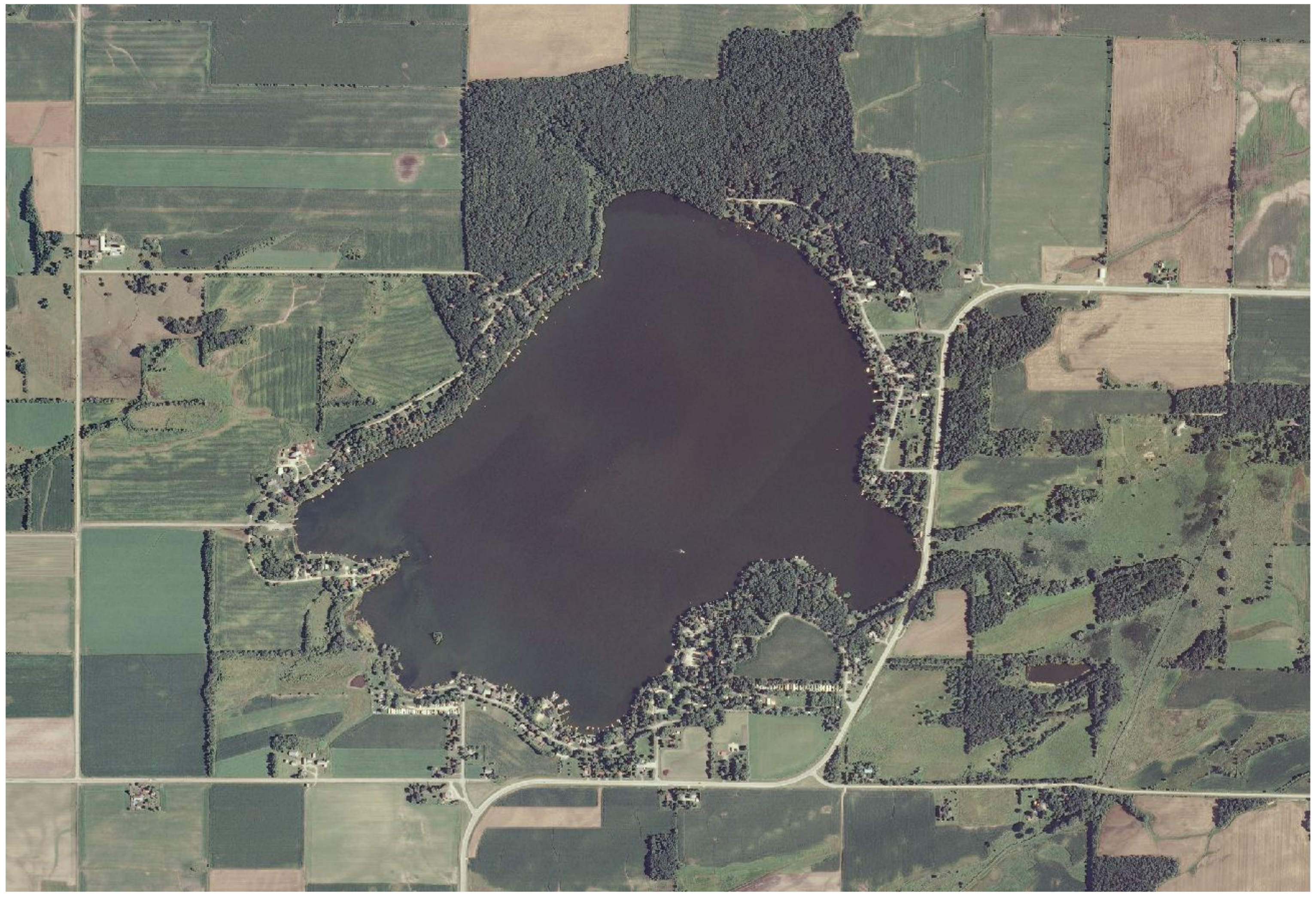
Little Green Lake Aquatic Plant Management Plan

June 9, 2011



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AQUATIC PLANT MANAGEMENT PLAN

LITTLE GREEN LAKE
GREEN LAKE COUNTY, WISCONSIN

June 9, 2011

Prepared for:

Little Green Lake Protection and Rehabilitation District
PO Box 212
Markesan, Wisconsin 53946

Prepared by:

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

FIGURES

TABLES

APPENDICES

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1.0 EXECUTIVE SUMMARY

Little Green Lake is a 466 acre lake located in the town of Green Lake in southeast Green Lake County, Wisconsin. Little Green Lake exhibits fair water quality but experiences periods of dense aquatic plant and algal growth. The aquatic plants on the lake provide important habitat for fish and wildlife, but dense plant growth has historically been a nuisance condition, interfering with recreation on the lake (e.g. boat navigation, swimming, canoeing, and other recreation activities). The District currently operates one aquatic plant harvester to address nuisance plant growth on the lake and developed an Aquatic Plant Management (APM) Plan to obtain a long term harvesting permit from the Wisconsin Department of Natural Resources (WDNR) and to help guide future aquatic plant management.

Water quality data collected in 1986 - 2007 indicate a eutrophic lake system. Nutrients from within the lake, nutrients flowing into the lake from two intermittent inlets and from land uses within the watershed are likely enhancing aquatic plant growth. During 2005 to 2010 the WDNR conducted aquatic plant survey's to help monitor current aquatic plant conditions. The aquatic macrophyte community of Little Green included a minimum of 7 species (9 visual) in 2005 to a max of 13 species in 2008 of floating leaved, emergent, and submerged aquatic vascular plant species. Floristic quality index's (FQI) (help assess lake quality using the aquatic plants that live in a lake) ranged from a low of 12.47 in 2005 to a high of 17.79 in 2008 and 17.75 in 2009 and 2010.

Two aquatic invasive plant species Eurasian watermilfoil (*Myriophyllum spicatum*) and Curly-leaf pondweed (*Potamogeton crispus*) were identified in high densities and frequency. Two native aquatic plants Elodea (*Elodea canadensis*) and Coontail (*Ceratophyllum demersum*) were also identified in high densities and frequency. All four species are many times at nuisance levels limiting lake access for both recreation and navigation.

The District has prepared a comprehensive APM Plan to manage nuisance aquatic plant growth on Little Green Lake which includes the following components

Manual Removal:	**Individual property owners can manually remove nuisance aquatic plants in the lake offshore from their property to a maximum width of 30 feet for native aquatic plants and an unlimited width for exotic species to provide pier, boat lift, swimming, or fishing.**
Mechanical Harvesting:	**The District will continue mechanical harvesting for navigation purposes in accordance with the conditions of a WDNR-issued harvesting permit.**
Selective /Nuisance Chemical Control:	**The District will continue using chemical herbicides for navigation, recreation, and exotic species relief purposes in near shore areas where the harvestor can not operate and in open water areeas for aquatic invasive species (AIS) control. Both selective and nonselective chemicals will be used to maintain navigation, private access for boating, fishing and swimming, and to manage nuisance levels of aqauatic plants both native and aquatic.** This activity can be completed by the District or individual landowners (WDNR permit is required).

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Other components of the APM Plan include periodic review of APM technologies, nutrient control efforts by the District and landowners, historic water quality monitoring in 1986-2001 and 2007, periodic aquatic macrophyte surveys completed in 2005 - 2010, aquatic species prevention and control, and public education about the value of aquatic plants and threat of aquatic invasive plant species.

An Aquatic Invasive Species (AIS) prevention and control plan will be implemented through watercraft inspection, monitoring, and APM and AIS education. Nutrient controls and watershed management will continue to drive many District goals and objectives. Water quality monitoring will also be completed to monitor lake water quality and its impact on and/or a result of proposed management activities to help facilitate future aquatic plant management.

2.0 INTRODUCTION

Little Green Lake is located in the town of Green Lake just north of the City of Markesan in southeast Green Lake County, Wisconsin. Figure 1 depicts the lake location [Wisconsin Department of Transportation (WDOT)]. Little Green Lake provides year around activities ranging from, fishing, motorized boating activities, canoeing, pontooning, wildlife viewing, snowmobiling, cross country skiing, and ice fishing. Little Green Lake is primarily used for sport fishing, recreational activities, and relaxation.

Little Green Lake exhibits fair water quality and experiences periods of dense aquatic plant and algal growth (Ramaker & Associates, 1999). Excessive algae and rooted aquatic plant growth are identified as the primary lake use impairments. While the aquatic plants on the lake provide important habitat for fish and wildlife, dense aquatic plant growth on Little Green Lake has historically interfered with recreation on the lake (e.g. boat navigation, recreation and swimming). In response to the lake users concerns, the Little Green Lake Protection and Rehabilitation District (Little Green Lake P&R District) was formed in 1984. Recent changes in Wisconsin's aquatic plant management laws and the subsequent Wisconsin Department of Natural Resources' (WDNR) administration of their aquatic plant management program (NR 109 Wis. Adm. Code) have required that the District update there 1999 Aquatic Plant Management Plan (APM Plan).

This APM Plan was designed to meet the District's needs for nuisance aquatic plant relief and the WDNR's requirements (e.g. applying for permits under Chapter NR 107 and Chapter NR 109 Wisconsin Administrative Code for aquatic plant chemical control and harvesting). This APM Plan summarizes the lake morphology and lake watershed characteristics; reviews historical aquatic plant management activities; discusses the District's, goals and objectives; presents the aquatic plant ecology; presents results of the recent 2005 - 2009 WDNR aquatic plant survey's; evaluates feasible aquatic plant management alternatives; and provides a selected suite of aquatic plant management options in a comprehensive and integrated APM Plan.

2.1 Lake History and Morphology

Little Green Lake is a 466-acre groundwater seepage lake and has approximately 4.2 miles of shoreline. Groundwater seepage lakes are defined as systems that lack a significant inlet or outlet. Surface water enters Little Green Lake from precipitation, groundwater and via two intermittent inlets. A static water level is maintained on Little Green Lake by a dam-regulated outlet structure on the east side of the lake on Highway 44. The lake's mean depth is 10 feet with a maximum depth of 26.5 feet (Ramaker and Associates, 1999). Figure 2 illustrates the bathymetry of Little Green Lake.

2.2 Fishery

The fishery is comprised of panfish, largemouth bass, smallmouth bass, northern pike, walleye, and muskellunge. The WDNR has stocked Little Green Lake with walleye, muskellunge, and northern pike over a variety years since 1972.

2.3 Watershed Overview

Little Green Lake's watershed is approximately 2,131 acres or 3.33 square miles with a watershed-to-lake surface area ratio of 3.57, a low-ratio lake. A low watershed to lake ratio generally means that runoff within the watershed has less of an impact on a lake's water quality. This relatively low watershed-to-lake ratio also means that projects within the watershed often help reduce point and non-point nutrient sources and are sometimes easier to identify within a watershed dominated by agricultural land uses and fertile soils.

The watershed consists predominantly of the Plano-Mendota-St. Charles soils association (United States Department of Agriculture, 1977). Watershed topography is gently rolling, with the most dramatic elevation changes just north of Little Green Lake. The lake's elevation is situated at approximately 922 feet above mean level (Ramaker & Associates, 1997).

Land uses within the watershed of Little Green Lake are identified as:

Agriculture 77% or 1,641acres
Wooded 15% or 320 acres
Urban 5% or 106 acres
Road 3% or 64 acres

Potential nutrient loadings to Little Green Lake may be occurring from all of the above land uses. Agricultural runoff however, is known to contribute significant quantities of sediment-laden runoff and nutrient loading to receiving water bodies, especially after significant rainfall events.

2.4 Water Quality

2.4.1 Trophic Status

Trophic status is a measure of nutrient enrichment and primary productivity as determined by correlating total phosphorus, chlorophyll *a*, and secchi disk depths. A trophic state is a measure of a lake's biological productivity, which may range from nutrient-poor and relatively unproductive to nutrient-rich and highly productive. Water resource managers and scientists use the Carlson's and/or Wisconsin Trophic State Index (TSI) to monitor Wisconsin lakes water quality. Aquatic resource managers use the secchi disk, total Phosphorus, and chlorophyll *a* data and apply Carlson's and/or Wisconsin's TSI to place the water into one of the following categories based upon the degree of eutrophication.

Trophic Category Descriptions

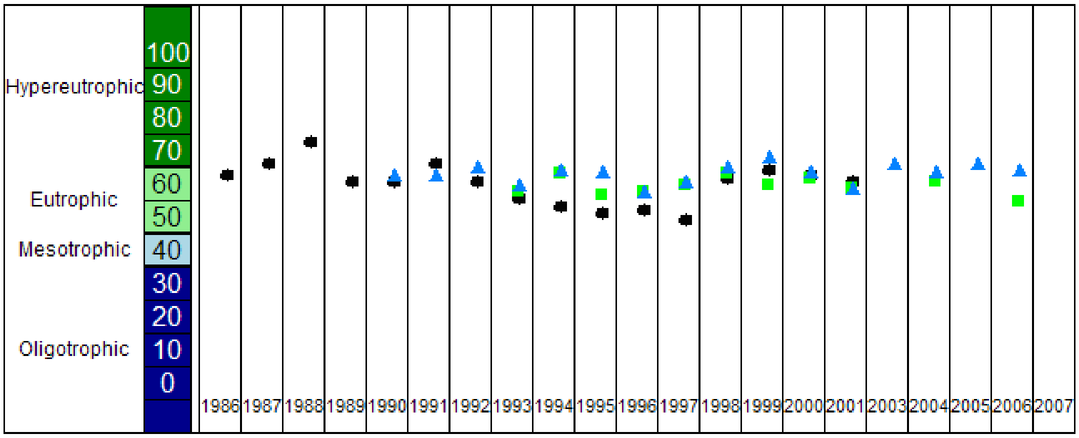
Category	TSI	Lake Characteristics
Oligotrophic	1-40	Clear water; oxygen rich at all depths, except if close to mesotrophic border; then may have low or no oxygen; cold-water fish likely in deeper lakes.
Mesotrophic	41-50	Moderately clear; increasing probability of low to no oxygen in bottom waters.
Eutrophic	51-70	Decreased water clarity; probably no oxygen in bottom waters during summer; warm-water fisheries only; blue-green algae likely in summer in upper range; plants also excessive.
Hypereutrophic	70-100	Heavy algal blooms throughout the summer; if > 80, fish kills likely in summer and rough fish dominate.

All lakes undergo a natural aging process, shifting from an oligotrophic state to an eutrophic state. Human activities can accelerate this aging process through nutrient and sediment additions from agriculture, lawn fertilizers, septic systems, and urban storm sewers. TSI values have held very constant over the years on Little Green ranging from the 40's in spring/early summer and increasing to the 60's during the summer months. Eutrophic lakes typically have turbid water, can develop anoxic hypolinia during the summer, may have excessive aquatic macrophytes, and will normally only support warm-water fisheries (Shaw, 1994). TSI = 60 - 14.41 ln Secchi disk (meters) **or** 9.81 ln Chlorophyll a (ug/L) + 30.6 **or** 14.42 ln Total phosphorus (ug/L) + 4.15.

TSI	TSI Description
TSI < 30	Classical oligotrophy: clear water, many algal species, oxygen throughout the year in bottom water, cold water, oxygen-sensitive fish species in deep lakes. Excellent water quality.
TSI 30-40	Deeper lakes still oligotrophic, but bottom water of some shallower lakes will become oxygen-depleted during the summer.
TSI 40-50	Water moderately clear, but increasing chance of low dissolved oxygen in deep water during the summer.
TSI 50-60	Lakes becoming eutrophic: decreased clarity, fewer algal species, oxygen-depleted bottom waters during the summer, plant overgrowth evident, warm-water fisheries (pike, perch, bass, etc.) only.
TSI 60-70	Blue-green algae become dominant and algal scums are possible, extensive plant overgrowth problems possible.
TSI 70-80	Becoming very eutrophic. Heavy algal blooms possible throughout summer, dense plant beds, but extent limited by light penetration (blue-green algae block sunlight).
TSI > 80	Algal scums, summer fishkills, few plants, rough fish dominant. Very poor water quality.

Several sampling events by WDNR staff in 2005 and 2006 also provided secchi disk, total phosphorus, or chlorophyll *a* data that was also used to establish the TSI of Little Green Lake. Historical TSI values were calculated from these sample results. Water quality parameters were collected as part of the Self-Help Lake Monitoring program in 1986 – 2001 and 2007. Analysis of the water quality information from these events indicate that Little Green Lake is an eutrophic lake. Eutrophic lakes have the potential for: heavy algal blooms throughout the summer, fish kills, and a fishery typically dominated by rough fish.

Trophic State Index Graph



Monitoring Station: Little Green Lake - Deep Hole, Green Lake County
Past Summer (July-August) Trophic State Index (TSI) averages.

◆ = Secchi ■ = Chlorophyll ▲ = Total Phosphorus

Source: WDNR Lake Water Quality Report – Report data can be found at: http://www.dnr.state.wi.us/lakes/CLMN/reportsanddata/index.asp?project=clmn&folder=CLMN

2.5 Aquatic Plant Management History

Lake users have historically reported problems with dense aquatic plant growth on Little Green Lake. The District acquired an aquatic plant harvester in 2005. The District has continued operation of the harvester since then to manage excessive aquatic macrophyte growth. Periodic chemical treatment was also completed for many years. A very active chemical treatment program has been undertaken since 2005 to help reduce the presence of *Myriophyllum spicatum* (Eurasian watermilfoil - EWM) and *Potamogeton crispus* (Curly-leaf Pondweed – CLP).

A lake management planning grant project was completed in conjunction with an aquatic plant survey in 1994 by Northern Environmental. This report identified fourteen genera of aquatic macrophytes. *Myriophyllum spicatum* was reported as an identified species in 1993 (Northern Environmental, 1994). EWM has not officially been verified by WDNR staff on Little Green Lake as indicated on the WDNR web page listing water bodies with positive id's, however, hybrid milfoil was identified in 1993 (WDNR, 2010).

Curly-leaf Pondweed was the second most abundant species identified in 2004 (Northern Environmental, 1994). CLP was not positively identified until 2005 by WDNR staff on Little Green Lake (WDNR, 2010).

Dense aquatic plant growth continues to impair most recreation on Little Green Lake weather it be boating, fishing or swimming in near shore areas. EWM and CLP in particular have been problem exotic species along with native stands of Coontail (*Ceratophyllum demersum*) and Elodea (*Elodea canadensis*). As a result, aquatic plant harvesting and chemical control have been used to manage abundant vegetation.

