*Schoenoplectus acutus*
Softstem bulrush	*Schoenoplectus tabernaemontani*
Water knotweed	*Polygonum amphibium*

*Note: Bold red name indicates extremely aggressive/invasive introduced species.

FIELD NOTES:
- Macrophyte densities estimated as follows: 1=light; 2=moderate; 3=heavy
- Densities generally not noted for emergent and floating leaf plants
- No macrophytes found in water >16-17'
- Macrophyte densities are greatest at depths 10 ft and less
- Macrophyte densities are greater closer to shoreline/shallows
- High water level

Legend

- Emergent Plants
- Floating Leaf Plants
- Submerged Aquatic Plants
- No Aquatic Vegetation

N

0 1,000 2,000
Feet

0 300 600
Meters

Imagery Source: 2009 AE

BARR

LAKE DEMONTREVILLE MACROPHYTE SURVEY RESULTS
August 17, 2011
Valley Branch Watershed District

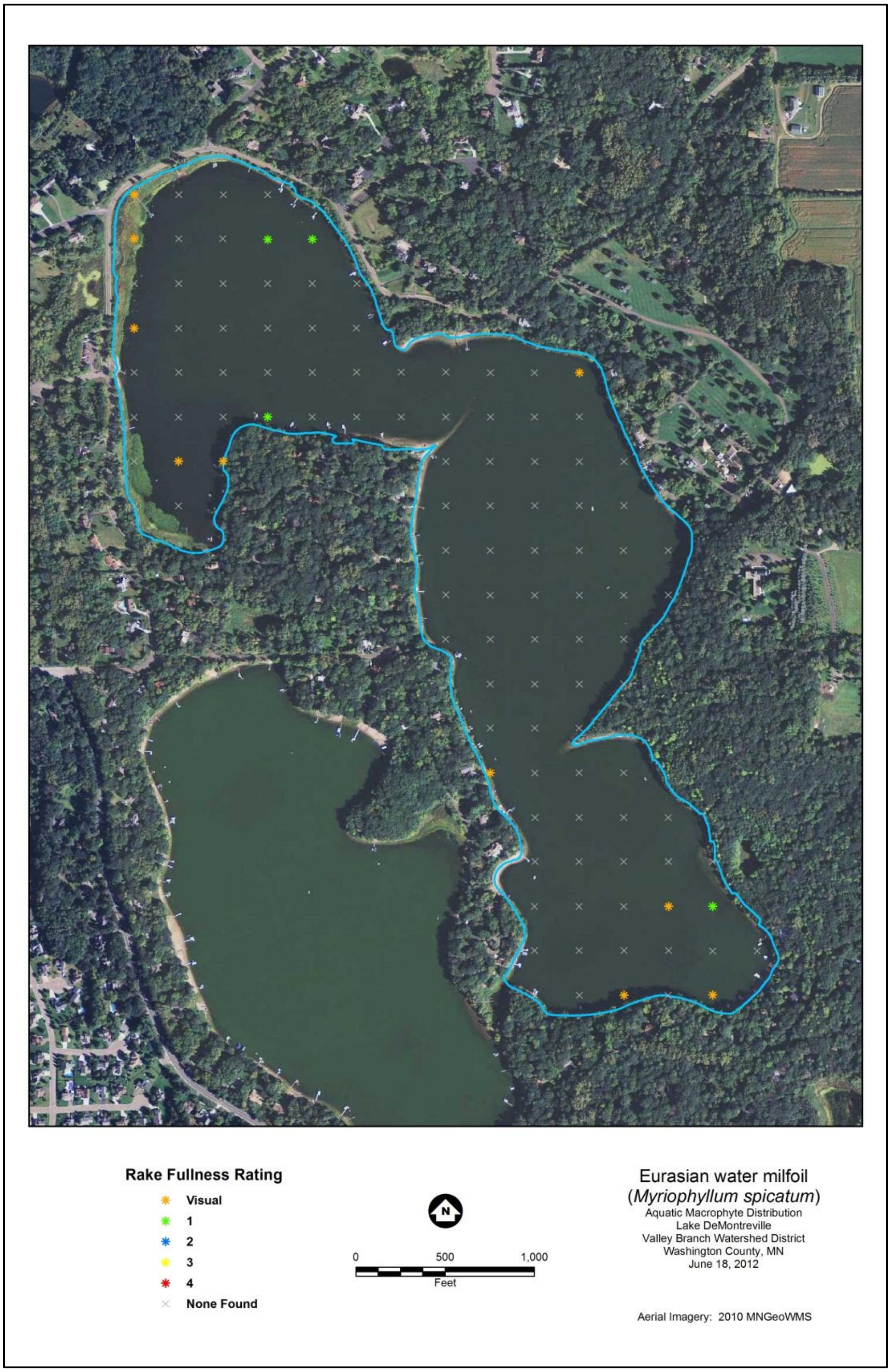


Figure 11. Lake DeMontreville Eurasian Watermilfoil: June 18, 2012

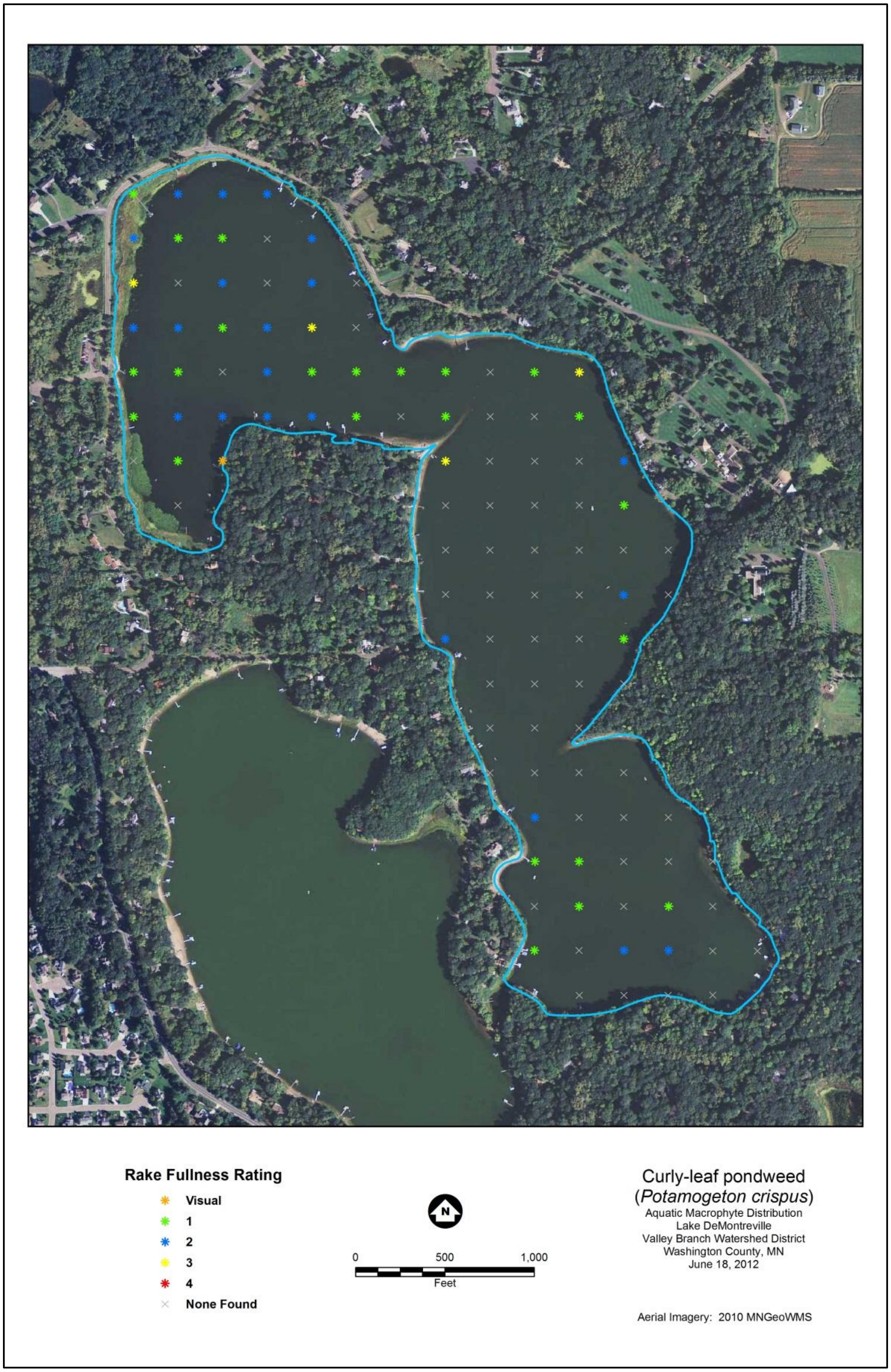


Figure 12. Lake DeMontreville Curly-leaf Pondweed: June 18, 2012

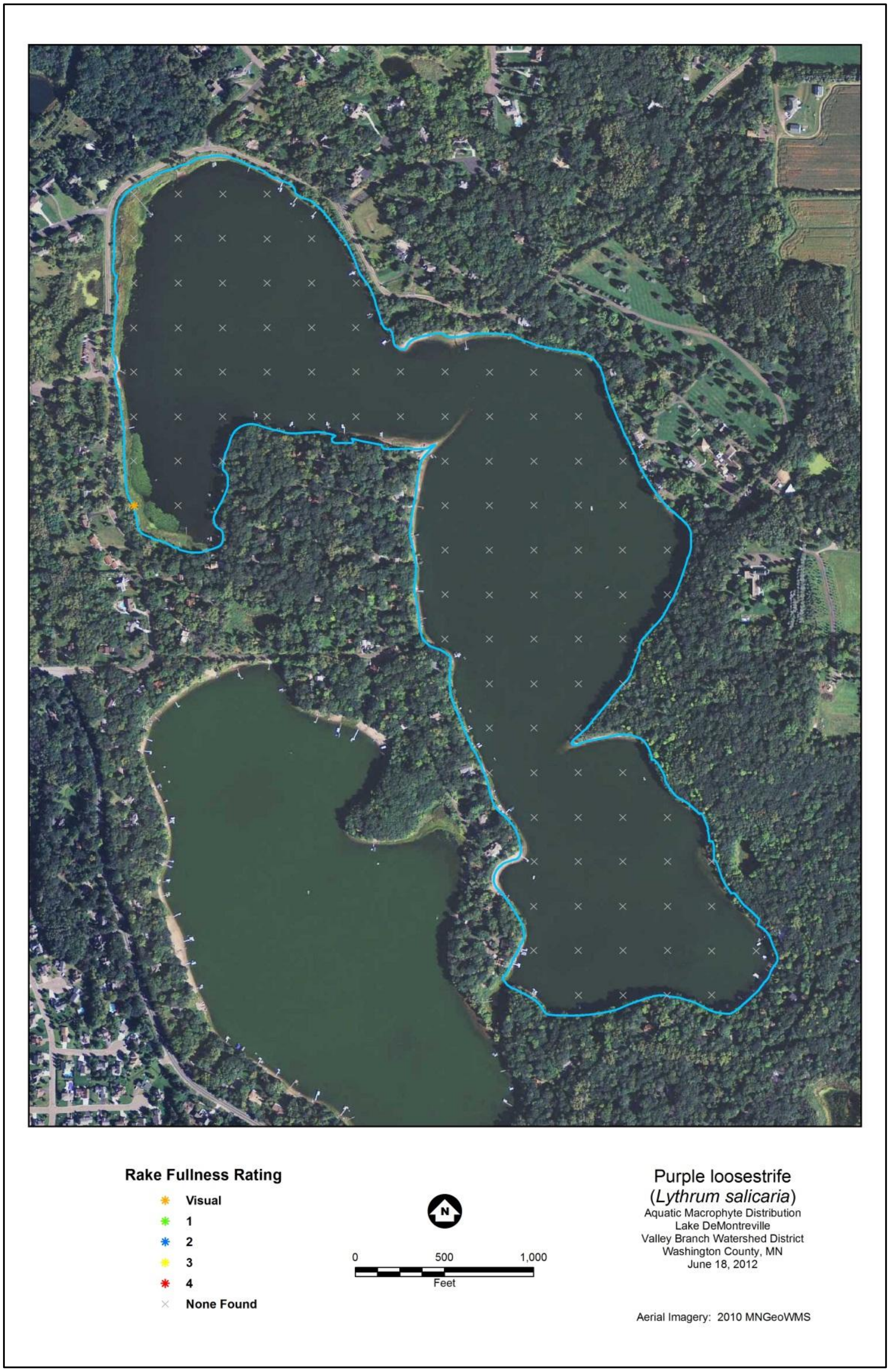
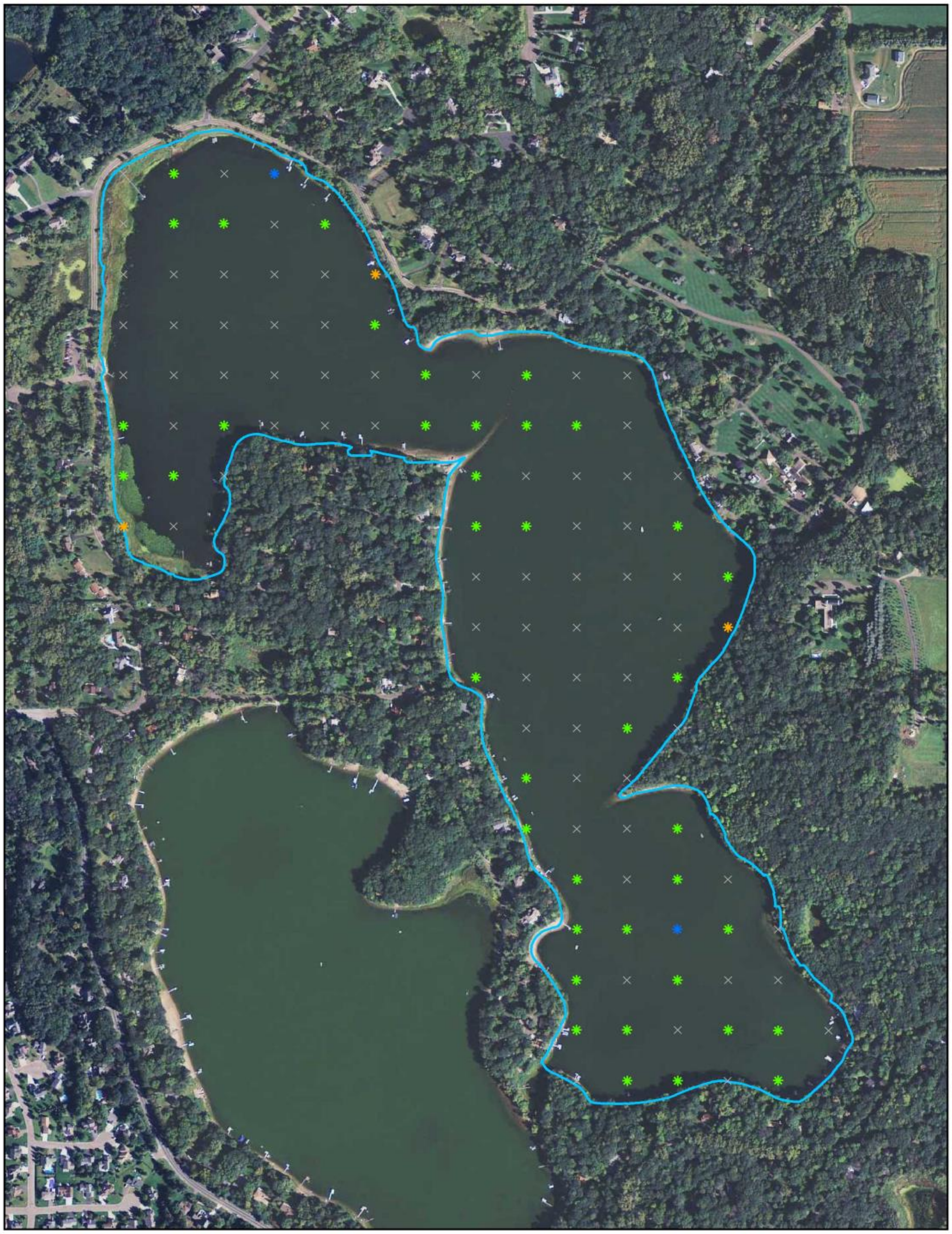