2.6 Goals and Objectives

The main project objective is to complete an updated APM Plan integrating aquatic plant survey data that has been collected by WDNR staff in 2005 thru 2010. This information is then used to quantify and map the abundance and distribution of aquatic plant species. Since there has not been an updated APM Plan written since 1999 (Ramaker and Associates, 1999). Harvesting in conjunction with chemical control have been used as a successful management tool for controlling nuisance aquatic plant growth on Little Green Lake since 2005. **APM Plan goals and objectives are a follows:**

- ✓ **Achieve and maintain frequency of occurrence's for EWM and CLP < 15% as achieved in 2006 – 2008**
- ✓ **Manage coontail and elodea through harvesting to maintain and improve recreational activities including boating and fishing**
- ✓ **Continue selective chemical control as needed to reduce prevalence and density of EWM and CLP lake wide**
- ✓ **Maintain and improve recreational opportunities using selective and/or nuisance chemical control, manual removal, and mechanical harvesting**
- ✓ **Start and continue a water quality monitoring program to track how proposed and ongoing management actions are affecting lake water quality**
- ✓ **Educate lake users on invasive species and benefits of native aquatic plant communities**
- ✓ **Maintain an effective chemical control program in near shore areas for exotic species (EWM and CLP) and nuisance aquatic plant growth as needed**
- ✓ **Preserve native aquatic plants except in localized areas where they pose a nuisance and inhibit access to open water or prohibit recreation**
- ✓ **Protect sensitive areas**
- ✓ **Continue an efficient mechanical control program**
- ✓ **Prevent the spread of AIS, such as Eurasian watermilfoil and Curly-leaf pondweed**
- ✓ **Protect and improve fish and wildlife habitat**
- ✓ **Manage potential sources of nutrients leading to algae blooms**
- ✓ **Provide limited individual nuisance or access control of aquatic plants**
- ✓ **Work in partnership with the WDNR to continue remediation efforts on Little Green while simultaneously aiding the WDNR in fulfilling their Mission Statement**
- ✓ **Continue to improve water quality of Little Green Lake by collecting and maintaining appropriate scientific data to provide evidence of progress**
- ✓ **To be a model for other lakes by demonstrating positive results through cooperative efforts among governing bodies, concerned citizens, and lake users**

3.0 PROJECT METHODS

To accomplish the District's goals, the District needs to make informed decisions regarding APM on the Lake. To make informed decisions, the District proposed to:

- ✓ **Collect, analyze, and interpret basic aquatic plant community data while using existing plant data collected by WDNR staff from 2005 - 2010**
- ✓ **Recommend practical, scientifically-sound aquatic plant management strategies to help guide future management objectives for Little Green Lake**
- ✓ **Collect, analyze, and interpret basic water quality parameters to track how proposed and ongoing management activities are affecting lake water quality and make scientifically based management decisions**

3.1 Existing Data Review

A variety of background information resources were researched to develop a thorough understanding of the ecology of the Lake. Information sources included:

- ✓ Local and regional geologic, limnologic, hydrologic, and hydrogeologic research
- ✓ Discussions with District members and Citizens
- ✓ Available topographic maps and aerial photographs
- ✓ Data from WDNR files
- ✓ Past Lake Study Reports

These sources were essential to understanding the historic, present, and potential future conditions of the Lake, as well as to ensure that previously completed studies were not unintentionally duplicated. Specific references are listed in Section 7.0 of this report.

3.2 Aquatic Plant Survey and Analysis

The aquatic plant community of the Lake was surveyed during June 6, 2005, July 31 and August 2, 2006, July 5 and 6, 2007, July 2, 2008, June 30, 2009, and June 30, 2010. The survey's were conducted using the point intercept sampling method described by Madsen (1999), as is recommended in the draft guidance on APM in Wisconsin (WDNR, 2006). The point intercept method is readily adapted to "whole-lake" or large plot assessments as compared to the transect method that is best used in evaluating study plots or selected areas to evaluate aquatic macrophyte communities.

To use the point intercept method, a base map was developed with 377 sampling points (i.e., intercept points) established on a 70 meter grid (Figure 3). Latitude and longitude coordinates and sample identifications were assigned to each intercept point on the grid (Appendix B). A global positioning system (GPS) was used by WDNR staff to navigate to intercept points. At each intercept point, plants were observed visually (V is recorded) or collected with a rake on a telescopic pole (P is recorded) or a rake attached to a rope (R is recorded).

All observed plants were identified to the lowest practicable taxonomic level (e.g., typically genus or species) and recorded on field data sheets. Water depth and sediment type was recorded at each intercept point (when detectable) on field data sheets. A (M) was reported for muck, a (S) was recorded for sand, and a (R) was recorded for rock.

At each intercept point, a value of 1-3 was assigned to the species collected based on densities observed on the rake, or rake fullness ratings. 1 being a few plants on the rake head, 2 when the rake head is approximately ½ full, and three being full of aquatic plants with the rake head not visible. If a species was not collected at that point, the space was left blank. For the survey, the data for each sample point was entered into the WDNR "Worksheets" (i.e., a data-processing spreadsheet) to calculate the following statistics:

- ✓ **Taxonomic richness** (the total number of taxa detected)
- ✓ **Maximum depth of plant growth**
- ✓ **Community frequency of occurrence** (number of intercept points where aquatic plants were detected divided by the number of intercept points shallower than the maximum depth of plant growth)
- ✓ **Mean intercept point taxonomic richness** (the average number of taxa per intercept point)
- ✓ **Mean intercept point native taxonomic richness** (the average number of native taxa per intercept point)
- ✓ **Taxonomic frequency of occurrence within vegetated areas** (the number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the total number of intercept points where vegetation was present)
- ✓ **Taxonomic frequency of occurrence at sites within the photic zone** (the number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the total number of intercept points which are equal to or shallower than the maximum depth of plant growth)
- ✓ **Relative taxonomic frequency of occurrence** (the number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the sum of all species' occurrences)
- ✓ **Mean density** (the sum of the density values for a particular species divided by the number of sampling site)
- ✓ **Simpson Diversity Index (SDI)** is an indicator of aquatic plant community diversity. SDI is calculated by taking one minus the sum of the relative frequencies squared for each species present. Based upon the index of community diversity, the closer the SDI is to one, the greater the diversity within the population.
- ✓ **Floristic Quality Index (FQI)** (This method uses a predetermined Coefficient of Conservatism (C), that has been assigned to each native plant species in Wisconsin, based on that species' tolerance for disturbance. Non-native plants are not assigned conservatism coefficients. The aggregate conservatism of all the plants inhabiting a site determines its floristic quality. The mean C value for a given lake is the arithmetic mean of the coefficients of all native vascular plant species occurring on the entire site, without regard to dominance or frequency. The FQI value is the mean C times the square root of the total number of native species. This formula combines the conservatism of the species present with a measure of the species richness of the site. Each plant is assigned a number from 1 to 10. Low nutrient and undisturbed conditions are given a higher number and plants typically found in more nutrient rich and/or disturbed waters are given a lower coefficient of conservatism. Lake quality is quantified by the number of species found, the identity of plants and the coefficient of conservatism. The FQI was developed by Stan Nichols (Wisconsin Geological and Natural History Survey) to help assess lake quality using the aquatic plants that live in a lake.

All of the above statistics can be found in Appendix A and Tables 2 – 10.

4.0 AQUATIC PLANTS AND WATER QUALITY

Aquatic plants are vital to the health of a water body. Unfortunately, people too often refer to rooted aquatic plants as "weeds" and ultimately wish to eradicate them. This type of attitude, and the misconceptions it breeds, must be overcome in order to properly manage a lake ecosystem. Rooted aquatic plants (macrophytes) are extremely important for the well being of a lake community and posses many positive attributes. These attributes are what make the littoral zone the most important and productive aquatic habitat in freshwater lakes. Despite their positive role, aquatic macrophytes can become a nuisance when aquatic invasive species (AIS) occupy large portions of a lake and/or excessive growth of AIS or native macrophytes negatively affect recreational activities. When "managing" aquatic plants, it is important to maintain a well-balanced, stable, and diverse aquatic plant community that contains high percentages of desirable native species. To be effective, aquatic plant management in most lakes must maintain a plant community that is:

- ✓ Robust
- ✓ Species rich
- ✓ Diverse
- ✓ Predominantly native

4.1 The Ecological Role of Aquatic Plants

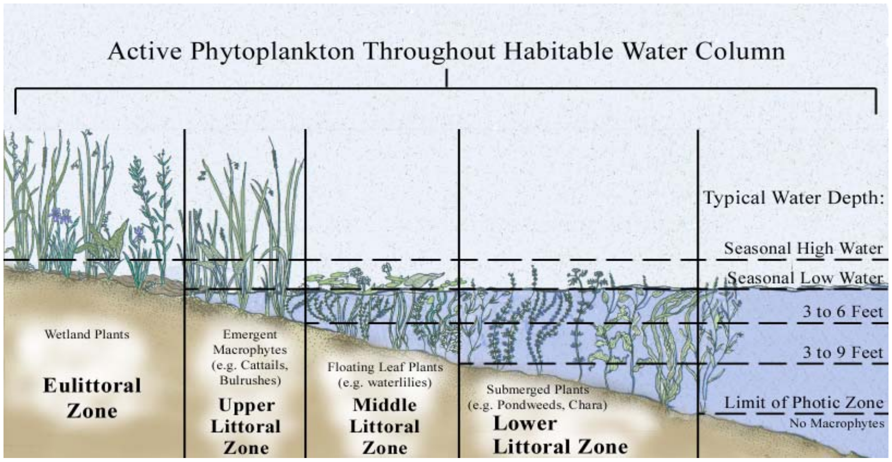
Aquatic plants can be divided into two major groups: microphytes (phytoplankton and epiphytes) composed mostly of single-celled algae, and macrophytes that include macroalgae, flowering vascular plants, and aquatic mosses and ferns. Wide varieties of microphytes co-inhabit all hospitable areas of a lake. Their abundance depends on light, nutrient availability, and other ecological factors. In contrast, macrophytes are predominantly found in distinct habitats located in the littoral (i.e., shallow near shore) zone where light sufficient for photosynthesis can penetrate to the lake bottom. The littoral zone is subdivided into four distinct transitional zones: the eulittoral, upper littoral, middle littoral, and lower littoral (Wetzel, 1983).

Eulittoral Zone: Includes the area between the highest and lowest seasonal water levels, and often contains many wetland plants.

Upper Littoral Zone: Dominated by emergent macrophytes and extends from the water edge to water depths between 3 and 6 feet.

Middle Littoral Zone: Occupies water depths of 3 to 9 feet, extending lakeward from the upper littoral zone. The middle littoral zone is dominated by floating-leaf plants.

Lower Littoral Zone: Extends to a depth equivalent to the limit of the photic zone, which is defined as percent of surface light intensity.



Aquatic Plant Communities Schematic

The abundance and distribution of aquatic macrophytes are controlled by light availability, lake trophic status as it relates to nutrients and water chemistry, sediment characteristics, and wind energy. Lake morphology and watershed characteristics relate to these factors independently and in combination (NALMS, 1997).

In many instances aquatic plants serve as indicators of water quality due to the sensitive nature of plants to water quality parameters such as water clarity and nutrient levels. To grow, aquatic plants must have adequate supplies of nutrients. Microphytes and free-floating macrophytes (e.g., duckweed) derive all their nutrients directly from the water. Rooted macrophytes can absorb nutrients from water and/or sediment. Therefore, the growth of phytoplankton and free-floating aquatic plants is regulated by the supply of critical available nutrients in the water column. In contrast, rooted aquatic plants can normally continue to grow in nutrient-poor water if lake sediment contains adequate nutrient concentrations. Nutrients removed by rooted macrophytes from the lake bottom may be returned to the water column when the plants die. Consequently, killing aquatic macrophytes may increase nutrients available for algal growth.

In general, an inverse relationship exists between water clarity and macrophyte growth. That is, water clarity is usually improved with increasing abundance of aquatic macrophytes. Two possible explanations are postulated. The first is that the macrophytes and epiphytes out-compete phytoplankton for available nutrients. Epiphytes derive essentially all of their nutrient needs from the water column. The other explanation is that aquatic macrophytes stabilize bottom sediment and limit water circulation, preventing resuspension of solids and nutrients (NALMS, 1997).

If aquatic macrophyte abundance is reduced, then water clarity may suffer. Water clarity reductions can further reduce the vigor of macrophytes by restricting light penetration, reducing the size of the littoral zone, and further reducing water clarity. Studies have shown that if 30 percent or less of the area of a lake occupied by aquatic plants is controlled, water clarity will generally not be affected. Every lake system can react differently based on active management and site conditions.

Aquatic plants also play a key role in the ecology of a lake system. Aquatic plants provide food and shelter for fish, wildlife and invertebrates. Plants also improve water quality by protecting shorelines and the lake bottom, improving water quality and adding to the aesthetic quality of the lake.

4.2 Aquatic Invasive Plant Species

Invasive species have invaded our backyards, forests, prairies, wetlands, and waters. Invasive species are often transplanted from other regions, even from across the globe. "A species is regarded as invasive if it has been introduced by human action to a location, area, or region where it did not previously occur naturally (i.e., is not native), becomes capable of establishing a breeding population in the new location without further intervention by humans, and spreads widely throughout the new location " (Source: WDNR website, Invasive Species, 2010). Aquatic invasive species (AIS) include plants and animals that affect our lakes, rivers, and wetlands in negative ways. Once in their new environment, AIS often lack natural control mechanisms they may have had in their native ecosystem and may interfere with the native plant and animal interactions in their new "home". Some AIS have aggressive reproductive potential and contribute to ecological declines and problems for water based recreation and local economies. AIS often quickly become a problem in already disturbed lake ecosystems (i.e. one with relatively few native plant species). While native plants provide numerous benefits, AIS can contribute to ecological decline and financial constraints to manage problem infestations.

Eurasian Watermilfoil *(Myriophyllum spicatum)*


Eurasian watermilfoil
Source: WDNR Website

EWM is the most common AIS found in Wisconsin lakes. EWM was first discovered in southeast Wisconsin in the 1960's. During the 1980's, EWM began to spread to other lakes in southern Wisconsin and by 1993 it was common in 39 Wisconsin counties. EWM continues to spread across Wisconsin and is now found in the far northern portion of the state.

Unlike many other plants, EWM does not rely on seed for reproduction. Its seeds germinate poorly under natural conditions. It reproduces vegetatively by fragmentation, allowing it to disperse over long distances. The plant produces fragments after fruiting once or twice during the summer. These shoots may then be carried downstream by water currents or inadvertently picked up by boaters. EWM is readily dispersed by boats, motors, trailers, bilges, live wells, or bait buckets, and can stay alive for weeks if kept moist (WDNR website, 2010).

Once established in an aquatic community, EWM reproduces from shoot fragments and stolons (runners that creep along the lake bed). As an opportunistic species, EWM is adapted for rapid growth early in spring. Stolons, lower stems, and roots persist over winter and store the carbohydrates that help milfoil claim the water column early in spring, photosynthesize, divide, and form a dense leaf canopy that shades out native aquatic plants. Its ability to spread rapidly by fragmentation and effectively block out sunlight needed for native plant growth often results in monotypic stands. Monotypic stands of EWM provide only a single habitat, and threaten the integrity of aquatic communities in a number of ways; for example, dense stands disrupt predator-prey relationships by fencing out larger fish, and reducing the number of nutrient-rich native plants available for waterfowl (WDNR website, 2010).

Dense stands of EWM also inhibit recreational uses like swimming, boating, and fishing. The visual impact that greets the lake user on milfoil-dominated lakes is the flat yellow-green of matted vegetation, often prompting the perception that the lake is "infested" or "dead". Cycling of nutrients from sediments to the water column by EWM may lead to deteriorating water quality and algae blooms of infested lakes (WDNR website, 2010).

Curly-leaf pondweed *(Potamogeton crispus)*


Curly-leaf Pondweed
Source: WDNR Website

Curly-leaf pondweed (CLP) spreads through burr-like winter buds (turions), which are moved among waterways. These plants can also reproduce by seed, but this plays a relatively small role compared to the vegetative reproduction through turions. New plants form under the ice in winter, making CLP one of the first nuisance aquatic plants to emerge in the spring.

The leaves of CLP are reddish-green, oblong, and about 3 inches long, with distinct wavy edges that are finely toothed. The stem of the plant is flat, reddish-brown and grows from 1 to 3 feet long. The plant usually drops to the lake bottom by early July.

CLP becomes invasive in some areas because of its tolerance for low light and low water temperatures. These tolerances allow it to get a head start on and out-compete native plants in the spring. CLP forms surface mats that interfere with aquatic recreation in early-summer, when most aquatic plants are growing, CLP plants are dying off. Plant die-offs may result in a critical loss of dissolved oxygen. Furthermore, the decaying plants can increase nutrients which contribute to algal blooms, as well as create unpleasant stinking messes on beaches (WDNR website, 2010).

Purple Loosestrife (*Lythrum salicaria*)


Purple Loosestrife
Source: WDNR Website

Purple loosestrife is a perennial herb 3-7 feet tall with a dense bushy growth form. Showy flowers vary from purple to magenta, possess 5-6 petals aggregated into numerous long spikes, and bloom from July to September.

Purple loosestrife was first detected in Wisconsin in the early 1930's, but remained uncommon until the 1970's. It is now widely dispersed in the state, and has been recorded in 70 of Wisconsin's 72 counties. Low densities in most areas of the state suggest that the plant is still in the pioneering stage of establishment. Areas of heaviest infestation are sections of the Wisconsin River, the extreme southeastern part of the state, and the Wolf and Fox River drainage systems. This plant's optimal habitat includes marshes, stream margins, alluvial flood plains, sedge meadows, and wet prairies. It is tolerant of moist soil and shallow water sites such as pastures and meadows, although established plants can tolerate drier conditions. Purple loosestrife has also been planted in lawns and gardens, which is often how it has been introduced to many of our wetlands, lakes, and rivers. Purple loosestrife spreads mainly by seed, but it can also spread vegetatively from root or stem segments. A single stalk can produce from 100,000 to 300,000 seeds per year. Seed survival is up to 60-70%, resulting in an extensive seed bank. Mature plants with up to 50 shoots grow over 2 meters high and produce more than two million seeds a year. Germination is restricted to open, wet soils and requires high temperatures, but seeds remain viable in the soil for many years. Even seeds submerged in water can live for approximately 20 months (WDNR website, 2010).

4.3 Other Aquatic Invasive Species

The following AIS are not plants, but are mentioned here because they also can significantly disrupt healthy aquatic ecosystems.

Zebra mussels (*Dreissena polymorpha*)

Zebra mussels are a tiny (1/8-inch to 2-inch) bottom-dwelling clam native to Europe and Asia. Zebra mussels were introduced into the Great Lakes in 1985 or 1986, and have been spreading throughout them since that time. They were most likely brought to North America as larvae in ballast water of ships that traveled from fresh-water Eurasian ports to the Great Lakes. Zebra mussels look like small clams with a yellowish or brownish D-shaped shell, usually with alternating dark- and light-colored stripes. They can be up to two inches long, but most are under an inch. Zebra mussels usually grow in clusters containing numerous individuals.
http://www.seagrant.umn.edu/ais/zebramussel


Zebra Mussels
Source: WDNR Website

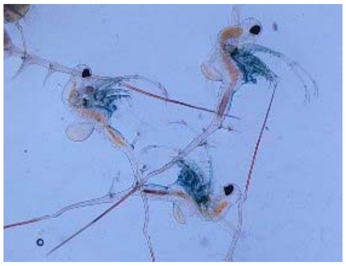
Rusty crayfish (*Orconectes rusticus*)

Rusty Crayfish
Source: WDNR Website

Rusty crayfish have invaded portions of Minnesota, Wisconsin, Ontario, and many other areas. Although native to parts of some Great Lakes states, rusty crayfish have spread to many northern lakes and streams where they cause a variety of ecological problems. Rusty crayfish were probably spread by non-resident anglers who brought them north to use as fishing bait. As rusty crayfish populations increased, they were harvested for the regional bait market and for biological supply companies. Such activities probably helped spread the species further. Invading rusty crayfish frequently displace native crayfish, reduce the amount and kinds of aquatic plants and invertebrates, and reduce some fish populations. Long term and labor intensive trapping efforts, along with special fishing regulations designed to increase predation on juvenile crayfish has demonstrated control of a "rusty" infestation. The best way to prevent further ecological problems is to prevent or slow their spread into new waters.

http://www.seagrant.umn.edu/exotics/rusty

Spiny Water Flea (*Bythotrephes cederstoemi*) are predatory zooplankton (tiny aquatic animals) that have a barbed tail making up most of their body length (one centimeter average). They compete with small fish for food supplies (zooplankton) and small fish cannot swallow the spiny water flea due to the long spiny appendage. More research is being completed to determine the potential impacts of the spiny water flea. More information about this invader can be found at http://dnr.wi.gov/invasives/fact/spiny



Spiny Water Flea
Source: WDNR Website

4.4 Aquatic Plant Survey's (2005 – 2010)

The aquatic macrophyte community of the Lake included a minimum of 7 species (9 including visual) in 2005 to a max of 13 species in 2006 and 2008 of floating leaved, emergent, and submerged aquatic vascular plant species. The survey included sampling at 377 intercept points and the observed taxa are summarized in Table 1. The distribution of aquatic plant species during the WDNR surveys are illustrated in Figures 4-9, respectively.

The aquatic plant community present on Little Green Lake from 2005 - 2010 exhibited a relatively low species diversity. The Simpson Diversity Index value of the community was 0.75 in 2005, 0.79 in 2006, 0.79 in 2007, 0.79 in 2008, 0.81 in 2009, and 0.82 in 2010 (Table 2). Aquatic vegetation was detected on an average of 247 intercept points of 377 total sample points from 2005 – 2010 of site shallower than the maximum depth of plants. The photic zone depth ranged from 20 feet in 2006 to 13 feet in 2009 as indicated by the maximum depth that plants were observed at (Table 2). The taxonomic richness of the aquatic plant community was 7 taxa in 2005 (9 including visual), 11 taxa (13 including visual) in 2006 and 2007, 13 taxa in 2008, 12 taxa in 2009, and 11 taxa in 2010 (15 including visual) (Table 2). An average of 1.28 taxa were detected at intercept points in 2005, 1.98 taxa in 2006, 1.29 taxa in 2007, 1.27 taxa in 2008, 1.64 taxa in 2009, and 1.73 taxa in 2010 in areas shallower than the max depth.

The most abundant aquatic plants in 2005 included hybrid watermilfoil, CLP, elodea, and coontail, in 2006 elodea, coontail, EWM, and watermilfoil, in 2007 coontail, elodea, CLP and hybrid milfoil, in 2008 coontail, CLP, EWM, and elodea, in 2009 elodea, coontail, EWM and CLP, and in 2010 elodea, coontail, EWM and CLP.

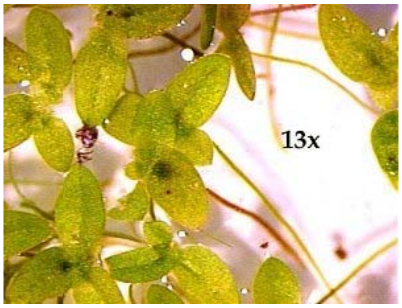
Invasive species, such as Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*), tend to densely colonize affected lakes and out compete native species. Unfortunately, both invasives were detected in Little Green Lake all five survey years ranging from 2005 to 2010. Additional information about these exotic aquatic plants is available in the educational materials in Appendix H. Additional information is also available from the WDNR website:

http://dnr.wi.gov/invasives/aquatic/

4.4.1 Free-Floating Plants

Free-floating aquatic plant species identified during the WDNR aquatic plant surveys in 2005 - 2010 are listed in Table 1. A brief description about these plants follows.

Lemna minor (Small Duckweed)



Small Duckweed
Source: University of Florida Website

Lemna minor (Small Duckweed), is a common free-floating aquatic plant. Duckweed has round oval shaped leaf bodies called fronds. These fronds float individually or in groups on the waters surface. Duckweed reproduces commonly by budding. The plants obtain nutrients from the water by absorbing nutrients through its leaf undersurface and dangling roots. Duckweed is a nutritious food source for a variety of waterfowl. Duckweed can reproduce at tremendous rates sometimes doubling in number in as little of three to five days (Borman, et al., 1997).

Lemna trisulca (Forked Duckweed)

Lemna trisulca (Forked Duckweed), is a common free-floating aquatic plant. Common watermeal is composed of a simple flattened leaf body or frond that is long stalked with three faint nerves and a single root. Forked duckweed is commonly found just beneath the surface of quite waters. It may drift with the wind or current and is not dependent on depth, sediment type or water clarity, however, there must be adequate nutrients in the water to sustain growth. Forked duckweed is a good waterfowl food consumed by a variety of ducks and geese including mallard and scaup. (Borman, et al., 1997).

Forked Duckweed
Source: UW Herbarium Website

4.4.2 Floating-Leaf Plants

Floating-leaf aquatic plant species identified during the WDNR aquatic plant surveys in 2005 – 2010 are listed in Table 1. A brief description about these plants follows.

Nuphar variegata (Spatterdock)

Spatterdock
Source: UW Herbarium Website

Nuphar variegata (Spatterdock) shows a preference for soft sediment and water that is 6 feet or less in depth. Floating leaves emerge in early summer from rhizomes that are actively growing in the soft sediments. Yellow flowers occur throughout the summer. Floating leaves provide cover and shade for fish as well as habitat for invertebrates (Borman, et al., 1997).

Nymphaea odorata (White water lily) was also visually observed in 2007-2010 during the boat survey.

4.4.3 Submergent Plants

Submergent aquatic plant species identified during the WDNR aquatic plant surveys in 2005 – 2009 are listed in Table 1. A brief description about these plants follows.

Coontail
Source: UW Herbarium Website

Ceratophyllum demersum (Coontail)

Coontail (*Ceratophyllum demersum*) is a submergent aquatic plant. Unlike most other submergent aquatic plants, coontail is not rooted and can drift, making it tolerant to higher water levels. Because it does not have roots, it absorbs nutrients dissolved in the lake water. Coontail provides excellent shelter and foraging opportunities for fish and invertebrates, and waterfowl consume its foliage and fruit (Borman, et al., 1997). Coontail is also commonly misidentified and mistaken for *Myriophyllum spicatum* (Eurasian watermilfoil).

Elodea canadensis (Elodea)

*Elodea canadensis (*Elodea or common waterweed) is an abundant native plant species that is distributed statewide. It prefers soft substrate and water depths to 15 feet (Nichols, 1999). Elodea reproduces by seed and sprigs (USDA, 2002). The stems of elodea offer shelter and grazing to fish, but very dense elodea can interfere with fish movement. Elodea can be considered invasive at times and out-competes other more desirable plants.

Source: UW Herbarium Website

Myrionphyllum spicatum (Eurasian watermilfoil-EWM)

Eurasian watermilfoil
Source: UW Herbarium Website

Eurasian watermilfoil (EWM) is a submersed aquatic plant native to Europe, Asia and northern Africa. It was introduced to the United States by early European settlers. Eurasian watermilfoil has proliferated in waterways across North America. Eurasian watermilfoil was first detected in Wisconsin lakes during the 1960's. In the past three decades, this exotic species has significantly expanded its range to about 61 of Wisconsin's 72 counties. The range of Eurasian watermilfoil continues to expand in Wisconsin from 1994 to 2001 (DNR, 2004). Because of its potential for explosive growth and its incredible ability to regenerate, Eurasian watermilfoil can successfully out-compete most native aquatic plants, especially in disturbed areas.
Eurasian watermilfoil shows no substrate preference, and can grow in water depths greater than 4 meters (Nichols, 1999). Eurasian watermilfoil does not rely on seed for re-production; its seeds germinate poorly under natural conditions. It reproduces vegetatively by fragmentation, allowing it to disperse over long distances. The plant produces fragments after fruiting once or twice during the summer. These shoots may then be carried down or up the Lake by water currents or inadvertently picked up by boaters. EWM is readily dispersed by boats, motors, trailers, bilges, live wells, or bait buckets, and can stay alive for weeks if kept moist. Once established in an aquatic community, milfoil reproduces from shoot fragments and stolons (runners that creep along the substrate).

As an opportunistic species, Eurasian watermilfoil is adapted for rapid growth early in spring. Stolons, lower stems, and roots persist over winter and store the carbohydrates that help milfoil claim the available light from water column early in spring, photosynthesize, divide, and form a dense leaf canopy that shades out native aquatic plants. Its ability to spread rapidly by fragmentation and effectively block out sunlight needed for native plant growth often results in monotypic stands. Monotypic stands of Eurasian watermilfoil provide only a single habitat, and threaten the integrity of aquatic communities in a number of ways. For example, dense stands disrupt predator-prey relationships by fencing out larger fish, and reducing the number of nutrient-rich native plants available for waterfowl (DNR 2002).

Myriophyllum sibiricum (Northern watermilfoil)

Myriophyllum sibiricum (Northern watermilfoil) has light colored stems that emerge from rootstalks and rhizomes. Stems are sparingly branched and fairly erect in water. Leaves are divided like a feather, with 5-12 pairs of thread-like leaflets. Leaves are arranged in whorls. Waterfowl eat the foliage and fruit of northern watermilfoil, while beds of this plant provide cover and foraging opportunities for fish and invertebrates. Northern watermilfoil is usually found growing in soft sediment in fairly clear-water lakes and can grow in depths over 12 feet deep.


Northern watermilfoil
Source: UW Herbarium Website

Najas flexilis (Slender Naiad)

Najas flexilis (Slender Naiad) is sometimes called bushy pondweed and has fine branched stems that emerge from a slight rootstalk. Leaves are paired and sometimes smaller leaves are bunched. Slender Naiad can grow in very shallow and very deep waters. Waterfowl, marsh birds, and muskrats consume the stems, leaves, and seeds of naiad. The foliage produces forage and shelter opportunities for fish and invertebrates (Borman, et al., 1997).

Slender Naiad
Source: UW Herbarium Website

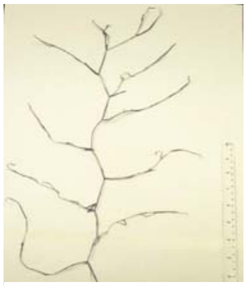
Potamogeton crispus (Curly-leaf Pondweed -CLP)

Curly-leaf pondweed (*Potamogeton crispus*) is also an exotic plant of eurasian origin that forms surface mats that interfere with aquatic recreation. CLP was the most severe nuisance aquatic plant in the Midwest until Eurasian watermilfoil appeared. CLP grows under the ice, but dies relatively early, releasing nutrients to the water column in summer possibly leading to algal blooms. It provides cover and foraging opportunities to fish and invertebrates. It also provides critical spawning habitat for perch in March and April. The plant usually drops to the lake bottom throughout July. It prefers soft substrate and shallow water depths (Nichols, 1999). CLP reproduces by seed and vegetative buds called turions. Seeds play a relatively small role in reproduction compared to germination of turions. CLP can also out-compete more desirable native plant species.

Curly-leaf pondweed
Source: UW Herbarium Website

Stuckenia pectinata (Sago Pondweed)

Stuckenia pectinata (Sago Pondweed) resembles two other pondweeds with needle-like leaves, but sago pondweed is more common. The fruit and tubers of sago pondweed are very important food sources for waterfowl, while leaves and stems provide shelter for small fish and invertebrates (Borman, et al., 1997).



Sago Pondweed
Source: UW Herbarium Website

4.4.4 Emergent Plants

No Emergent aquatic plant species were recorded at identified sampling points. *Typha sp.* (Cattail) and *Sparganium eurycarpum* (Common Bur-Reed) were identified during the 2009 and 2010 boat survey's.

4.5 Floristic Quality Index

Floristic quality index (FQI) varies around the state of Wisconsin and ranges from 3.0 to 44.6 with the average FQI of 22.2 (Aquatic Plant Management in Wisconsin - Draft, 2006). FQI is used to help compare lakes around the state and to assess the lake over time. Higher FQI numbers indicate better lake quality. Little Green Lake's FQI ranged from a low in 2005 of 12.47 to a high in 2008 of 17.79 a value below Wisconsin's median of 22.2 (Table 9). This FQI value suggests that the Lake has below average water quality.

4.6 Water Quality

Water quality parameters, specifically secchi depth readings, chlorophyll *a* levels, and phosphorus levels help determine the health of a lake and are easy parameter s to test for. During each season of the year water quality is very dynamic and varies greatly over time.

Trophic classification of Wisconsin lakes based on chlorophyll *a*, water clarity measurements, and total phosphorus values. (*Adapted from Lillie and Mason, 1983.*)

Trophic class	Total phosphorus μg/l	Chlorophyll *a* μg/l	Secchi Disc feet
Oligotrophic	3	2	12
	10	5	8
Mesotrophic	18	8	6
	27	10	6
Eutrophic	30	11	5
	50	15	4

4.6.1 Temperature

Water temperature profoundly affects lake characteristics. Temperature influences water circulation patterns, solubility of various compounds, chemical reaction rates, and species and distribution of aquatic plants and animals. The temperature regimens of a lake are controlled by climatic and wind conditions, lake basin morphology, surrounding topography and vegetation, water inflows and outflows, and water chemistry.

Most deeper lakes in Wisconsin thermally stratify. In such lakes, temperature-induced density changes cause a lake to develop three distinct temperature zones. During summer, these zones include the epilimnion (warm surface layer), metalimnion (transitional layer), and the hypolimnion (cold bottom layer). Little mixing occurs between these layers while the lake is stratified. Since the hypolimnion is not exposed at the lake surface, it does not exchange gases with the atmosphere. In eutrophic lakes, decomposing organic debris in the hypolimnion can deplete oxygen, leading to an anoxic hypolimnion. Anoxic water is not habitable for most aquatic life and encourages dissolution of phosphorus from bottom sediment (Shaw, et al., 1994).

In most lakes, thermal stratification breaks down each fall as the atmosphere cools, allowing deeper water formerly trapped in the hypolimnion to mix with surface layers. During winter, many lakes once again stratify. Since water reaches its maximum density at 4° Centigrade (a temperature slightly above the freezing point of water), warmer water is found at depth, while cooler, near-freezing water is found directly below the ice. This inverse temperature stratification is easily disrupted, and lakes usually mix during spring. Mixing can bring large amounts of nutrients to the surface of a lake, enhancing productivity. Lakes that stratify and undergo two periods of mixing are termed “dimictic.”

4.6.2 Oxygen

Oxygen solubility varies with temperature, water purity, and atmospheric pressure. More oxygen can dissolve into pure cold water at low elevations. Increasing water temperature, salinity, and elevation decrease oxygen saturation potential. Dissolved oxygen is also affected by biological productivity. Aquatic plants produce oxygen, but plant and animal decomposition and respiration use oxygen. When respiration and decomposition use more oxygen than can be replenished by exchange with the atmosphere and plant oxygen production, oxygen levels decrease. Oxygen can be exhausted in some cases, especially when water cannot freely mix and exchange gases with the atmosphere. Fish kills can occur during winter because ice does not allow air to water oxygen transfer while ice and snow limit light penetration, hindering photosynthetic oxygen production. Although less common, excessive aquatic plant growth and subsequent decomposition of dead organic matter can also cause excessively low dissolved oxygen concentrations. In some lakes, abundant aquatic plant growth can cause dissolved oxygen concentrations to rise above saturation values. Supersaturated oxygen concentrations can also be detrimental to aquatic organisms.

Water should contain at least 5 milligrams per liter (mg/l) oxygen to support a healthy warm-water fishery. To support trout, at least 7 mg/l oxygen should be present. Even though fish can tolerate lower oxygen concentrations for variable periods, low oxygen levels stress the fish, and often promote the success of less desirable species, such as carp and bullheads.