Figure 13: Lake DeMontreville Purple Loosestrife: June 18, 2012



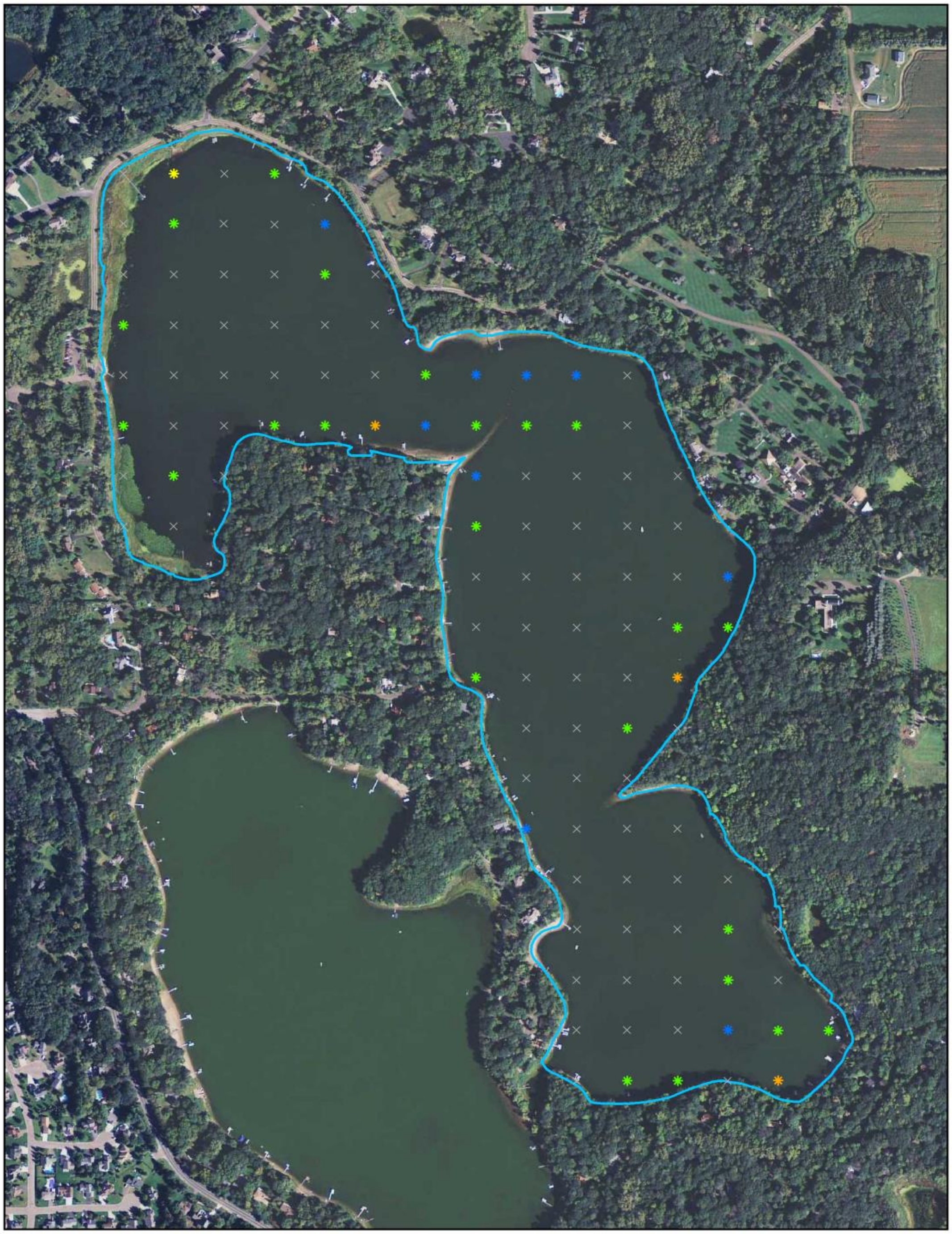
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

0 500 1,000
Feet

Curly-leaf pondweed
(*Potamogeton crispus*)
Aquatic Macrophyte Distribution
Lake DeMontreville
Valley Branch Watershed District
Washington County, MN
June 24, 2013

Aerial Imagery: 2010 MNGeoWMS



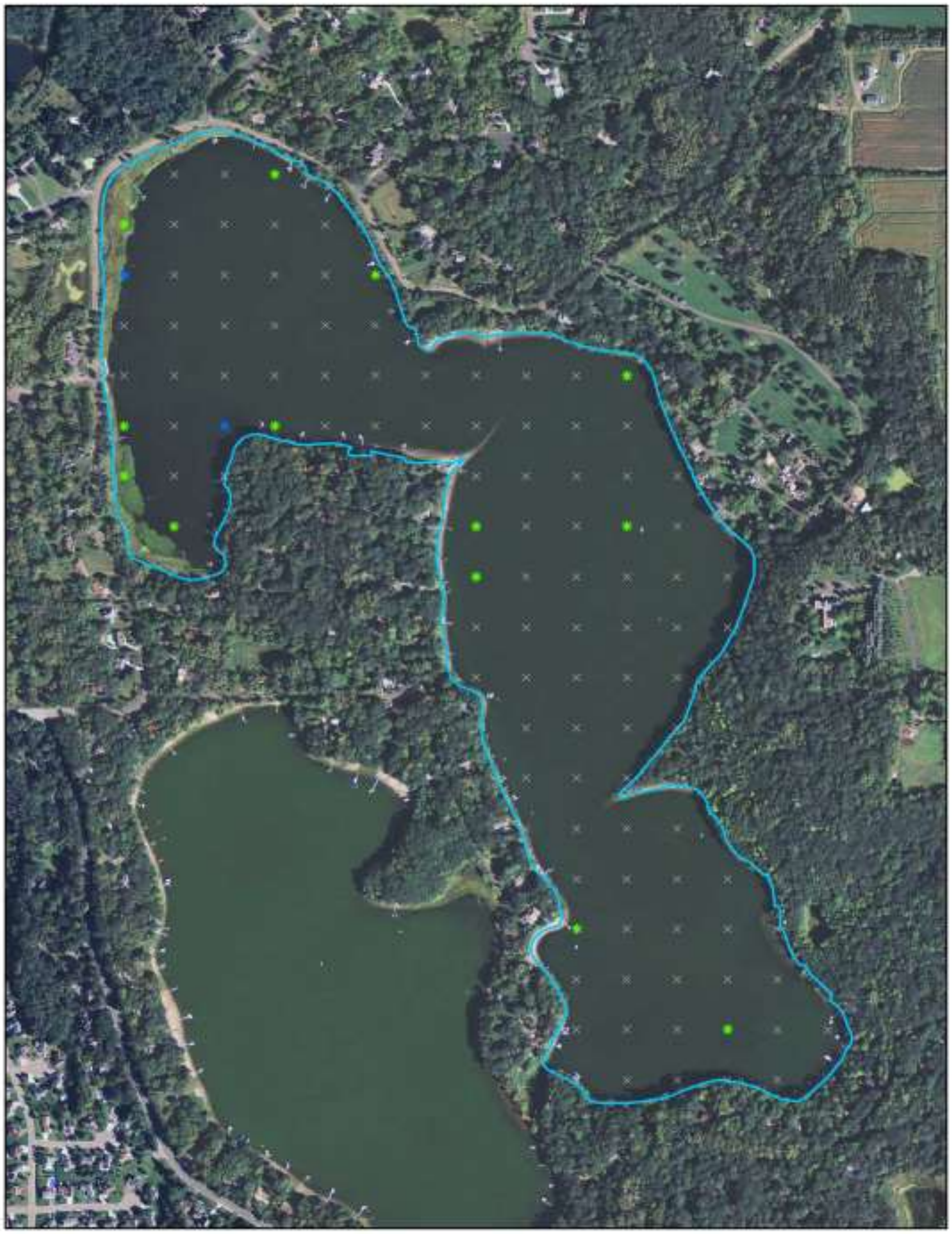
Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

0 500 1,000
Feet

Eurasian water milfoil
(*Myriophyllum spicatum*)
Aquatic Macrophyte Distribution
Lake DeMontreville
Valley Branch Watershed District
Washington County, MN
June 24, 2013

Aerial Imagery: 2010 MNGeoWMS



Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

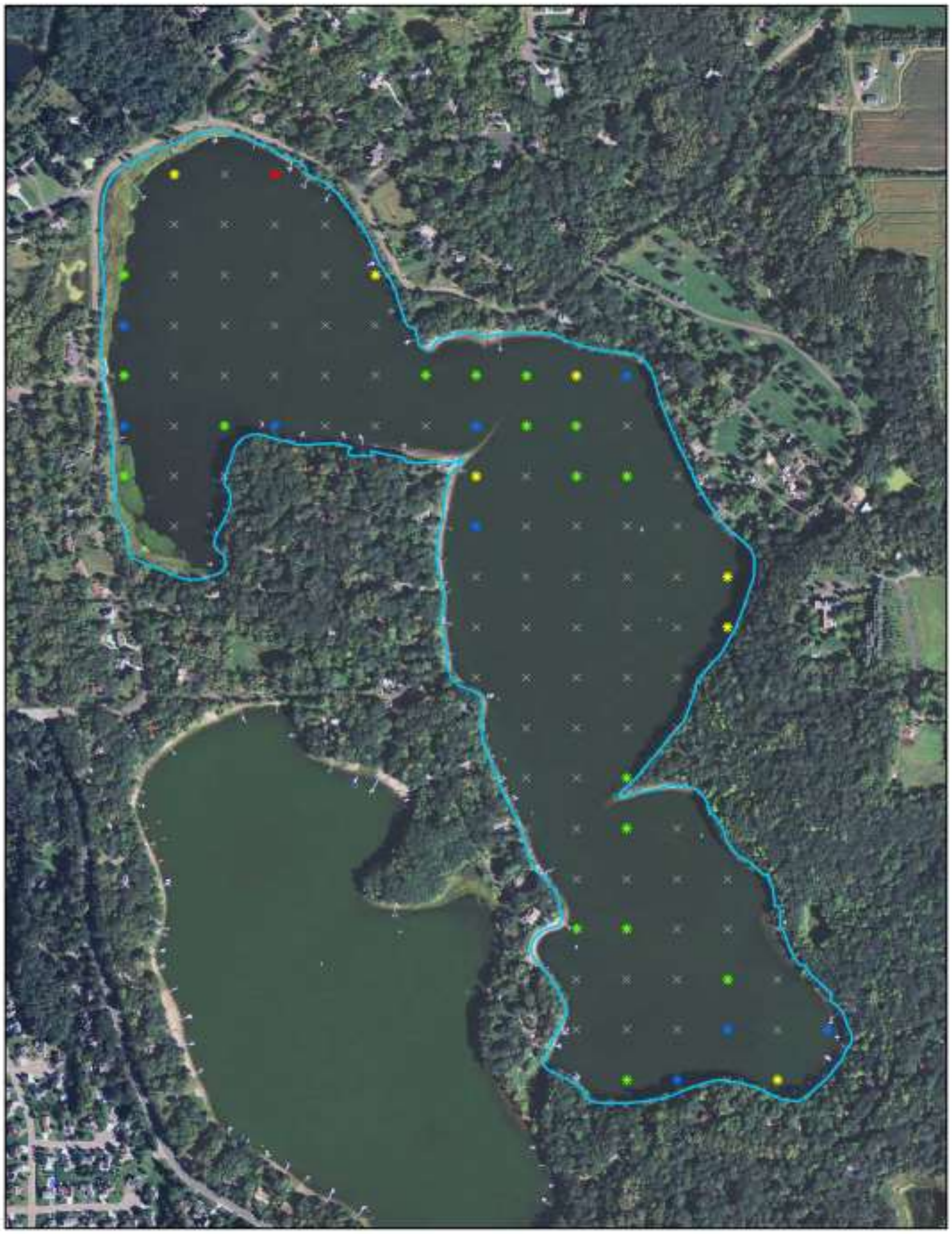
N

0 500 1,000

Feet

Curly-leaf pondweed
(*Potamogeton crispus*)
Pretreatment Survey
Lake DeMontreville
Valley Branch Watershed District
Washington County, MN
May 24, 2014

Aerial Imagery: 2010 MNGeoWMS



Rake Fullness Rating

- Visual
- 1
- 2
- 3
- 4
- None Found

Eurasian water-milfoil
(*Myriophyllum spicatum*)
Pretreatment Survey
Lake DeMontreville
Valley Branch Watershed District
Washington County, MN
May 24, 2014

Aerial Imagery: 2010 MNGeoWMS

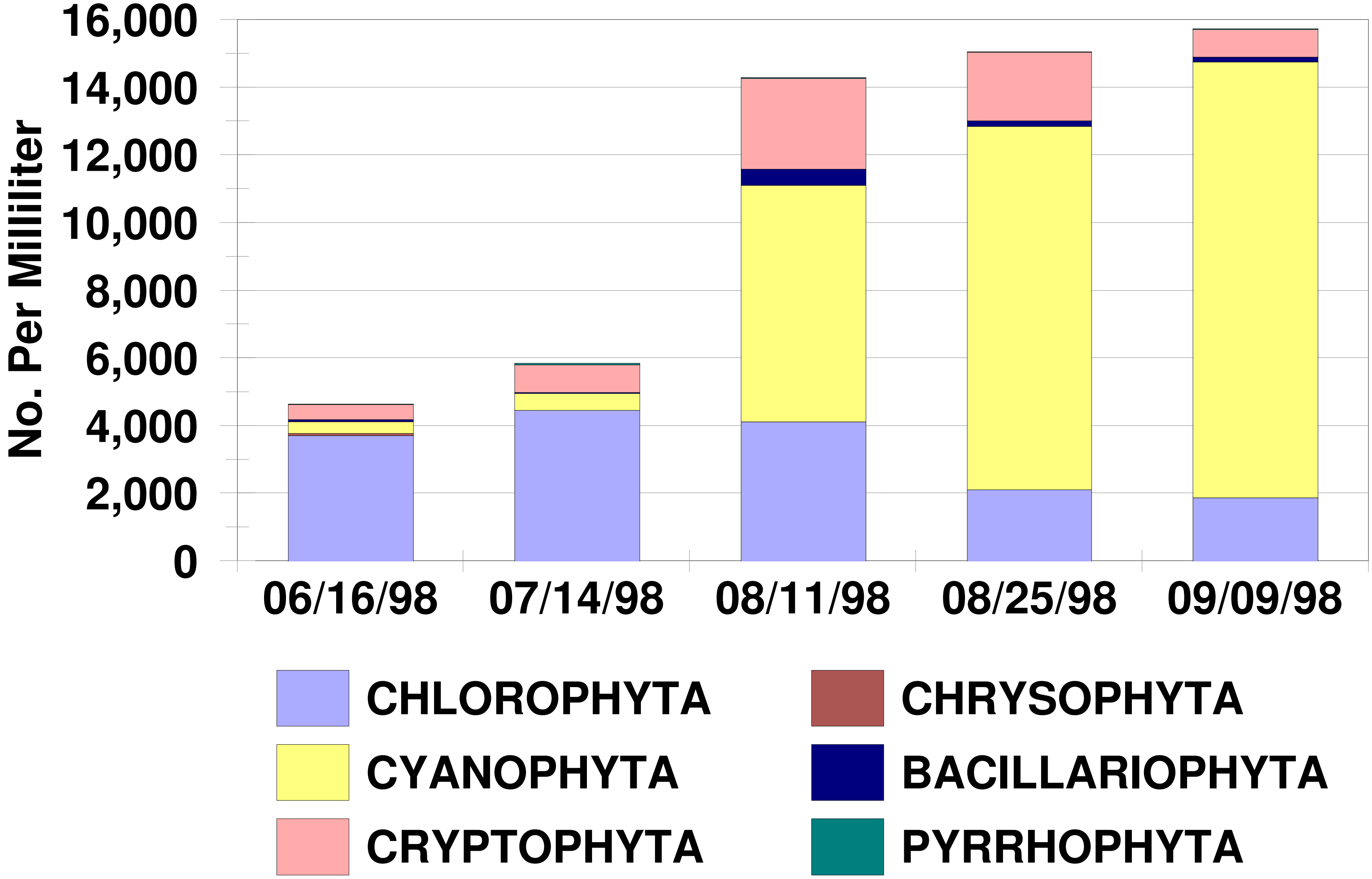
Appendix D-5.7 Additional Phytoplankton Information