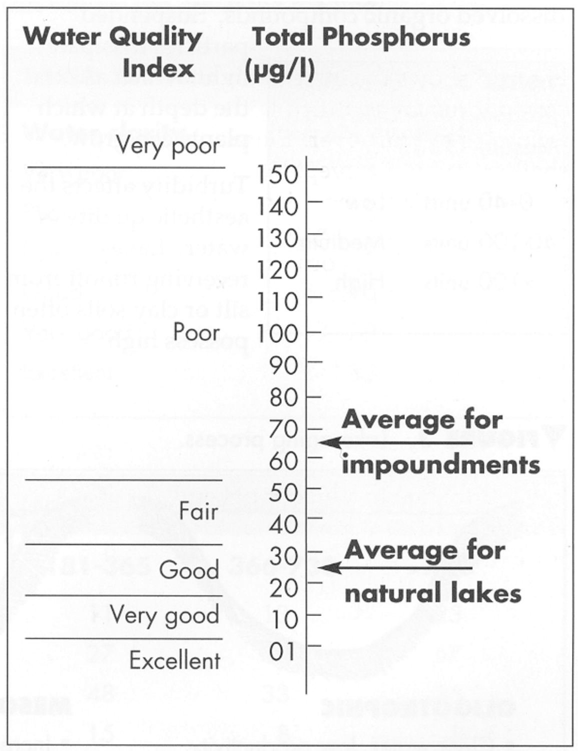
Little Green Lake receives significant quantities of groundwater seepage. Under many conditions, groundwater contains very little oxygen. When the water is exposed to the atmosphere, however, oxygen concentrations increase to near saturation. The deepest sections of Little Green Lake thermally stratify and therefore cannot contact the atmosphere. Decaying organic material consumes oxygen in this deeper water; consequently, little oxygen is found in the deepest portions of the Lake.

4.6.3 Nutrients

Nitrogen and phosphorus are macronutrients essential to plant growth. While plants require many compounds to live, most are readily available in sufficient quantities to allow growth. Nitrogen and phosphorus are typically not as available, and the concentrations of one or the other usually limit aquatic plant growth. Consequently, knowing the concentration of these compounds in lake water can help us understand current and potential plant growth limitation factors.

4.6.3.1 Phosphorus

In 80 percent of Wisconsin lakes, phosphorus is the key nutrient controlling excessive aquatic plant and algae growth (Shaw, et al., 1994). Lake water phosphorus concentrations are usually measured as soluble reactive phosphorus and total phosphorus. Soluble reactive phosphorous is readily available to plants. Consequently, its concentration can vary widely over short periods. A potentially better measure of lake water phosphorus level is total phosphorus, which measures dissolved phosphorus as well as phosphorus in plants and animal fragments suspended in lake water.



Total phosphorus concentrations for Wisconsin's natural lakes and impoundments. (*Adapted from Lillie and Mason, 1983.*)

Phosphorus is very reactive in the environment, being absorbed by plants and attaching itself tightly to sediments. Consequently, sediments carried by surface water are typically the largest external source of phosphorus to lakes. Phosphorus does not readily dissolve in lake water, forming insoluble precipitate with iron, calcium, and aluminum. Consequently, most fully oxygenated lakes have a net flux of phosphorus to the lake bottom. However, if lake water lacks oxygen, iron precipitates become unstable and release phosphorus to the overlying water. The hypolimnia in eutrophic lakes are often devoid of oxygen during summer, increasing the concentration of phosphorus available to plant growth. Lakes with total phosphorous levels below 2 µg/l will generally not have nuisance algae blooms (Shaw, et al., 1994).

4.6.3.2 Nitrogen

Nitrogen is another nutrient limiting the growth of aquatic plants, usually second in importance to phosphorus. Nitrogen limits the growth of plants in a few Wisconsin lakes. Nitrogen can be found in lakes in many forms including nitrate (NO_3^-), nitrite (NO_2^-), and ammonium (NH_4^+). These inorganic forms of nitrogen can be readily used by aquatic plants and algae. Nitrite is usually present in only trace quantities and is readily transformed to nitrate in oxygenated water. Nitrogen can enter a lake via precipitation (which can have concentrations of nitrogen as high as 0.5 mg/l), breakdown of organic compounds (forming ammonia), and human-induced sources of nitrogen such as fertilizers, sewage effluent, and animal waste.

Even though nitrogen demand in vegetated terrestrial soils is high during active growing periods, nitrogen can move through soil and reach ground water if:

- ✓ Vegetation is not actively growing
- ✓ Nitrogen supply exceeds vegetative demand
- ✓ Nitrogen is injected directly to subsurface sediment (e.g., septic system drainfields)

Once nitrate “leaches” to the ground-water table, nitrate migrates freely with groundwater moving towards discharge points such as surface waters, wetlands, and drinking water wells.

Kjeldahl nitrogen includes nitrogen contained in suspended organic matter and ammonium. Total nitrogen is calculated by adding nitrate and nitrite to kjeldahl nitrogen. Inorganic nitrogen is the sum of nitrate, nitrite, and ammonia. If spring inorganic nitrogen levels are below 0.3 mg/l, summer algae blooms are less likely (Shaw, et al., 1994). The average organic concentration in a study of 61 southeastern Wisconsin lakes was 0.94 mg/l while the average total nitrogen concentration for these lakes was 1.43 mg/l (Lillie and Mason, 1983).

4.6.3.3 Nitrogen/Phosphorous Ratio

When the ratio of total nitrogen to total phosphorus is greater than 15 to 1, plant and algal growth in a lake is controlled by the amount of phosphorus available and is considered “phosphorus-limited.” When the ratio is below 10 to 1, nitrogen is the limiting nutrient for plant and algae growth; values between 10 to 1 and 15 to 1 are considered transitional (Shaw, et al., 1994). Most Wisconsin lakes are phosphorus-limited.

Available total nitrogen to total phosphorus ratios on Little Green Lake indicate that the lake is phosphorus limited using historic water chemistry data collected and recorded for Citizen Lake Monitoring (WDNR, 2010). As such, ample nitrogen is present to fuel growth of aquatic plants, and additional phosphorus loading will fuel additional aquatic plant growth and potential algae blooms.

4.6.4 Chlorophyll *a*

Chlorophyll *a* concentrations correspond to the abundance of algae in lake water. Chlorophyll *a* concentrations respond to seasonal light changes, lake water nutrient content and transparency, aquatic macrophyte growth, temperature, and zooplankton abundance. High chlorophyll *a* concentrations relate to algal blooms. Algal blooms can occur when events liberate nutrients into the lake system or otherwise upset nutrient equilibrium. Examples of events that could cause an algal bloom are:

- ✓ Severe thunderstorms washing nutrient-laden water or sediment into a lake
- ✓ Decrease in zooplankton abundance
- ✓ Significant manipulation of the macrophyte community

If significant amounts of aquatic macrophytes are destroyed and are not removed from the water, the demand for limiting nutrients is decreased and nutrients are returned to the water from decomposing aquatic plants. This chain of events can cause algal blooms.

Blue-green algae levels were measured by the WDNR in 2008. A water sample was collected on Little Green indicating high concentrations of blue-green algae. When blue-green algae are growing, they sometimes produce toxins and store them within the algal cell. Algal toxins are naturally produced chemical compounds that are sometimes found within the cells of certain species of blue-green algae. If a cell is broken open, the toxins may be released. Additional information about blue-green algae is available in Appendix C.

4.6.5 Alkalinity and pH

Lake water alkalinity is largely attributable to bicarbonate and carbonate that are typically released from dissolution of calcite and dolomite. Dissolution of calcite and dolomite also releases calcium and magnesium, producing hard water. Median alkalinity concentration in 61 southeastern Wisconsin lakes is 160 mg/l. Alkalinity buffers the effects of acidic rainfall by neutralizing low pH rainfall.

Lakes with abundant plant growth and high alkalinity water often have marl deposits. Marl is composed primarily of calcium carbonate but also includes phosphorus. Plant growth fosters marl formation by removing carbon dioxide from the water which subsequently increases pH and converts most alkalinity to carbonate. Marl in often visible on the leaves of certain aquatic macrophytes. Marl formations also contribute to phosphorus precipitating out of the water column and subsequently reducing algae growth.

pH is an exponential index of hydrogen ion concentration used to measure acidity. pH is represented on a logarithmic scale from 1 to 14, 7 being neutral. Readings above 7 have less hydrogen ions and are basic (alkaline); readings below 7 have more hydrogen ions and are considered acidic.

Water clarity index.

Water clarity	**Secchi depth (ft.)**
Very poor	3
Poor	5
Fair	7
Good	10
Very good	20
Excellent	32

4.6.6 Transparency

[3]

Transparency is a function of water color and turbidity and is usually measured with a secchi disk. A secchi disk is an 8-inch circular plate with alternating black and white quadrants fixed to a length of graduated cord. During the middle of the day, the disk is lowered on the shaded side of the boat until an observer can no longer see the secchi disk. The depth is noted, the disk is then raised until it just again is visible, and the depth again is noted. The two measurements are averaged to give a reading. The deeper the secchi disk reading, the clearer the water. High concentrations of algae or suspended sediment usually account for shallow secchi disk readings. In some instances, colored water can also account for low secchi readings.

Weekly secchi depth readings collected over a number of years during open water periods would provide an excellent, low-cost method to evaluate changes in lake clarity that may relate to other changes in the Lakes' conditions.

5.0 CONCLUSIONS AND POSSIBLE MANAGEMENT OPTIONS

5.1 Conclusions

Little Green Lake has historically been perceived as a lake with fair water quality and abundant aquatic macrophytes. Water quality data collected over the years indicate a eutrophic lake system and some parameters sometimes borderline on hypereutrophic (WDNR, 2010). Nutrients from both within the lake land uses within the watershed are likely contributing nutrients to the lake which can enhance aquatic plant and algal growth. Little Green Lake is similar to many Wisconsin "shallow water" lake ecosystems. Aquatic macrophytes compete with algae for available nutrients. If too many macrophytes are removed, algae can become the dominant form of plant growth. Carp can excaserbate the problem.

A report published and prepared in 1999 by Ramaker and Associates was written to quantify the sources of the various nutrient inputs into Little Green Lake. This information was used to determine high nutrient-loading areas and to select management techniques that are the most cost-effective and best designed to address these problem areas. **The phosphorus budget was used to determine the significance of internal and external loading in Little Green Lake. The budget showed that internal recycling contributes the majority of the phosphorus to the lake. The best-fit model estimated that 69% of the load was coming from internal recycling (Ramaker, 1999**). The best-fit model also showed that approximately 25% of the load was coming from land use, 5% from precipitation, and 1% from septic tanks (Ramaker, 1999). These conclusions led to the installation of a destratification system to prevent or greatly reduce the longevity of stratification leading to anoxia in the bottom waters resulting in phosphorus being released from the sediments.

A report published by Paul Garrison – WDNR (LakeLine, 2009) on Destratifying of Moderately Shallow **Lakes concludes that Little Green's increased mixing of phosphorus (P) rich anoxic waters resulted in a shift in phytoplankton communities from cyanobacteria to diatoms and improved water clarity on Little Green. However, with decreased amounts of phosphorus being released for deep water areas other sources of internal loading may be compensating for the lack of reduction P values (LakeLine, 2009).**

One potential source of P may be a result of anoxic conditions forming in dense aquatic plant beds. Large amounts of P can be released from sediments in plant beds. Because of high photosynthetic activity in these beds the pH is elevated to levels above 9.0 which can result in the release of P from bottom sediments (Lakeline, 2009). Once P is released storm events may cause P to be resuspended in the water column creating a source of nutrients of algal blooms.

The conclusion of the report states that the destratification system was successful in reducing the release of phosphorus form the deep water sediments. It was achieved by injecting air bubbles into the water column, which resulted in the resistance of the water column to mixing (Lakeline, 2009).

Little Green Lake is a popular sport fishing lake especially in the winter. Recreational activities are extremely limited due to excessive aquatic plant growth in many near shore areas. Open water recreation occurs in areas that do not support aquatic plant growth mostly in areas greater than 15 feet. An aquatic plant harvester helps manage dense aquatic plant growth for boat navigation and provides lanes for game fish.

During the WDNR aquatic plant surveys from 2005 – 2010, 7 aquatic plant species (9 including visuals) were found in 2005, 11 species (13 including visuals) in 2006, 11 species in 2007, 13 species in 2008, 12 species in 2009, and 15 species in 2010 are an indicator of a low to moderately diverse aquatic plant community. EWM and CLP, two aquatic invasive species were identified. The most abundant aquatic plants in 2005 included hybrid watermilfoil, CLP, elodea, and coontail, in 2006 elodea, coontail, EWM, and watermilfoil, in 2007 coontail, elodea, CLP and hybrid milfoil, in 2008 coontail, CLP, EWM, and elodea, in 2009 elodea, coontail, EWM and CLP, and in 2010 elodea, coontail, EWM and CLP.

As confirmed in Table 10, the frequency of occurrence of Milfoil spp. and CLP have decreased since 2005 with a relative resurgence in 2009 and 2010 with historic lows in 2006 and 2007. Conversely, coontail and elodea have increased during this same time period. Intense and widespread chemical control programs targeting EWM and CLP were done from 2005 – 2008. The chemical control permit in 2009 was reduced to half the requested acreage resulting in a potential rebound in frequency of EWM and CLP. Again in 2010 the chemical control permit was limited in acreage. As the data shows, an aggressive chemical control program helped promote the native species coontail and elodea while reducing the frequency of milfoil and CLP.

Dense growth of Curly-leaf Pondweed, Eurasian watermilfoil, Elodea and Coontail cause navigation problems for boats throughout the summer as well as property owners trying to access the lake for swimming, boating and fishing. Dense aquatic plant growth makes it extremely difficult for lake users to access many parts of the lake and also may contribute to stunted fish populations.

5.2 Possible Management Options

Many areas of Little Green Lake exhibit aquatic plant growth that interferes with recreational activities. Dense aquatic plants tangle boat props and riparian landowners report problems getting their boats from their piers to open water areas. As a result, the District has operated an aquatic plant harvesting program along with a chemical control program. Historically, the harvesting activities were often largely unregulated statewide. The WDNR promulgated NR 109, Wis. Adm. Code requiring development of APM Plans in order to obtain a multi-year aquatic plant management permit for harvesting activities. The NR 109 program is intended to allow management for nuisance conditions but protect aquatic plant communities from improper management.

NR 109 requires that an applicant review all available aquatic plant management techniques before selecting a management strategy. Existing physical, biological, and chemical management techniques and current available research were reviewed in detail. A comprehensive comparision of APM techniques, including descriptions about the technology, benefits, drawbacks, and costs are included in Appendix D. Based on these comparisons and the specific aquatic plant problems on Little Green Lake, the following potential management strategies were considered.

5.2.1 Manual Removal

Hand raking or hand pulling can be completed to remove aquatic plants from the water. Benefits include low costs, and the drawbacks are the labor intensive nature of this option. Manual removal by individual landowners can be completed to a maximum width of 30 feet to provide pier, boat, or swimming raft access. A permit is not required for hand pulling or raking if the maximum width cleared does not exceed 30 feet. Manual removal exceeding 30 feet in width requires a permit from the WDNR for native aquatic macrophytes. Removal exceeding 30 feet in width is allowed without a permit for exotic species such as EWM and CLP.

5.2.2 Mechanical Harvesting

Aquatic plant harvesting allows easy treatment of large areas of nuisance aquatic plant stands. Advantages of this technology include immediate results, removal of plant material and nutrients, and the flexibility to move to problem areas and at multiple times of the year "as needed". Disadvantages of this method include the limited depth of operation in shallow areas, high initial equipment costs, disposal site requirements, and a need for trained staff to operate the harvester.

The District currently operates one aquatic plant harvester and a shore conveyer.

5.2.3 Aquatic Herbicide Treatment

Use of aquatic herbicides was considered as a potential management option. Chemical treatments are discussed at length in Appendix D. Chemical treatment of aquatic plants offers more control in confined areas (e.g. around docks) than harvesters can. The systemic herbicide containing an active ingredient of 2,4-Dichlorophenoxy acetic acid (2,4 D) has demonstrated EWM control and selectivity for protection of native plant species. 2, 4-D results can be seen in 10 to 14 days. A suitable herbicide applied at a suitable dose by an experienced licensed pesticide applicator can target exotic plant species but leave native species relatively unaffected. Navigate®, a granular 2,4-D product, has demonstrated watermilfoil control while not affecting white water lilies, yellow water lilies, or other high value aquatic plant species found in Little Green Lake. Disadvantages include: 2,4-D lasts only a short time in water and may potentially be detected in sediments after application.

Endothall is a contact herbicide, attacking a wide range of plants at the point of contact. The chemical is not readily transferred to other plant tissue, therefore regrowth can be expected and repeated treatments may be needed. It is sold in liquid and granular forms under the trade names of Aquathol K®, Aquathol ®, or Hydrothol®. Hydrothol is also an algaecide. Most endothall products break down easily and do not remain in the aquatic environment. Endothall products can result in plant reductions for a few weeks to several months. Multi-season effectiveness is not typical. A permit is required for use of this herbicide After the application, water use restrictions may be necessary as well.

Diquat is a fast-acting contact herbicide effective on a broad spectrum of aquatic plants. It is sold under the trade name of Reward®. Diluted forms of this product are also sold as private label products. Since Diquat binds to sediments readily, its effectiveness is reduced by turbid water. Multi-season effectiveness is not typical. A permit is required for use of this herbicide.

5.2.4 Drawdown

Little Green Lake's water level is maintained by a dam located on the east side of the Lake. The intake structure allows the water level to be lowered (one should consult dam engineering documents for an approximate elevation). By lowering the lake level, parts of the lake bed could be exposed and subject to freezing conditions during a winter drawdown. Advantages of drawdowns include the relative inexpense of the proposed action. Drawdowns have the capability to significantly impact populations of aquatic plants, including EWM. Disadvantages include: adverse effects on other aquatic plants; the controversy associated with shoreline landowners if the drawdown and a dry spring result in low water levels once summer returns; complex coordination effort with multiple regulatory agencies; and possible negative affects on fish populations. A drawdown may be largely successful if there is a cold winter with relatively little snow cover. Mild winters and increased snow limit their effectiveness.

A "Water Level Manipulation Study – Little Green Lake" (Montgomery and Associates, 2006) analyzed the various drawdown scenarios for Little Green and analyzed the environmental and social impacts of various drawdown levels. Through evaluation of the dam structure and modeling on the feasibility of a drawdown of 1,2,3,4, and 5 feet, it was determined that the dame structure could reliably drawdown the lake between 2.5 and 3.0 feet from the normal level resulting in 40 – 60 acres of desiccated sediments (Montgomery, 2006). In order to achieve a drawdown greater than 3 feet, a pump would need to be used to draw the lake down resulting in an additional 0.10 to 0.15 feet under normal conditions (Montgomery, 2006).