LAKE DEMONTREVILLE

PHYTOPLANKTON SUMMARY
SAMPLE: 0-2 METERS
STANDARD INVERTED MICROSCOPE ANALYSIS METHOD

DIVISION	TAXON	06/16/98 units/mL	07/14/98 units/mL	08/11/98 units/mL	08/25/98 units/mL	09/09/98 units/mL
CHLOROPHYTA (GREEN ALGAE)	*Ankistrodesmus falcatus*	0	0	156	84	117
	Ankistrodesmus Brauni	20	78	0	0	0
	Chlamydomonas globosa	3,572	3,826	3,514	1,854	1,523
	Closterium sp.	0	0	117	84	78
	Dictyosphaerium Ehrenbergianum	0	0	0	42	0
	Oocystis parva	59	156	0	0	0
	Schroederia Judayi	78	390	0	0	0
	Selenastrum minutum	0	0	78	42	117
	Sphaerocystis Schroeteri (Colony)	0	0	273	0	39
	CHLOROPHYTA TOTAL	**3,728**	**4,451**	**4,138**	**2,107**	**1,874**
CHRYSOPHYTA (GOLDEN BROWN ALGAE)	*Dinobryon sociale*	39	0	0	0	0
	CHRYSOPHYTA TOTAL	**39**	**0**	**0**	**0**	**0**
CYANOPHYTA (BLUE-GREEN ALGAE)	*Anabaena affinis*	0	0	4,333	3,160	2,108
	Anabaena flos-aquae	0	0	117	84	78
	Anabaena spiroides v. crassa	0	78	0	169	0
	Anabaenopsis raciborski	0	0	39	1,812	4,997
	Aphanizomenon flos-aquae	0	156	2,030	4,972	4,333
	Coelosphaerium Naegelianum	0	0	78	42	0
	Lyngbya limnetica	0	0	0	84	0
	Microcystis aeruginosa	371	195	156	0	39
	Microcystis incerta	0	0	195	253	117
	Oscillatoria Agardhii	0	0	0	169	586
	Oscillatoria limnetica	0	78	39	0	625
	CYANOPHYTA TOTAL	**371**	**508**	**6,988**	**10,746**	**12,883**
BACILLARIOPHYTA (DIATOMS)	*Cocconeis placentula*	0	39	0	0	0
	Fragilaria crotonensis	20	0	195	42	0
	Navicula sp.	20	0	0	0	0
	Rhizosolenia sp.	0	0	195	126	0
	Stephanodiscus Hantzschii	0	0	0	0	78
	Synedra ulna	0	0	78	0	78
	BACILLARIOPHYTA TOTAL	**39**	**39**	**468**	**169**	**156**
CRYPTOPHYTA (CRYPTOMONADS)	*Cryptomonas erosa*	449	820	2,694	2,023	820
	CRYPTOPHYTA TOTAL	**449**	**820**	**2,694**	**2,023**	**820**
EUGLENOPHYTA (EUGLENOIDS)	**EUGLENOPHYTA TOTAL**	**0**	**0**	**0**	**0**	**0**
PYRRHOPHYTA (DINOFLAGELLATES)	*Ceratium hirundinella*	20	39	0	0	0
	PYRRHOPHYTA TOTAL	**20**	**39**	**0**	**0**	**0**
	TOTALS	**4,607**	**5,856**	**14,289**	**15,044**	**15,733**

1998 Lake DeMontreville Phytoplankton Summary by Division

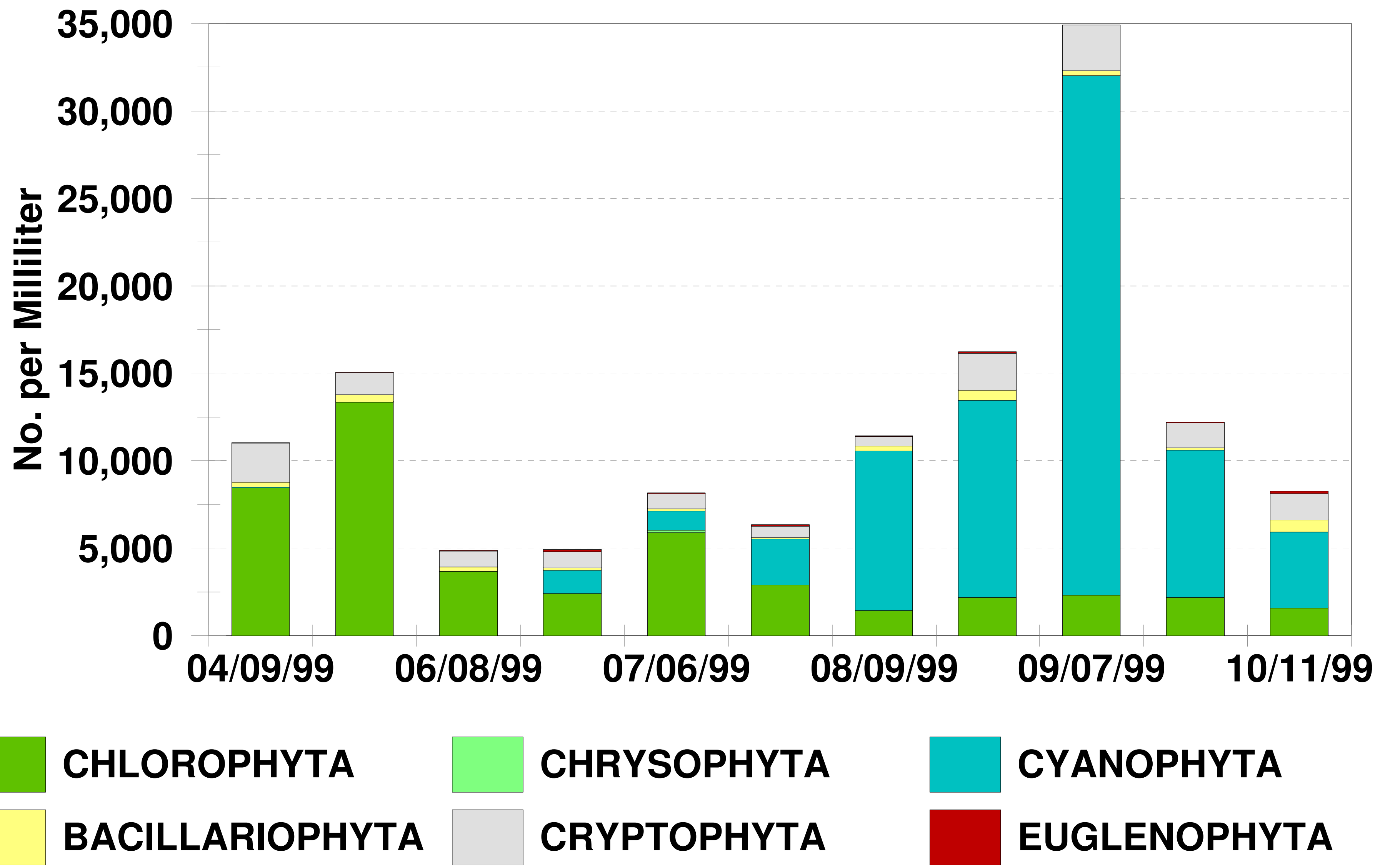


LAKE DEMONTREVILLE

SAMPLE: 0-2 METERS (INT. TUBE)
STANDARD INVERTED MICROSCOPE ANALYSIS METHOD

DIVISION	TAXON	04/09/99 units/mL	05/10/99 units/mL	06/08/99 units/mL	06/22/99 units/mL	07/06/99 units/mL	07/19/99 units/mL	08/09/99 units/mL	08/23/99 units/mL	09/07/99 units/mL	09/21/99 units/mL	10/11/99 units/mL
CHLOROPHYTA (GREEN ALGAE)	*Ankistrodesmus falcatus*	0	0	0	0	39	39	0	0	49	0	0
	Ankistrodemus spiralis	0	0	0	0	0	0	39	0	0	0	0
	Ankistrodesmus Brauni	0	42	0	0	78	78	0	78	97	195	0
	Chlamydomonas globosa	8,355	13,316	3,084	1,728	1,991	1,952	937	1,523	1,703	1,562	1,601
	Closterium sp.	0	0	39	42	0	0	0	78	243	156	0
	Cosmarium sp.	0	0	0	0	39	0	39	0	0	0	0
	Oocystis parva	0	0	117	0	0	390	273	117	49	78	0
	Oocystis sp.	0	0	0	42	0	0	156	0	0	0	0
	Pediastrum duplex	0	0	39	0	0	0	0	0	0	0	0
	Quadrigula sp.	117	0	39	0	0	0	0	78	0	39	0
	Rhizoclonium hieroglyphicum	0	0	0	0	0	0	0	0	97	0	0
	Schroederia Judayi	0	0	0	295	312	312	0	273	97	78	0
	Sphaerocystis Schroeteri (Colony)	0	42	390	337	3,436	117	0	0	0	0	0
	Staurastrum sp.	0	0	0	0	0	39	0	0	0	0	0
	Tetraedron minimum	0	0	0	0	0	0	0	39	0	0	0
	Unidentified Green Colony	0	0	0	0	0	0	0	0	0	78	0
	CHLOROPHYTA TOTAL	**8,472**	**13,400**	**3,709**	**2,444**	**5,895**	**2,928**	**1,444**	**2,186**	**2,336**	**2,186**	**1,601**
CHRYSOPHYTA (YELLOW-BROWN ALGAE)	*Dinobryon sociale*	0	0	0	0	156	0	0	0	0	0	0
	CHRYSOPHYTA TOTAL	**0**	**0**	**0**	**0**	**156**	**0**	**0**	**0**	**0**	**0**	**0**
CYANOPHYTA (BLUE-GREEN ALGAE)	*Anabaena affinis*	0	0	0	211	195	586	4,333	664	3,455	625	234
	Anabaena flos-aquae	0	0	0	169	508	625	234	39	146	0	39
	Anabaena spiroides v. crassa	0	0	0	0	0	429	859	117	195	0	39
	Anabaenopsis raciborski	0	0	0	0	0	0	195	5,505	12,507	1,249	195
	Aphanizomenon flos-aquae	0	0	0	0	0	78	1,952	4,138	10,317	5,544	3,279
	Coelosphaerium Naegelianum	0	0	0	169	117	195	390	0	97	117	78
	Lyngbya sp.	0	0	0	0	0	0	0	39	0	0	0
	Merismopedia tenuissima	39	0	0	0	0	0	0	0	0	0	0
	Microcystis aeruginosa	0	0	0	379	0	117	429	117	146	0	0
	Microcystis incerta	0	0	0	421	234	351	703	78	292	78	78
	Oscillatoria Agardhii	0	0	0	0	0	39	0	0	0	39	312
	Oscillatoria limnetica	0	0	0	0	0	0	39	586	2,579	742	78
	Oscillatoria redekii	0	0	0	0	39	39	0	0	0	39	0
	Phormidium mucicola	0	0	0	0	0	156	0	0	0	0	0
	CYANOPHYTA TOTAL	**39**	**0**	**0**	**1,348**	**1,093**	**2,616**	**9,135**	**11,283**	**29,735**	**8,433**	**4,333**
BACILLARIOPHYTA (DIATOMS)	*Asterionella formosa*	39	169	0	42	0	0	0	0	0	0	0
	Cymbella sp.	0	0	0	0	0	0	0	39	0	0	0
	Fragilaria crotonensis	0	0	39	0	0	0	39	0	97	39	117
	Navicula sp.	0	0	39	0	39	0	39	0	0	0	0
	Rhizosolenia sp.	0	0	0	0	0	0	0	0	0	0	78
	Stephanodiscus Hantzschii	0	0	156	0	0	0	0	468	97	78	508
	Stephanodiscus sp.	117	169	0	84	117	117	39	0	0	0	0
	Synedra ulna	117	42	0	0	0	0	195	117	49	0	0
	BACILLARIOPHYTA TOTAL	**273**	**379**	**234**	**126**	**156**	**117**	**312**	**625**	**243**	**117**	**703**
CRYPTOPHYTA (CRYPTOMONADS)	*Cryptomonas erosa*	2,264	1,306	937	885	859	625	547	2,069	2,628	1,484	1,523
	CRYPTOPHYTA TOTAL	**2,264**	**1,306**	**937**	**885**	**859**	**625**	**547**	**2,069**	**2,628**	**1,484**	**1,523**
EUGLENOPHYTA (EUGLENOIDS)	**EUGLENOPHYTA TOTAL**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PYRRHOPHYTA (DINOFLAGELLATES)	*Ceratium hirundinella*	0	0	0	126	0	78	0	78	0	0	117
	PYRRHOPHYTA TOTAL	**0**	**0**	**0**	**126**	**0**	**78**	**0**	**78**	**0**	**0**	**117**
	TOTALS	**11,048**	**15,086**	**4,880**	**4,930**	**8,159**	**6,364**	**11,439**	**16,241**	**34,942**	**12,220**	**8,276**

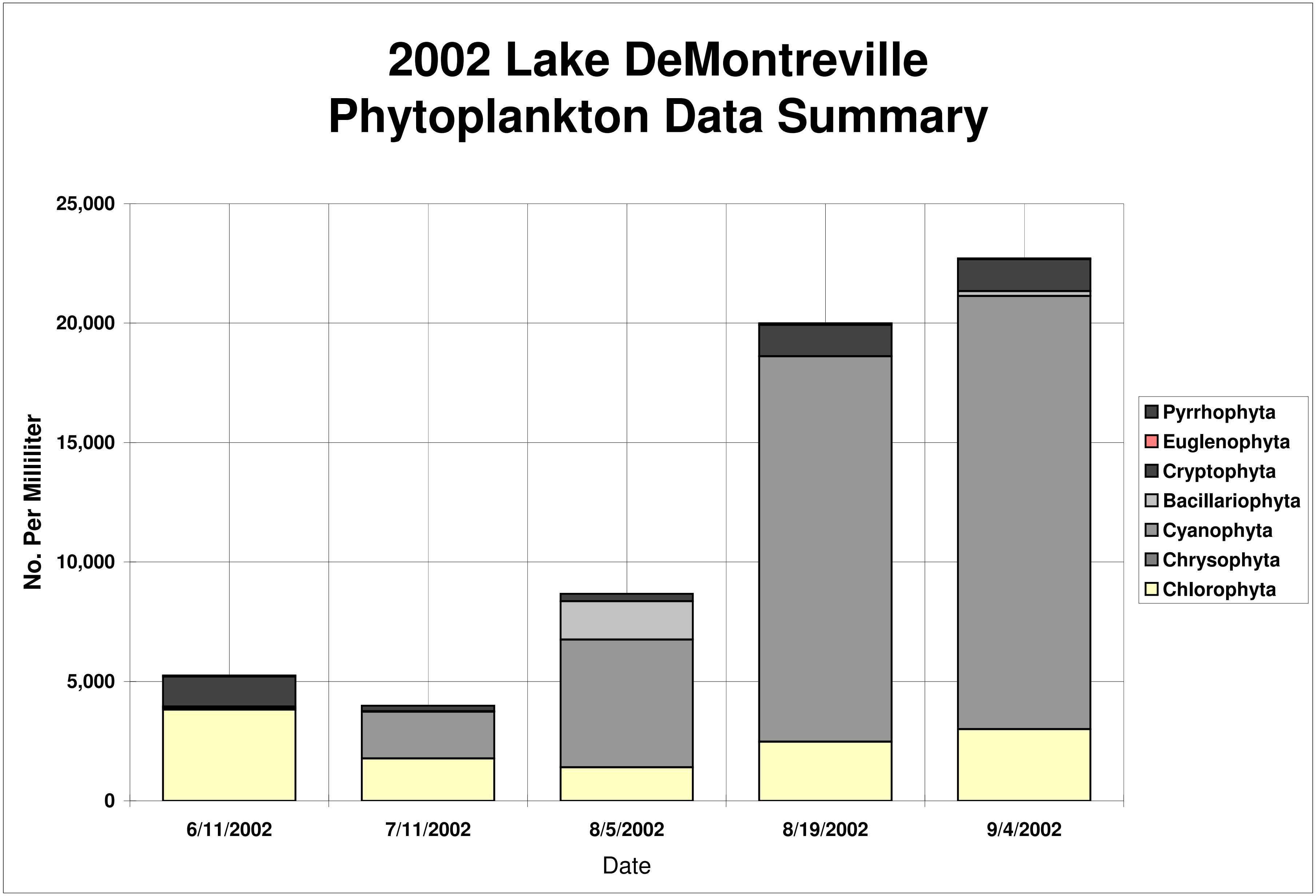
1999 Lake DeMontreville Phytoplankton Summary By Division



LAKE DEMONTREVILLE

SAMPLE: 0-2 METERS
STANDARD PHYTOPLANKTON CLUMP COUNT

DIVISION	TAXON	6/11/2002 units/mL	7/11/2002 units/mL	8/5/2002 units/mL	8/19/2002 units/mL	9/4/2002 units/mL
CHLOROPHYTA (GREEN ALGAE)	*Ankistrodesmus falcatus*	0	0	39	73	39
	Ankistrodesmus Brauni	190	63	0	73	39
	Chlamydomonas globosa	3,477	1,370	820	2,186	2,563
	Closterium sp.	0	0	39	0	0
	Coelastrum microporum	0	0	156	0	0
	Oocystis parva	105	169	195	36	0
	Pandorina morum	21	0	0	0	0
	Schroederia Judayi	0	169	39	36	355
	Scenedesmus sp.	0	0	0	36	0
	Selenastrum sp..	0	0	39	0	0
	Sphaerocystis Schroeteri (Colony)	0	0	39	0	0
	Tetraedron minimum	0	0	39	36	0
	Tetraedron sp.	21	0	0	0	0
	CHLOROPHYTA TOTAL	**3,814**	**1,770**	**1,405**	**2,477**	**2,997**
CHRYSOPHYTA (YELLOW-BROWN ALGAE)	**CHRYSOPHYTA TOTAL**	**0**	**0**	**0**	**0**	**0**
CYANOPHYTA (BLUE-GREEN ALGAE)	*Anabaena affinis*	0	105	1,015	1,493	710
	Anabaena flos-aquae	42	84	586	36	118
	Anabaena spiroides v. crassa	0	21	156	146	39
	Anabaenopsis raciborski	0	0	898	9,034	10,134
	Aphanizomenon flos-aquae	0	63	2,499	3,460	3,234
	Coelosphaerium Naegelianum	0	253	39	0	158
	Lyngbya sp.	0	0	0	73	0
	Merismopedia sp.	0	0	0	0	39
	Microcystis aeruginosa	21	1,243	39	109	237
	Microcystis incerta	21	147	78	328	118
	Oscillatoria limnetica	0	0	39	1,457	3,155
	Oscillatoria Agardhii	0	42	0	0	197
	CYANOPHYTA TOTAL	**84**	**1,959**	**5,348**	**16,137**	**18,139**
BACILLARIOPHYTA (DIATOMS)	*Fragilaria crotonensis*	0	21	0	0	0
	Stephanodiscus Hantzschii	42	0	1,562	0	0
	Synedra ulna	0	0	39	0	197
	BACILLARIOPHYTA TOTAL	**42**	**21**	**1,601**	**0**	**197**
CRYPTOPHYTA (CRYPTOMONADS)	*Cryptomonas erosa*	1,264	232	312	1,311	1,341
	CRYPTOPHYTA TOTAL	**1,264**	**232**	**312**	**1,311**	**1,341**
EUGLENOPHYTA (EUGLENOIDS)	*Phacus sp.*	0	0	0	73	0
	EUGLENOPHYTA TOTAL	**0**	**0**	**0**	**73**	**0**
PYRRHOPHYTA (DINOFLAGELLATES)	*Ceratium hirundinella*	42	0	0	0	39
	PYRRHOPHYTA TOTAL	**42**	**0**	**0**	**0**	**39**
	TOTALS	**5,246**	**3,982**	**8,667**	**19,998**	**22,714**