On major concern of the study was the potential change in the aquatic plant community in some of the shallow bay areas in respect to the decrease in densities of EWM and the increase of waterweed and coontail (Montgomery, 2006). This shift to a native species community dominance is a positive and desirable condition but a drawdown of greater than 2 feet may eliminate all of the plants in these shallow bays and during recovery, exotic species such as EWM and curly-leaf pondweed may have a chance to out-compete the native species resulting in a backward shift to the exotic species dominance (Montgomery, 2006). During a drawdown exposed mudflats will provide the opportunity for invasive and exotic species such as reed canary grass, cattail, and purple loosestrife to germinate and become established as well (Montgomery, 2006).

Social and economic impacts of a summer drawdown would be numerous and increasingly affected by drawdowns greater than 2 feet in depth (Montgomery, 2006). A drawdown of 3 feet would take approximately 45 days to achieve (if all stop logs are removed at the same time) and take the lake 6 to 8 months to recover to "normal" pool elevation (Montgomery, 2006).

A summer drawdown has the capability to emulate natural wet-dry cycles of flooding and drought that stimulate regrowth. Water manipulation has been a management strategy used to alter aquatic plant community density's while also compacting shallow flocculent sediments. Compacting shallow flocculent sediments increases water column depth by exposing and compacting submergent vegetation and bottom sediments by allowing the oxidation of organic materials.

This plan was presented at the annual Lake District meeting and was not well received at that time. Many concerns were raised by not only riparian property owners but also business owners that rely on a percentage of business generated by boat access to near-shore or beach areas during the summer recreational boating season.

This study along with a demonstrated "success story" of a shallow groundwater seepage lake, and not an impoundment, would help support the viability of this type of management option to help restore and or improve emergent aquatic plant populations.

6.0 RECOMMENDED ACTION PLAN

Consistent with the goals of the APM Plan, and the feasible aquatic plant management alternatives discussed in Section 5.2, the **District should implement comprehensive aquatic plant management plan that integrates aquatic plant management techniques for nuisance growth and AIS control on Little Green**. These techniques and other important components of the comprehensive APM Plan are discussed in the following sections. The District should periodically update this APM Plan to reflect current aquatic plant problems, and the most recent acceptable APM methods. Information is available from the WDNR website: http://dnr.wi.gov/lakes/plants/.

Little Green Lake has approximately 232 acres of total lake area <12' in depth. Maximum depth of aquatic plants found during the 2005 to 2009 aquatic plant surveys ranged from 13 to 20 feet. In keeping with recommendations of only controlling no more than 50% of the lake occupied by aquatic plants (not adversely affecting water clarity, (NALMS, 1997)) generally speaking active management can occur on 70 to 80 acres (30 – 35% of the lake controlled) in any given year and never exceed 115 acres in any given year.

6.1 Manual Removal

Individual property owners may manually remove nuisance aquatic plants in the lake offshore from their property. **Manual removal can be completed to a maximum width of 30 feet to provide pier or swimming raft access.** A permit is not required for hand pulling or raking if the maximum width cleared does not exceed 30 feet. Manual removal of native aquatic plant species exceeding 30 feet in width requires a permit from the WDNR. Removal exceeding 30 feet in width is permitted without a permit for exotic species such as EWM and CLP making sure not to disturb native species that may be present. However, requests to exceed 30 foot removal width should be brought to the District's attention and alternative management could be considered (e.g. harvesting and/or chemical treatment).

6.2 Mechanical Harvesting

The District should continue mechanical harvesting for navigation purposes using District-owned harvesting equipment. The WDNR reguates mechanical harvesting under Chapter NR109 of the Wisconsin Administrative Code (NR 109 Wis. Adm. Code). The District must comply with the conditions of a WDNR-issued harvesting permit. A copy of NR 109 Wisconsin Adm. Code is included in Appendix E. Harvesting is allowed to provide nuisance relief for navigation subject to the following restrictions.

Little Green Lake, Markesan Wisconsin

Depth

The harvester operator shall not operate the harvester in less than 3 feet of water depth to prevent disruption of the bottom sediments, turbidity, and/or damage to the cutting head. If any sediment is encountered, the cutter head will be raised immediately. Harvesters will cut approved harvesting areas at half the water column depth. Full cutter depth (5 feet) is only operated at water depths of 6 feet or greater.

Areas

Aquatic plant harvesting should be completed on Little Green for navigation purposes only within the permitted area illustrated on Figure 10. Harvester operators shall target nuisance areas of dense submergent aquatic plant growth that interferes with boat traffic or other recreation activities within these areas. The operator shall not harvest emergent (e.g. cattails) or floating leaved plants (e.g. water lilies). **Harvesting operations as shown in Figure 10 only impact ~8% or 18 acres <12' in depth. Harvesting as a whole only impacts ~4% of the entire lake area.** The area illustrated is between 3 and 12 feet of water depth minus areas where floating leaved vegetation is present or shoreline areas that are not developed.

A full discussion about harvesting is included in Appendix D.

The nuisance aquatic plants within the mapped area are only harvested for pier access, swimming areas, and boat navigation lanes. Furthermore, the harvester is not operated in less than 3 feet of water depth. Harvesting may occur at half the water column depth and aquatic plants growing to 12 feet are only cut to the 5 foot harvester cutter head depth. Some areas of harvesting may have 12 feet of vertical plant growth and only require a few cuttings to a depth of 5 feet to provide safe boating. Floaters are removed from all approved aquatic plant harvesting areas such as the multi-use channels and open water areas. Floaters along shorelines are also removed, however the cutter head is not operated lower than the minimum depths established above. Residents not wanting an access channel should request "No Cut" in front of their property.

Operators

Prior to each harvesting season, each operator will be required to review the APM Plan and conditions of the harvesting permit. Harvester operators will be trained to know the limitations of harvesting (areas and depths). The approved harvesting area map (Figure 10), a copy of the DNR harvesting permit, and the harvesting restrictions listed above will be included in a harvester guidance binder on the aquatic plant harvester. Harvesting operators report to the District commissioners who identify proposed harvesting routes based on plant density and navigation need.

Timing

Timing of aquatic plant harvesting is a useful tool in selective management and therefore is considered an important component of the APM Program activities. Aquatic plant harvesting activities should normally begin after Memorial Day. This date is protective of April and May fish spawning seasons.

Early June harvesting in approved areas targets areas with higher densities of curly-leaf pondweed. By harvesting curly-leaf pondweed before their turions are dropped in late June early July, the spread of this exotic may be reduced. After the turions have dropped, intensity will typically increase into late summer when EWM, coontail, and elodea become significant nuisance species.

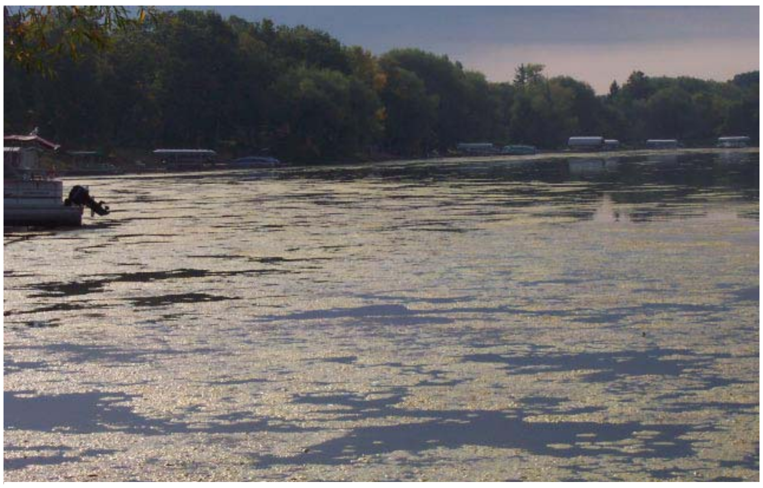
Record Keeping

The District should maintain detailed records including harvesting dates, harvesting areas, types, and amounts of aquatic plants harvested. A sample record keeping form is included in Appendix F.

Additional specific information about the Little Green Lake harvesting program (completed WDNR harvesting worksheet) is included in Appendix F.

6.3 Selective Herbicide Treatment

The District will continue using approved aquatic herbicide's to treat dense areas of EWM and/or CLP in near shore areas by individual properties (e.g. by individual piers) where the harvestor can not operate. Treatments is also occur in other areas of Little Green where EWM and CLP are found to reduce the prevalence of both EWM and CLP in a effort to restore a more diverse native aquatic plant community while ulimately controling the spread of these two AIS. This activity could be completed by the District or individual landowners (WDNR permit is required). Aquatic herbicide treatments have changed greatly over the past couple of years on selectivity and have also demonstrated safety to other aquatic plants while providing safety to both other plants and animals. Early spring treatments (before water reaches 60º F) for CLP and EWM in nearshore areas around piers using endothall (Aquathol) for CLP and 2,4-D (Weedar, Navigate) for EWM are an effective alternative. A typical control measure for EWM is described below. A similar management plan would be followed for CLP control.



Little Green Lake, Markesan Wisconsin

A granular 2,4 D product sold under the trade name Navigate® or a liquid 2,4-D product sold under the trade name Weedar 64® are herbicides that have been used to selectively reduce populations of EWM. Navigate® and Weedar 64® have demonstrated EWM control while not affecting white water lilies, yellow water lilies, or other high value aquatic plant species based on application rate and timing in which the treatment takes place. A typical treatment scenario follows.

In early to mid-May a EWM Assessment should be completed to map proposed treatment areas. The assessment along with a permit for chemical application should be submitted to the WDNR Water Resource Specialist for Green Lake County. Once an approved permit is awarded, a chemical treatment using a selective systemic aquatic herbicide like Navigate® or Weedar 64® could be applied by a licensed applicator.

The treatment using Navigate® or Weedar 64® targeting EWM should occur once water temperatures reach 50°F. In some instances one treatment may only be required, however, a potential follow up "spot treatment" may also be needed. All NR 107 public notice and water use restriction posting requirements would need to be followed. A public notice would also be published in the largest circulating newspaper for Little Green Lake if the proposed treatment area exceeds 10 acres in size or over 10% of the total littoral area is proposed to be treated. A public hearing may be requested if more than five or more individuals, organizations, or special units of government request a meeting to be held.

A yellow sign describing the treatment should be posted by the dock or shoreline of any property being treated. A swimming and water use restriction for 24 hours would follow the application. Also, the water should not be used to irrigate fruit or vegetable plants until an approved assay analyzing for 2,4-D is completed and residual levels have dropped below 70 parts per billion (ppb).

Selective chemical control of EWM and CLP will continue to help restore more desirable native plant communities while also controlling the spread of these two AIS. A pre-treatment survey should be completed before each treatment season to help target areas of EWM and CLP. Treatment areas change on a yearly basis based upon specific lake conditions, treatment success and to a greater extent weather. For this reason a specific site figure is not included showing treatment areas. A site specific map would be created based upon a pre-treatment survey and known site conditions. Areas of Little Green <12' in depth would be targeted.

Completing a pre-treatment survey insures that areas of greatest concern are targeted by avoiding areas that do no warrant treatment. Management areas should be limited in size to ensure a well balanced aquatic plant community and never exceed 30% of the total littoral area or approximately 70 acres (232 littoral acres) of TOTAL active management. AIS chemical control areas and acres will depend on population levels of EWM and CLP from year to year and should be completed before water reaches 60º F. Small summer spot treatments for EWM would also be possible based on population levels and conditions. A post-treatment survey should also be completed by the District to document treatment success. Frequency of occurrence's for EWM and CLP < 15% are able to be achieved as indicated in 2006 – 2008 after several years of intense management (Table 10).

Chemical treatment using contact herbicides is allowed in high use areas where a harvester cannot navigate such as near shore in and around piers, boat lifts and swimming rafts. A typical chemical treatment using contact herbicides would include a mixture of diquat, endothall, and algaecide sold under the typical trade names Reward®, Aquathol K® and Cutrine®. This type of treatment is not plant specific and would affect all species within a given treatment area. A qualified licensed aquatic herbicide applicator will need to complete these treatments. Individual riparian landowners can contract for chemical aquatic plant control.

6.4 Native Vegetation

Native plants are an important natural biological AIS control measure. A healthy native plant population can inhibit or slow an invasion of EWM and CLP by competing for space and nutrients, although in some lakes, even healthy native plant populations may eventually become infested with EWM and CLP. A diverse aquatic plant community also limits monotypic stands of native aquatic plants that sometimes demonstrate invasive characteristics. Damaging or stressing native plant communities may increase the potential for a severe AIS infestation and promote bigger and more dense areas of EWM and CLP infestation.

Chemical treatment using contact herbicides is allowed in high use areas where a harvester cannot navigate such as near shore in and around piers, boat lifts and swimming rafts. A typical chemical treatment using contact herbicides would include a mixture of diquat, endothall, and algaecide sold under the typical trade names Reward®, Aquathol K® and Cutrine®. This type of treatment is not plant specific and would affect all species within a given treatment area. A qualified licensed aquatic herbicide applicator will need to complete these treatments. Individual riparian landowners can contract for chemical aquatic plant control.

Broad spectrum herbicide treatments would only be done in areas following a pre-treatment survey and permit request to help pier access, swimming areas, and boat navigation lanes for riparian property owners to access the lake. Currently, areas of greatest concern would target dense stands of Coontail and Elodea. Management areas for native vegetation should be limited to 5-7 acres of chemical control for nuisance relief around docks where water depths are too shallow for mechanical control and mechanical control areas and acres should be limited as indicated in the WDNR mechanical harvesting permit.

6.5 Milfoil Weevils

The use of aquatic weevils (*Euhrychiopsis lecontei*) is a biological control option that has shown effective EWM control in some Wisconsin lakes. The aquatic weevil is native to Wisconsin and normally is present in healthy stands of northern watermilfoil. The weevils however, prefer to feed on EWM plants. The weevil burrows into the plant's stem, destroying plant tissue. Increasing a natural population of weevils can be a costly endeavor but EWM reductions can be observed if the weevil population is maintained. This management alternative is best suited for lakes with limited shoreline development because the insects need to over-winter on a shoreline with vegetation and adequate leaf litter. It is unknown if a weevil population exists on Little Green Lake. A survey would need to be completed to determine if weevils do indeed exist**. It is unlikely that a weevil augmentation program would be cost effective in controlling EWM with active harvesting and chemical control programs, however, promoting native buffer shorelines would help weevil populations if they do exist while also providing a nutrient near shore buffer as well.**

6.6 Sensitive Areas

WDNR may designate sensitive areas on Wisconsin Lakes. Sensitive Areas are defined as "areas of aquatic vegetation identified by the department as offering critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offering water quality or erosion control benefits to the body of water". Sensitive areas are often located where there is little to no shoreline development. WDNR has not conducted any sensitive area surveys on Little Green. If such surveys are completed, additional restrictions to the harvesting program or APM in general may be required. Information about sensitive areas is included in Appendix G.

6.7 AIS Prevention and Control Plan

An important component of the overall APM plan is an AIS Prevention and Control Plan (AIS Plan). The current AIS on the Little Green include EWM and CLP. To date other common AIS (purple loosestrife, zebra mussels, rusty crayfish, spiny water flea, etc.) have not been found. Invasive aquatic plants were discussed in Section 4.2. Additional AIS were discussed in Section 4.3.

The AIS component of the APM Plan includes the following components to address the current AIS and prevent new infestations.

6.7.1 Watercraft Inspection

A watercraft inspection program should be developed for Little Green Lake in accordance with the Clean Boat/ Clean Waters (CB/CW) Program developed by the University of Wisconsin Extension Lakes Program. CB/CW is a highly regarded volunteer watercraft inspection program developed by the WDNR and UWEX Lakes Program. The CB/CW efforts in Wisconsin involves providing information to lake users about what invasive species look like and what precautions they should take to avoid spreading them. It also involves visual inspection of boats to make sure they are "clean" and demonstration to the public of how to take the proper steps to clean their boats and trailers. Watercraft inspectors also install signs at boat landings informing boaters of infestation status, state law, and steps to prevent spreading AIS. The **Clean Boats Clean Waters** Program is sponsored by the DNR, UW Extension, and the Wisconsin Association of Lakes and offers training to volunteers on how to organize a watercraft inspection program. For more information see the following website:

http://www.uwsp.edu/cnr/uwexlakes/CBCW/default.asp

Training materials, a list of workshop dates, publications, supplies, and links to other important information are all provided on the CB/CW web page. Volunteers may also contact Erin McFarlane, Volunteer Coordinator for the Invasive Species Program, UW Extension-Lakes Program at (715) 346-4978 for details. Please note if any of the above hyperlinks to web addresses become inactive, please contact the WDNR, UW Extension Lakes Program for appropriate program and contact information. At a minimum, AIS and CB/CW signs at public boat launches should be maintained.

6.7.2 Monitoring

In addition to monitoring boat launches, volunteers should establish a lake monitoring program. An organized volunteer monitoring group should be established to closely observe the aquatic plant community of the Lake and document any noteworthy changes in the abundance of aquatic plants or algae. Close attention should be paid to frequency of algae blooms.

The District should either contract for annual AIS monitoring or have a volunteer trained to complete the AIS monitoring through the WDNR self help program. At a minimum the harvester operator should be able to recognize AIS such as EWM and CLP. The monitors should report any significant expansion of CLP or EWM to a District commissioner. Also any noted changes in native aquatic plants should also be reported as this may indicate current management practices may need modification to increase protection of native species. Additional information about these exotic aquatic plants is available in the educational materials in Appendix G. Additional information is also available from the WDNR website http://dnr.wi.gov/invasives/aquatic/. The operator shall report any new AIS areas to a District Commissioner immediately. Grants may be available to help fund hiring professionals to complete these monitoring efforts or local lake enthusiasts can become trained in the WDNR self-help citizen monitoring program. For more information on having volunteers provide AIS monitoring, please visit the following website:

http://dnr.wi.gov/invasives/aquatic/

Or contact your local lake coordinator from the list at:

http://dnr.wi.gov/invasives/aquatic/contacts/

6.7.3 APM & AIS Education

Education is the key to understanding the negative impacts of AIS, identifying AIS, and preventing the spread (both in the Lake and to nearby lakes). **The District should establish an organized education effort focusing on AIS prevention and control.** The following education approaches could be implemented.