2002 Lake DeMontreville
Phytoplankton Data Summary
No. Per Milliliter
25,000
20,000
15,000
10,000
5,000
0
6/11/2002
7/11/2002
8/5/2002
8/19/2002
9/4/2002
Date
Pyrrhophyta
Euglenophyta
Cryptophyta
Bacillariophyta
Cyanophyta
Chrysophyta
Chlorophyta

Appendix E-5.7 Additional Zooplankton Information

ZOOPLANKTON IDENTIFICATION SUMMARY (#/sq. m)

VALLEY BRANCH WATERSHED DISTRICT
23/83 207 V98 030

LAKE: **Demontreville**

		SAMPLE DATE				
DIVISION	**TAXON**	**06/16/98**	**07/14/98**	**08/11/98**	**08/25/98**	**09/09/98**
CLADOCERA						
	Daphnia galeata mendotae	31,796	74,190	4,483	6,944	8,674
	Daphnia parvula	14,838	6,359	0	0	0
	Daphnia retrocurva	0	0	0	6,944	60,716
	Bosmina sp.	67,831	44,514	22,415	50,922	17,348
	Chydorus sp.	2,120	0	0	0	0
	Diaphanosoma sp.	12,718	12,718	47,072	27,776	21,684
	Ceriodaphnia sp.	4,239	2,120	0	0	0
	Leptodora sp.	0	0	0	0	2,168
	Daphnia ambigua	0	4,239	0	0	0
	Total Cladocera	133,542	144,140	73,971	92,585	110,591
COPEPODA						
	Nauplii	616,836	220,450	121,043	187,485	201,665
	Cyclops sp.	2,120	16,958	13,449	25,461	15,179
	Mesocyclops sp.	42,394	50,873	20,174	20,832	30,358
	Diaptomus sp.	27,556	21,197	38,106	76,383	32,527
	Total Copepoda	688,906	309,478	192,772	310,160	279,729
ROTIFERA						
	Keratella cochlearis	52,993	38,155	398,993	261,553	206,002
	Asplanchna sp.	42,394	6,359	0	0	0
	Kellicottia sp.	25,437	27,556	22,415	104,158	145,286
	Polyarthra vulgaris	99,626	42,394	13,449	2,315	15,179
	Conochilus sp.	0	0	694,876	90,271	56,379
	Trichocerca sp.	0	0	6,725	27,776	2,168
	Filinia sp.	0	2,120	0	2,315	0
	Brachionus sp.	8,479	0	0	2,315	0
	Total Rotifera	228,929	116,584	1,136,458	490,701	425,014
	TOTAL ZOOPLANKTON	1,051,377	570,203	1,403,201	893,447	815,334

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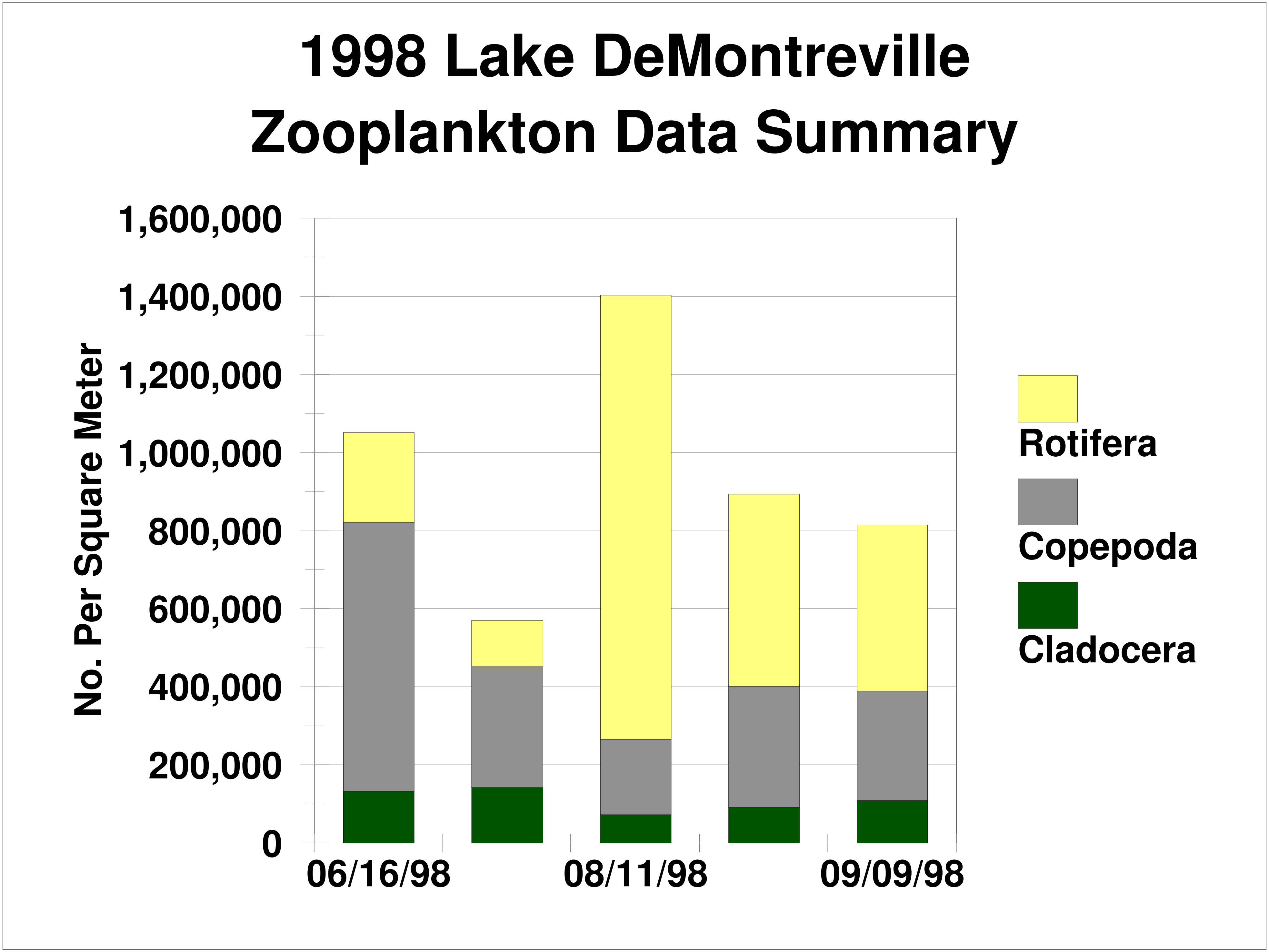


1998 Lake DeMontreville
Zooplankton Data Summary
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
No. Per Square Meter
06/16/98
08/11/98
09/09/98
Rotifera
Copepoda
Cladocera

ZOOPLANKTON IDENTIFICATION (Number per square meter)
Valley Branch Watershed District
PROJECT #: 23/82-207 V99 030