1) **A newsletter is an excellent way to reach a large audience and share information.** The District currently publishes and distributes a newsletter. AIS article topics can be published in the newsletter.
2) **Annual meeting -** the District currently holds an annual meeting. This meeting can also serve as an education opportunity. Topics focusing on AIS issues can include a summary of the previous year's efforts and successes, and samples of EWM and CLP.
3) **A web page** is an easy way to address large audiences and to share information. The District currently has a web site. Maintaining an undated web page is imperative so current issues can be addressed. The site should be updated with current information regarding meeting dates and topics relevant to lake stewardship.
4) **Conduct a "Clean Sweep" Lake Day -** the District should coordinate a day in late July or early August where property owners observe their shoreline for all plant species present. Any unknown or suspicious plants should be identified by trained volunteers or WDNR staff to document the spread of EWM and CLP and the presence of native plants.
5) **Purchase plastic buckets** to be placed at the boat landings for residents and transient boaters to place any plant fragments.

In addition to informing the Little Green Lake community, the District should publish an article in the local newspaper detailing the efforts the District is taking to address AIS on the Lake and prevent the spread of AIS to other area lakes.

Information should emphasize:

- ✓ The values aquatic plants provide
- ✓ The importance of keeping excessive nutrients out of a lake
- ✓ The importance of preventing and controlling AIS

Several WDNR and UW Extension fact sheets are available. The District can order copies of WDNR and UW Extension publications by visiting the following website: http://www.uwsp.edu/cnr/uwexlakes/publications/

Public education should continue with emphasis on the above topics. If you need additional public education materials, contact your WDNR lake coordinator or local UW Extension agent

6.8 Nutrient Controls and Watershed Management

Recognizing that nutrients in runoff and from septic systems can contribute to excessive aquatic plant growth on Little Green, the District should consider developing a Lake Management Plan incorporating an aggressive nutrient and water quality component to help assess "problem areas" around Little Green. See also Section 6.9.

Little Green has both natural and manicured shoreline areas. Natural shorelines are beneficial to a lake's health in that they filter nutrients and sediments from storm water runoff. **The District should also consider encouraging landowners to install a natural shoreline buffer on their property. Offering lakeshore residents within the District who complete such a project a tax credit may encourage members to participate.**

Since agriculture makes up 77% or 1,641 acres of the surrounding 2,131 acre watershed this land use is predicted to contribute the majority of the nutrients to Little Green Lake. Efforts should be made to minimize agricultural runoff. Agricultural best management practices (BMPs) can help prevent erosion and nutrient runoff. **The Disrict should continue to work with the Green Lake County LCD to identify areas of potential concern and implement BMPs as needed.** The District has been very active in trying to protect areas of greatest concern within the surrounding watershed.

The District is currently eligible for several WDNR grant funds (e.g. Lake Management **Planning** grants). However, completing a lake management plan would allow the District to qualify for WDNR Lake Management **Protection** grant funds.

As always, contact your local WDNR grant specialist and lake staff to discuss your project ideas and the potential for funding sources.

6.9 Public Education

The District should continue to educate lake users about the importance of aquatic plants to the lake ecosystem. Several WDNR and UW Extension fact sheets about aquatic plants and aquatic plant management are provided an included in Appendix H. The District can order copies of WDNR and UW Extension publications by visiting the following website: http://www.uwsp.edu/cnr/uwexlakes/publications/

6.10 Monitoring

To evaluate the effectiveness of the APM Program, the District should complete monitoring of multiple APM Plan components. The District should constantly evaluate their program for potential improvement opportunities, however, the following items are considered minimum monitoring components.

6.10.1 APM Technologies

The APM technologies listed in Appendix D should be re-visited periodically to evaluate if new or improved technologies are available. The professional environmental science community includes universities, state natural resource regulatory agencies (e.g. WDNR), and federal regulatory agencies (e.g. USFWS, USACE, EPA, and USGS). These parties along with private conservation groups continuously seek government funding for research about exotic species. **The District is encouraged to "stay current" with this research as the knowledge gained from these endeavors may prove useful for APM activities or overall aquatic ecosystem management in the future.**

6.10.2 Public Input

The District should assess the public's perception of APM on Little Green. Periodic questionnaires should be solicited in District mailings to evaluate the opinions of lake users about aquatic plants and management on Little Green.

6.10.3 Periodic Aquatic Macrophyte Surveys

In addition to evaluating EWM and CLP, the District should complete lakewide aquatic macrophyte surveys every 3 to 5 years to monitor changes in the aquatic plant community and the effects of APM in the management area. Aquatic plant communities may change with varying water levels, water clarity, nutrient levels, and aquatic plant management. At a minimum, the aquatic plant surveys should duplicate the WDNR point intercept survey.

6.10.4 Water Quality Monitoring

Little Green Lake's water quality is determined to be fair and an adequate monitoring system can help track changes within the lake and prevent significant lake problems. **The District should complete water quality monitoring. A good program to be involved in is the WDNR Self-Help Citizen Lake Monitoring Network.** WDNR records indicate that self help monitoring has been completed in 1986-2001 and 2007. Using the self help program, volunteers measure water clarity, using the Secchi Disk method, as an indicator of water quality. Volunteers may also collect water chemistry, parameters, temperature, and dissolved oxygen data.

The WDNR provides all equipment to the volunteer. Training of the volunteers is provided by either DNR or University of Wisconsin - Extension staff. Volunteers provide their time to collect samples. The information can be used by WDNR and other lake experts to track changes in the lake's health. Portions of the equipment and laboratory work are eligible for funding through lake management planning grant funds. For more information on volunteer monitoring, visit the following DNR web page on the internet: http://dnr.wi.gov/lakes/CLMN/. Or contact your local DNR lake professionals for more information.

The following illustrates a typical WDNR Citizen Lake Monitoring Network parameter and schedule for citizen lake monitoring.

	April – May	June	July	August	Sept. – Oct.	Winter
Water Clarity	Biweekly	Biweekly	Biweekly	Biweekly	Biweekly	
Total Phosphorus	X	X	X	X	X	
Chlorophyll a		X	X	X	X	
Dissolved Oxygen / Temperature	X	X	X	X	X	X

* Note: Completing Nitrogen sampling is also encouraged to better understand nutrient sources.

Every few years, this data should be reviewed collectively to determine if the lake's trophic status has changed. A lake management planning grant could pay for updating and interpreting this lake data**. If the lake's clarity, chlorophyll *a*, or phosphorus levels indicate a reduction in water quality or lake users notice a perceived change in water quality, then the District may consider completing a full lake water budget and nutrient budget to determine the sources of water quality deterioration. After that is completed, the District should consider completing a feasibility study for controlling the nutrient sources of concern.**

7.0 REFERENCES

While not all references are specifically cited, the following references were used in preparation of this report.

Borman, Susan, Robert Korth, and Jo Temte, *Through the Looking Glass, A Field Guide to Aquatic Plants*, Wisconsin Lakes Partnership, 1997.

Fassett, Norman C., *A Manual of Aquatic Plants*, The University of Wisconsin Press, Madison, Wisconsin, 1975.

Garrison, Paul J., *Destratifying Moderately Shallow Lakes*, Lakeline, Page 15-18, Fall 2009.

Getsinger, Kurt D., and H.E. Westerdahl, *Aquatic Plant Identification and Herbicide Use Guide, Volume II Aquatic Plants and Susceptibility to Herbicides*, U.S. Army Corps of Engineers Waterways Experiments Station, Technical Report A-88-9, 1988.

Hotchkiss, Neil, *Common Marsh, Underwater and Floating-Leafed Plants of the United States and Canada*, Dover Publication, Inc., New York, 1972.

Little Green Lake Wisconsin Lake Management Planning Grant Project, *Little Green Protection and Rehabilitation District*, Northern Environmental, 1994.

Little Green Lake Management Plan, *Little Green Protection and Rehabilitation District*, Ramaker & Associates, 1997.

Little Green Lake Aquatic Plant Management Plan, *Little Green Protection and Rehabilitation District*, Ramaker & Associates, 1999.

Little Green Lake Limited Phosphorus Budget, *Little Green Protection and Rehabilitation District*, Ramaker & Associates, 1999.

Madsen, John, *Point Intercept and Line Intercept Methods for Aquatic Plant Management, Aquatic Plant Control Technical note MI-02*, February 1999.

Nichols, Stanley A. *Distribution and habitat descriptions of Wisconsin lake plants*, Wisconsin Geological and Natural History Survey Bulletin 96, 1999.

Nichols, Stanley A. Floristic quality assessment of Wisconsin lake plant communities with extensive applications. Lake and Reservoir Management 15 No. 2: 133-141, 1999.

North America Lake Management Society of Aquatic Plant Management Society (NALMS), *Aquatic Plant Management in Lakes and Reservoirs*, 1997.

Prescott, G.W., *How to Know the Aquatic Plants*, Wm. C. Brown Publishers, Dubuque, Iowa, 1980.

United States Department of Agriculture, *Soil Survey of Green Lake County, Wisconsin*, 1977.

United States Geological Survey, *Green Lake, Wisconsin Quadrangle, 7.5 minute (Topographic) Series*, 1992.

Water Level Manipulation Feasibility Study, *Little Green Protection and Rehabilitation District*, Montgomery Associates and Eco-Resource Consulting, 2006.

Welsh, Jeff, *Guide to Wisconsin Aquatic Plants*, Wisconsin Department of Natural Resources Publication WR 173, 1992 revised.

Wetzel, Robert G., *Limnology*, 1983

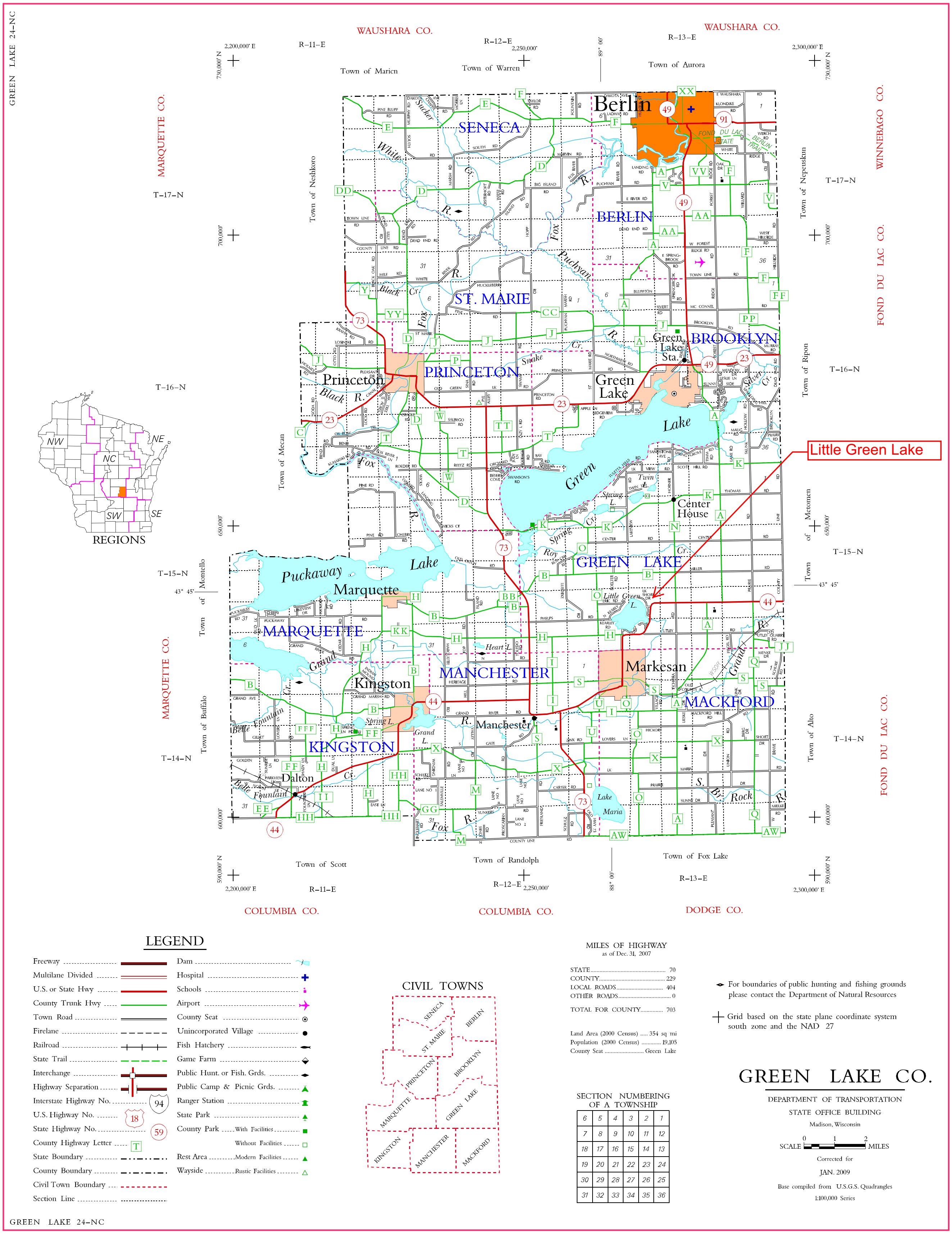
Wisconsin Department of Natural Resources, *Eurasian Watermilfoil in Wisconsin as of October 16, 2009* (fact sheet from WDNR website), 2009.

Wisconsin Department of Natural Resources, *Potamogeton crispus in Wisconsin as of October 16, 2009* (fact sheet from WDNR website), 2009.

Wisconsin Department of Natural Resources, *Aquatic Plant Management in Wisconsin DRAFT (not for distribution), UWEX*, April 20 2006.

FIGURES

Figure 1: Little Green Lake Location



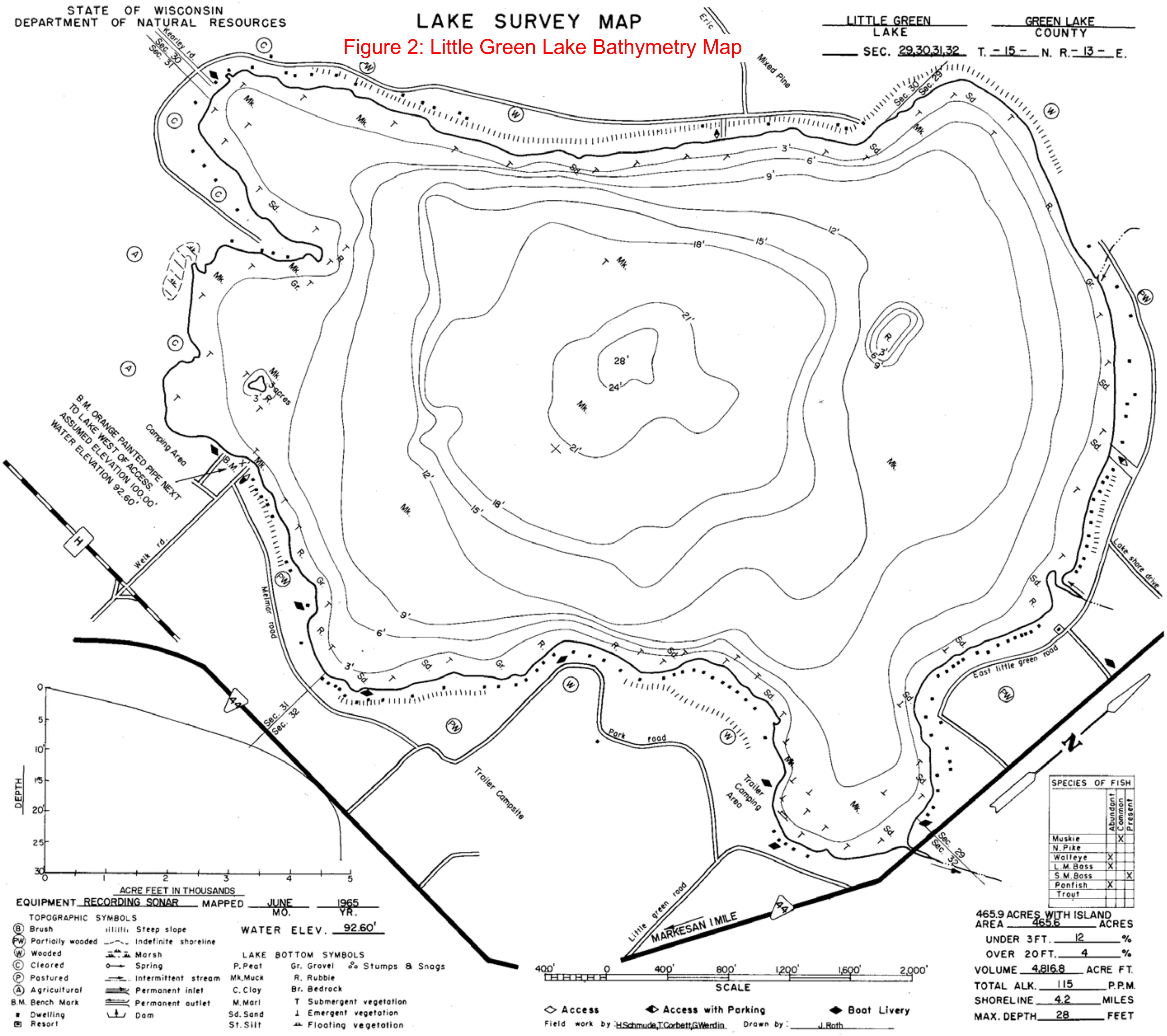


Figure 2: Little Green Lake Bathymetry Map

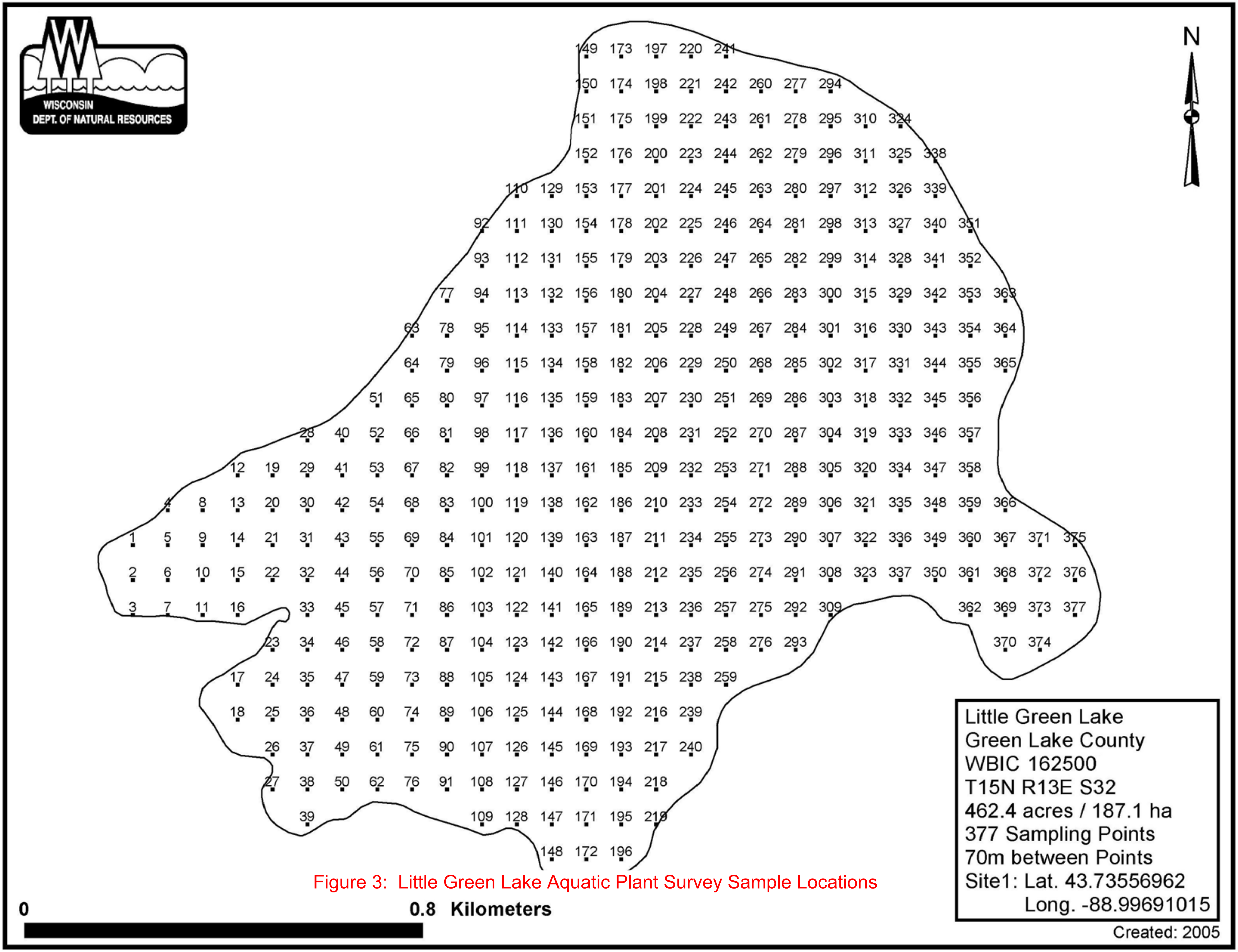
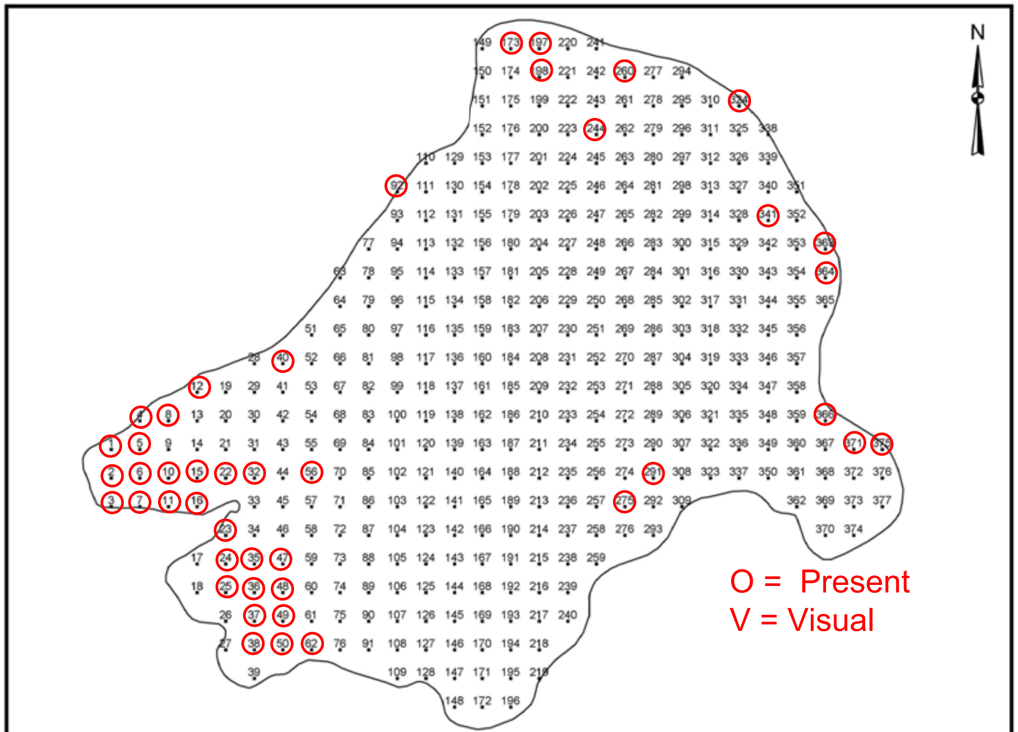
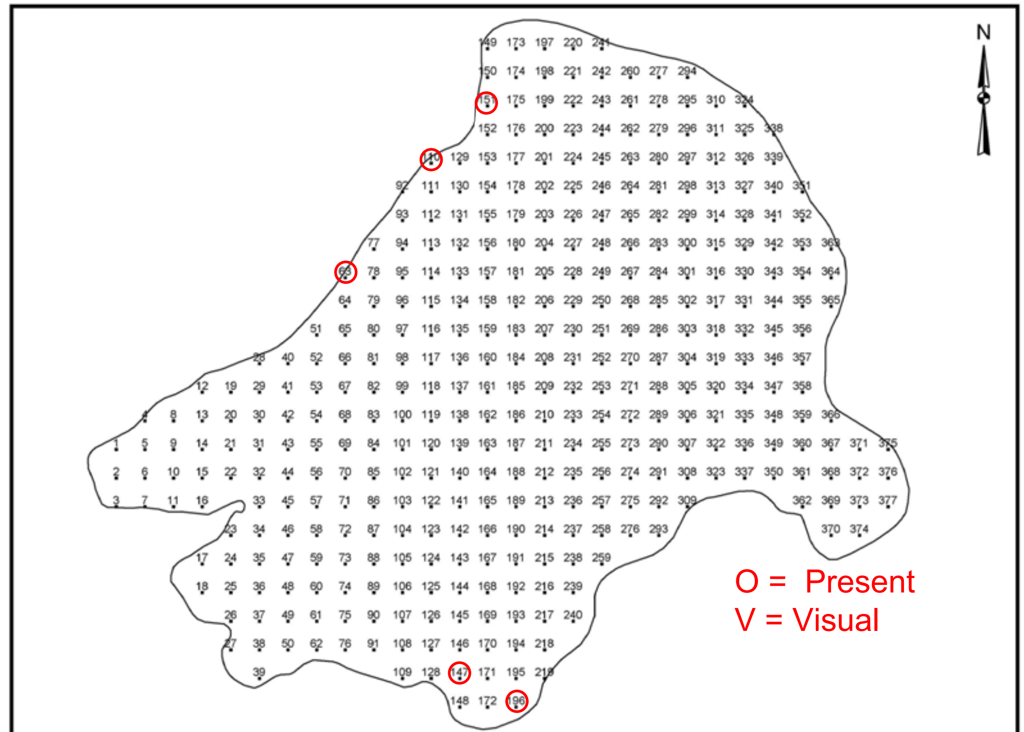


Figure 3: Little Green Lake Aquatic Plant Survey Sample Locations

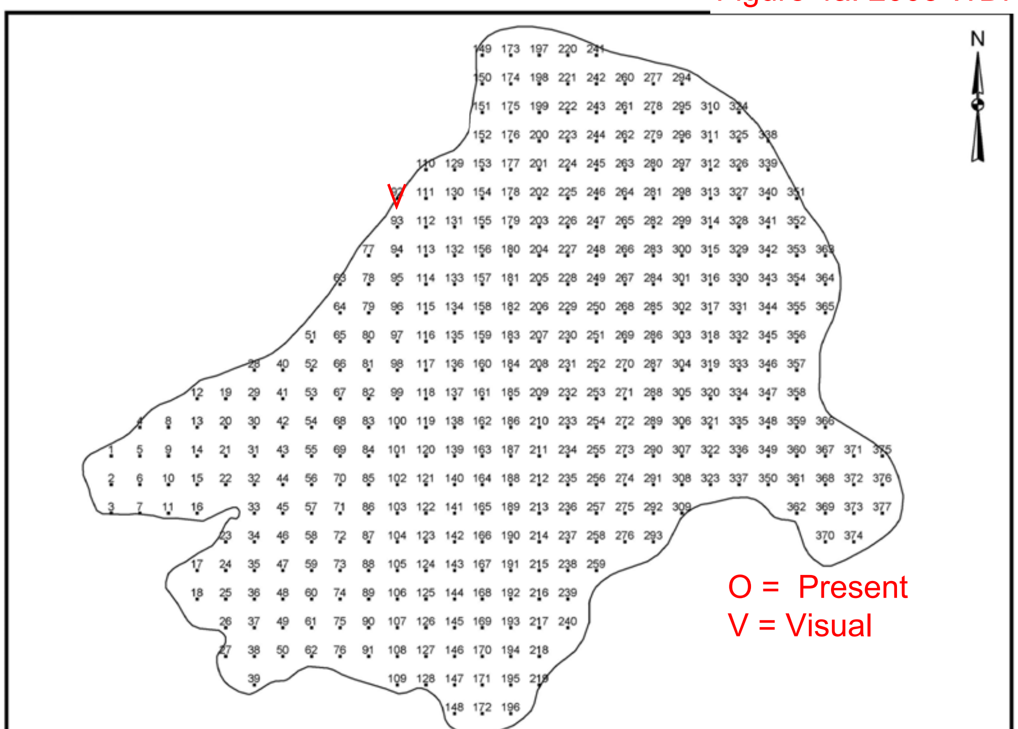
Figure 4a: 2005 WDNR Aquatic Plant Survey



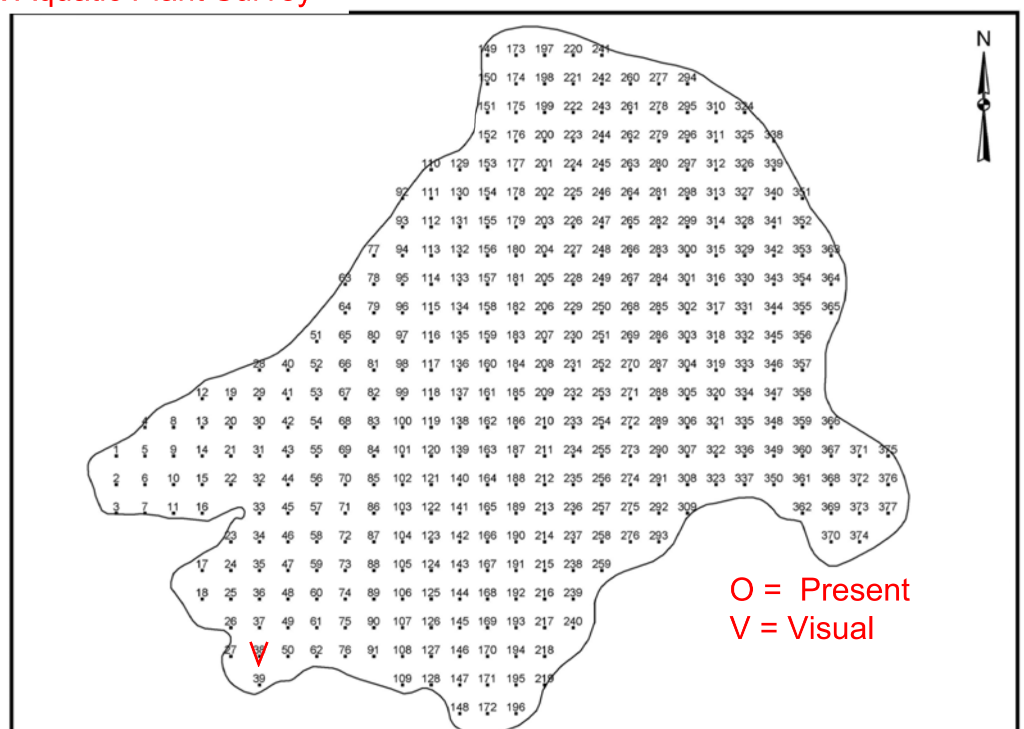
Ceratophyllum demersum (Coontail)



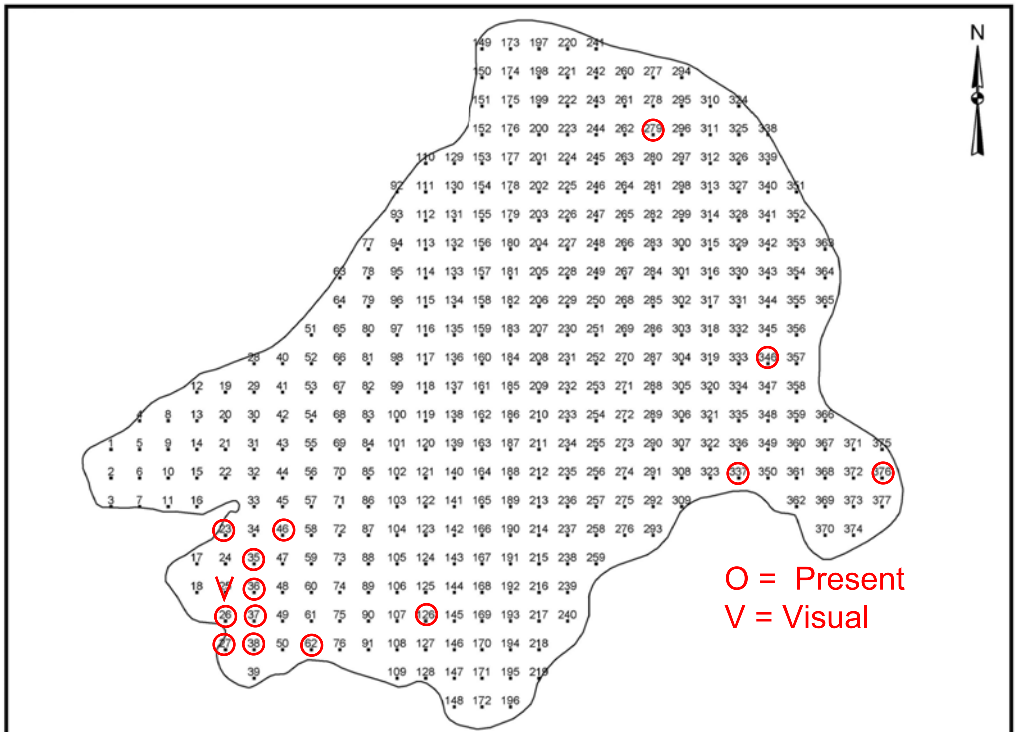
Chara spp.(Muskgrass)



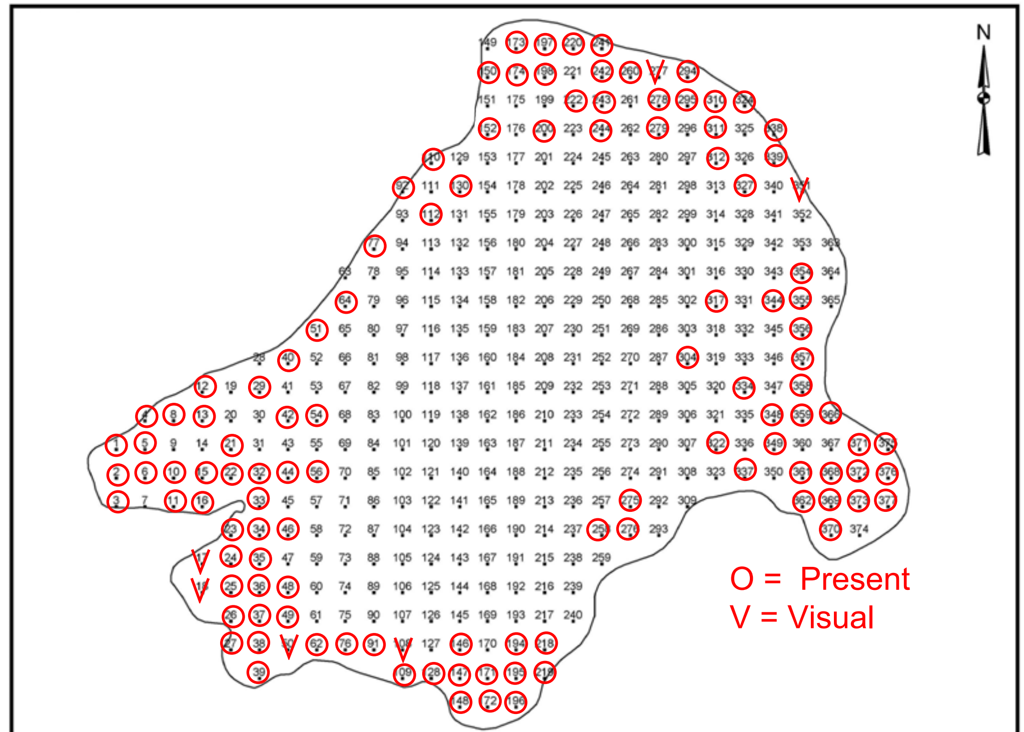
Hereranthera dubia (Water Star-grass)



Lemna minor (Small Duckweed)