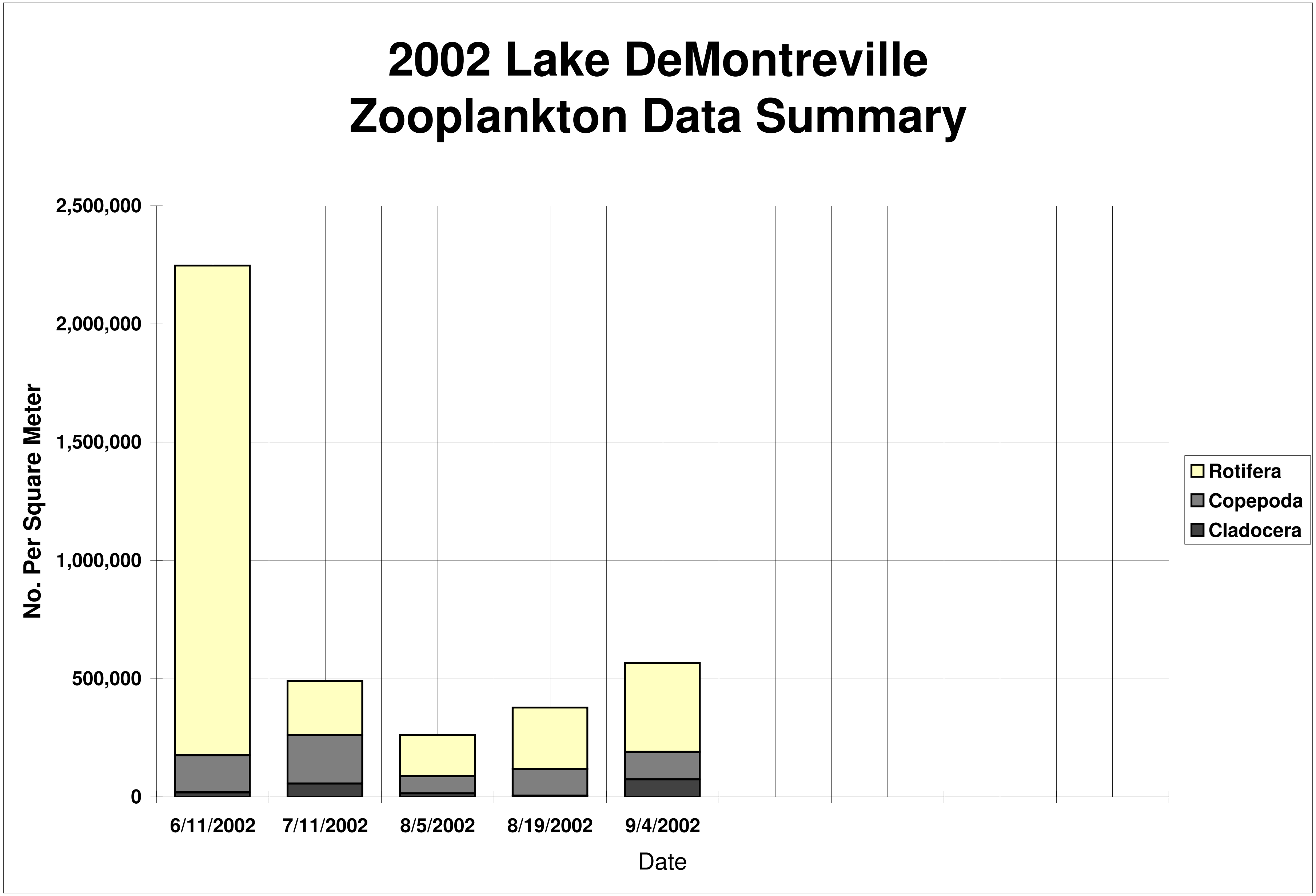
LAKE: DEMONTREVILLE

		SAMPLE DATE										
DIVISION	**TAXON**	**4/9/1999**	**5/10/1999**	**6/8/1999**	**6/22/1999**	**7/6/1999**	**7/19/1999**	**8/9/1999**	**8/23/1999**	**9/7/1999**	**9/21/1999**	**10/12/1999**
CLADOCERA												
	Daphnia galeata mendotae	6,834	20,770	19,986	45,557	8,132	28,510	0	4,433	19,839	21,493	16,974
	Daphnia ambigua/parvula	0	23,366	17,488	63,780	2,033	4,752	0	2,217	2,204	0	0
	Daphnia retrocurva	0	0	0	0	0	2,376	6,319	4,433	48,496	74,030	41,222
	Bosmina sp.	141,226	25,962	39,972	38,723	8,132	4,752	10,532	35,466	52,905	74,030	26,673
	Chydorus sp.	0	5,192	19,986	18,223	14,230	4,752	33,702	22,166	48,496	62,090	33,947
	Diaphanosoma sp.	0	0	2,498	66,057	30,494	19,006	105,320	39,899	24,248	35,821	0
	Ceriodaphnia sp.	0	0	2,498	13,667	0	2,376	0	0	0	0	0
	SUBTOTAL	148,060	75,291	102,429	246,007	63,020	66,523	155,873	108,614	196,188	267,463	118,815
COPEPODA												
	Nauplii	266,507	449,151	132,409	314,342	113,843	299,352	58,979	88,664	255,706	234,030	80,018
	Cyclops sp.	72,891	77,887	22,484	13,667	0	9,503	4,213	4,433	24,248	52,537	312,799
	Mesocyclops sp.	2,278	7,789	19,986	9,111	28,461	59,395	6,319	37,682	35,270	14,328	24,248
	Diaptomus sp.	88,836	83,080	49,966	29,612	87,415	14,255	40,021	13,300	41,883	16,716	16,974
	SUBTOTAL	430,512	617,907	224,845	366,732	229,719	382,506	109,532	144,080	357,107	317,612	434,039
ROTIFERA												
	Kellicottia sp.	305,231	2,287,295	209,855	15,945	34,559	92,657	6,319	19,949	198,393	119,403	0
	Conochilus sp.	72,891	176,545	614,576	4,556	0	11,879	109,532	11,083	61,722	54,925	29,098
	Keratella cochlearis	97,947	700,987	74,948	11,389	40,658	173,434	206,426	157,379	152,101	210,149	0
	Keratella quadrata	9,111	0	0	0	0	0	0	0	0	0	972,344
	Polyarthra vulgaris	11,389	44,136	139,904	211,839	111,810	57,019	10,532	4,433	24,248	59,701	0
	Brachionus sp.	2,278	2,596	4,997	2,278	0	0	0	0	0	0	179,435
	Filinia longiseta	6,834	7,789	0	4,556	0	0	0	2,217	0	0	0
	Aplanchna sp.	0	0	24,983	72,891	0	0	0	0	0	0	0
	Trichocerca sp.	0	0	0	0	0	0	86,362	0	2,204	0	0
	Lecane sp.	0	0	0	0	0	0	2,106	0	0	0	0
	SUBTOTAL	505,681	3,219,348	1,069,263	323,453	187,028	334,990	421,278	195,062	438,668	444,179	1,180,877
	TOTAL	1,084,252	3,912,547	1,396,537	936,193	479,767	784,018	684,577	447,755	991,963	1,029,253	1,733,731

LAKE DEMONTREVILLE

SAMPLE: BOTTOM TO SURFACE TOW
ZOOPLANKTON ANALYSIS

DIVISION	TAXON	6/11/2002	7/11/2002	8/5/2002	8/19/2002	9/4/2002
	Vertical Tow (m)					
		#/m2	#/m2	#/m2	#/m2	#/m2
CLADOCERA	*Bosmina longirostris*	18,568	22,282	0	0	18,568
	Ceriodaphnia sp.	0	11,141	0	0	0
	Chydorus sphaericus	0	0	0	0	4,642
	Daphnia galeata mendotae	0	11,141	3,655	0	27,852
	Daphnia retrocurva	0	0	0	0	9,284
	Diaphanosoma leuchtenbergianum	0	11,141	10,964	4,907	4,642
	Immature Cladocera	0	0	0	0	9,284
	CLADOCERA TOTAL	**18,568**	**55,704**	**14,619**	**4,907**	**74,272**
COPEPODA	*Cyclops sp.*	92,840	5,570	10,964	24,536	41,778
	Diaptomus sp.	9,284	38,993	10,964	9,815	4,642
	Nauplii	55,704	161,542	51,165	78,516	69,630
	COPEPODA TOTAL	**157,829**	**206,106**	**73,093**	**112,867**	**116,050**
	Asplanchna priodonta	0	33,423	3,655	0	0
	Filinia longiseta	0	0	0	0	4,642
	Lecane sp.	0	5,570	3,655	0	4,642
	Keratella cochlearis	454,918	55,704	135,223	176,662	208,891
	Keratella quadrata	0	0	0	4,907	0
	Kellicottia sp.	1,522,582	61,275	10,964	24,536	111,408
	Polyarthra vulgaris	92,840	72,415	14,619	24,536	41,778
ROTIFERA	*Trichocerca cylindrica*	0	0	7,309	29,444	0
	Trichocerca multicrinis	0	0	0	0	4,642
	ROTIFERA TOTAL	**2,070,341**	**228,387**	**175,424**	**260,086**	**376,004**
	TOTALS	**2,246,737**	**490,197**	**263,136**	**377,860**	**566,326**


2002 Lake DeMontreville
Zooplankton Data Summary
No. Per Square Meter
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
6/11/2002
7/11/2002
8/5/2002
8/19/2002
9/4/2002
Date
Rotifera
Copepoda
Cladocera