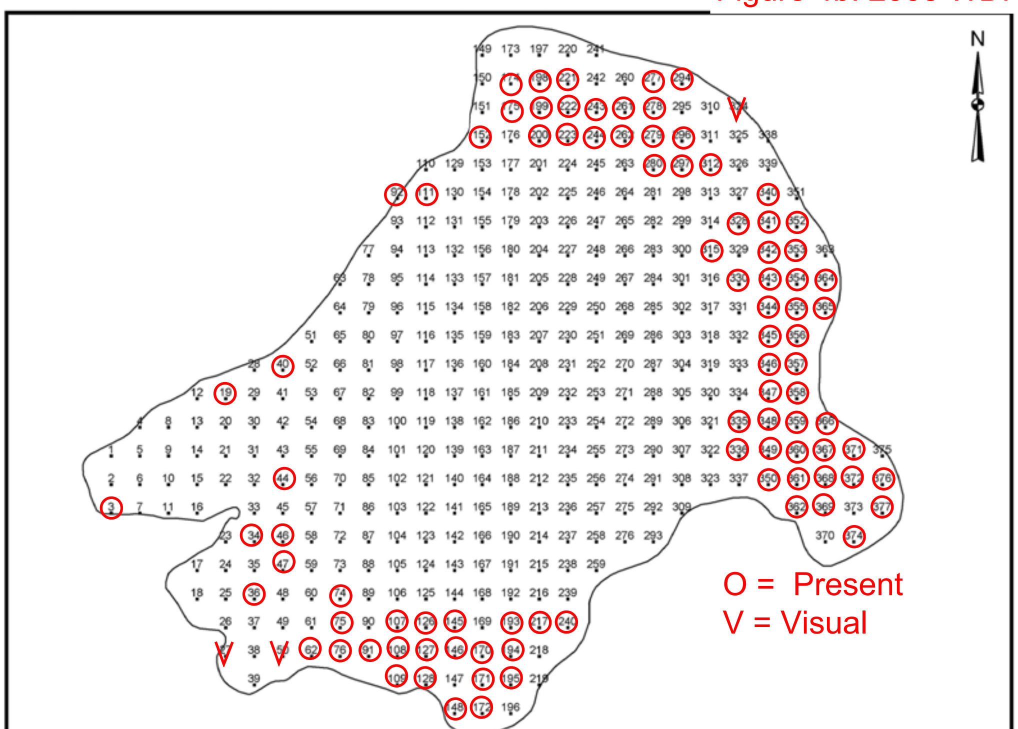


Lemna trisulca (Forked Duckweed)

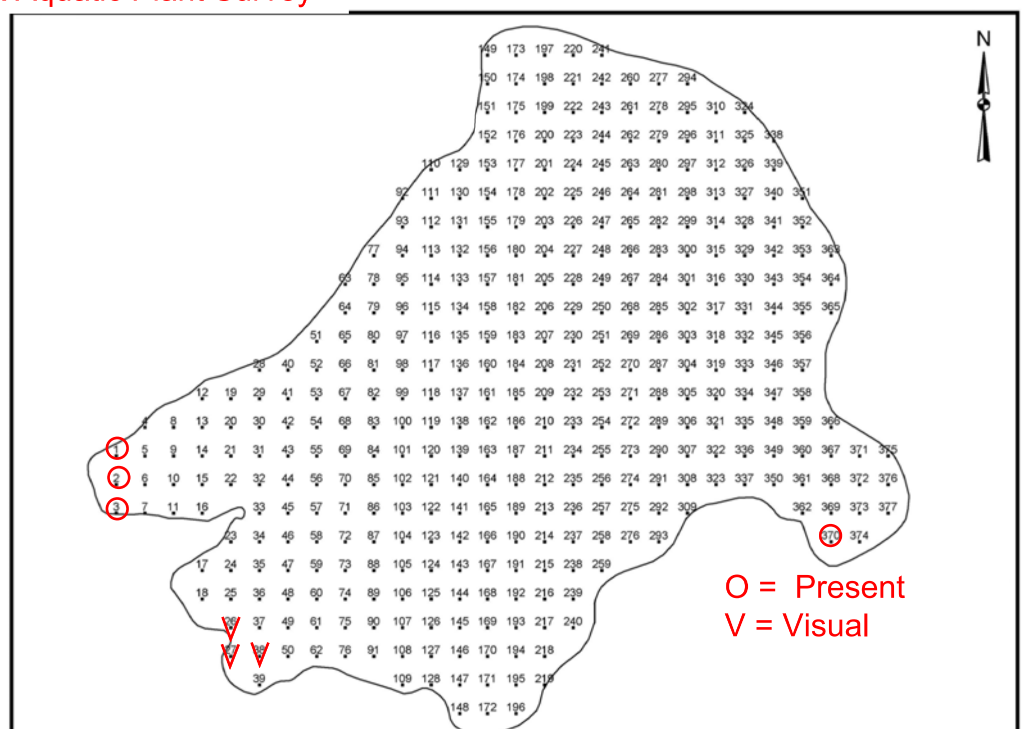


Myriophyllum spicatum x sibericum (Hybrid Watermilfoil)

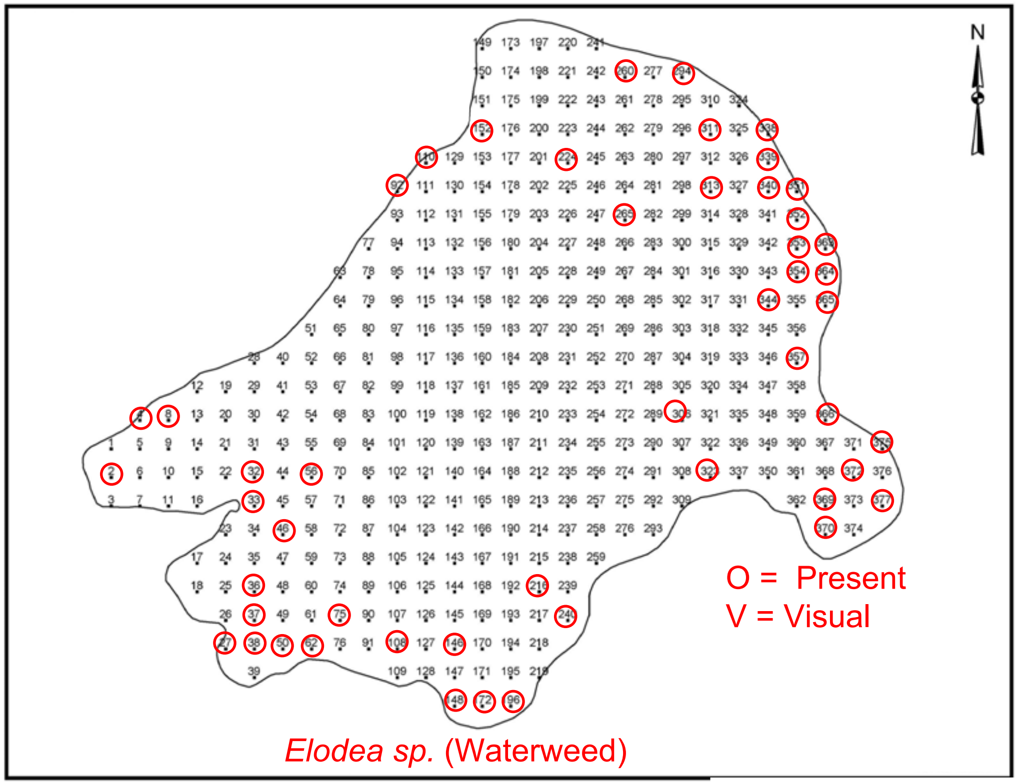
Figure 4b: 2005 WDNR Aquatic Plant Survey



Potamogeton crispus (Curly-leaf Pondweed)



Stuckenia pectinata (Sago Pondweed)



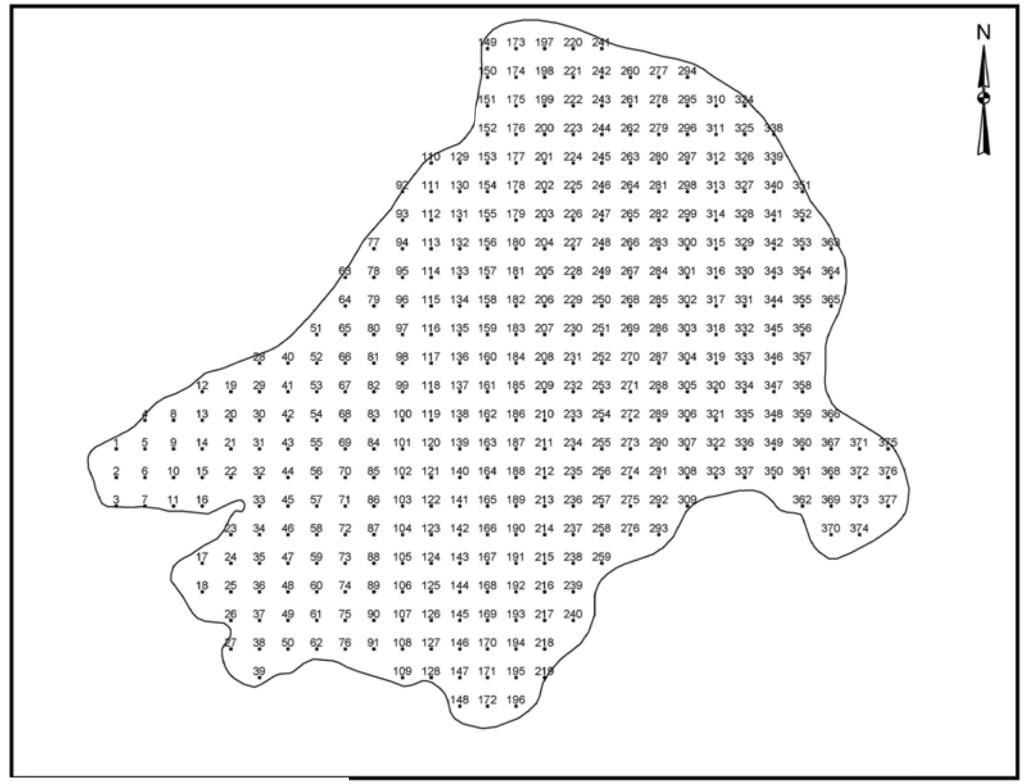
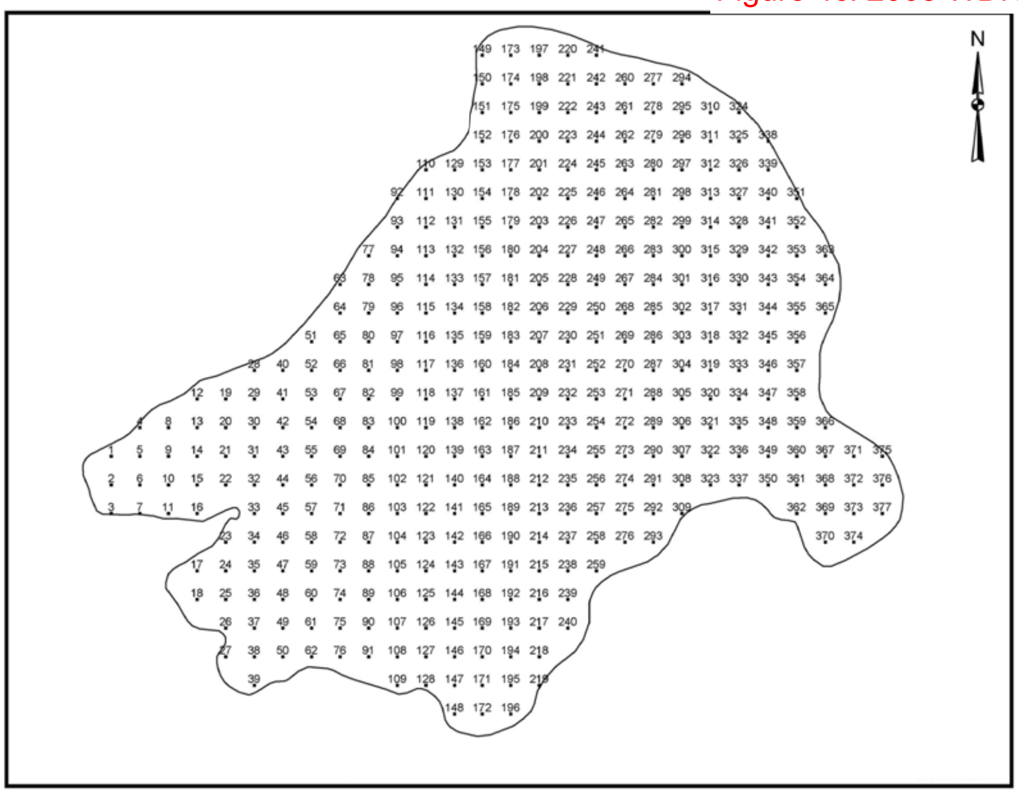
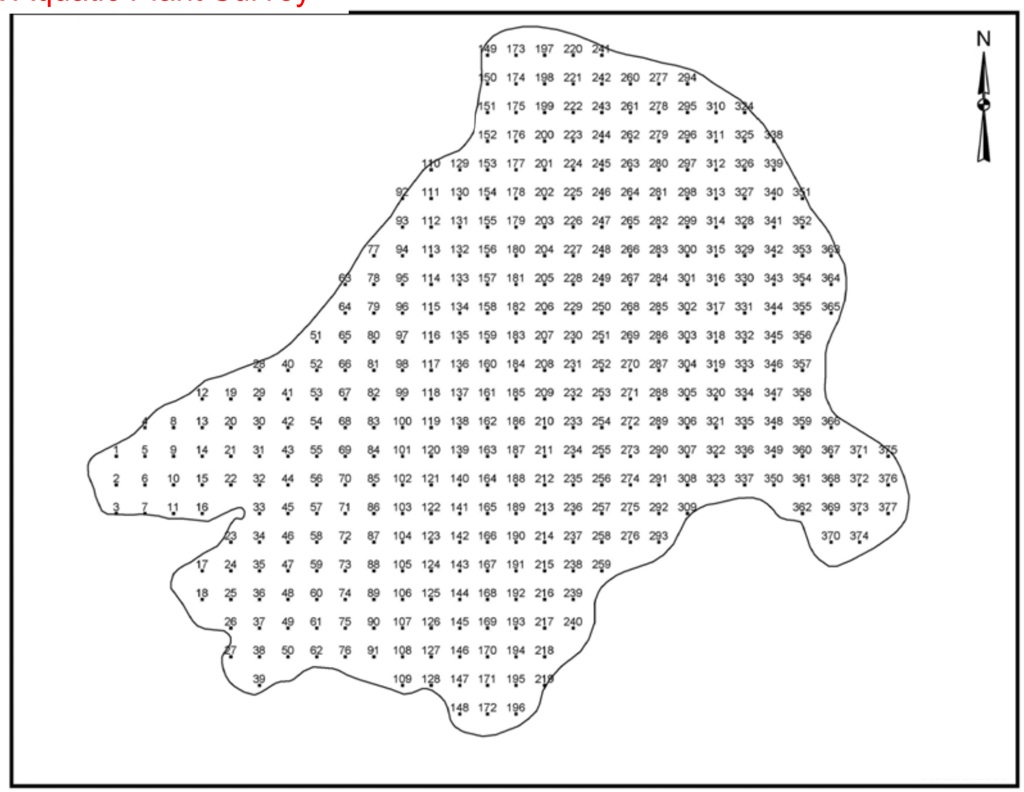


Figure 4c: 2005 WDNR Aquatic Plant Survey





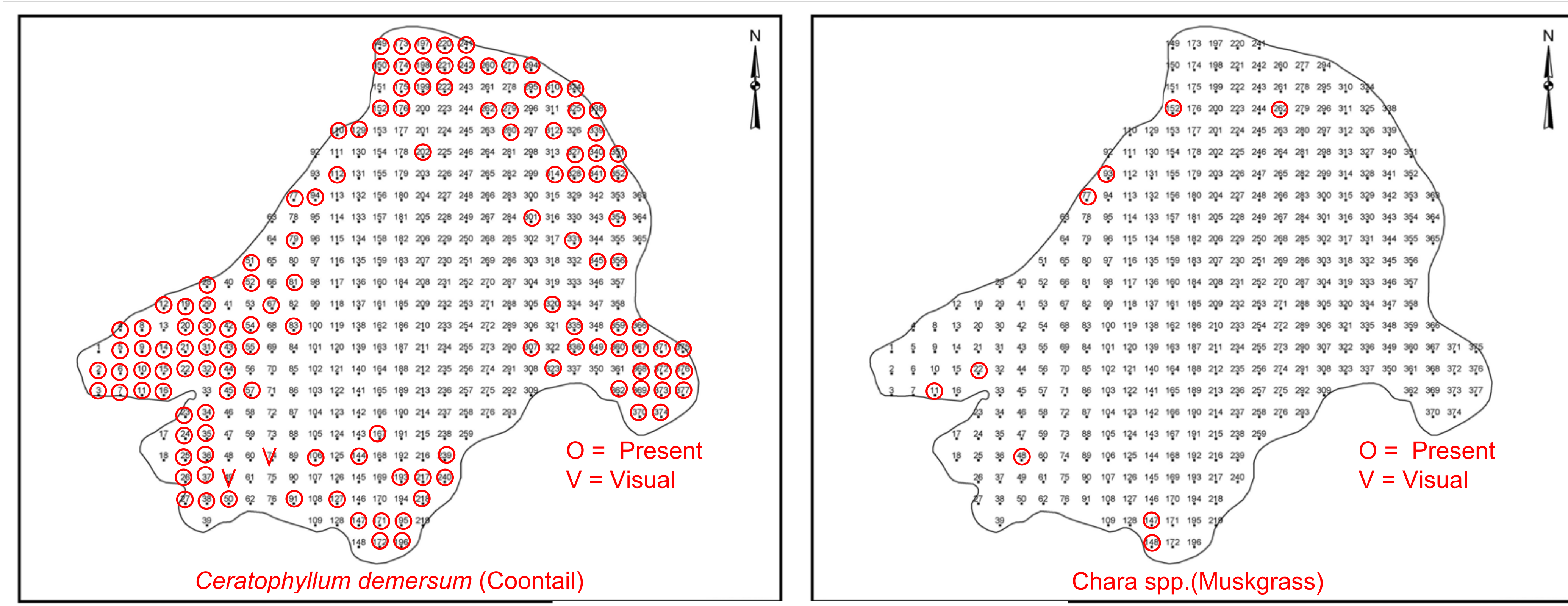


Figure 5a: 2006 WDNR Aquatic Plant Survey

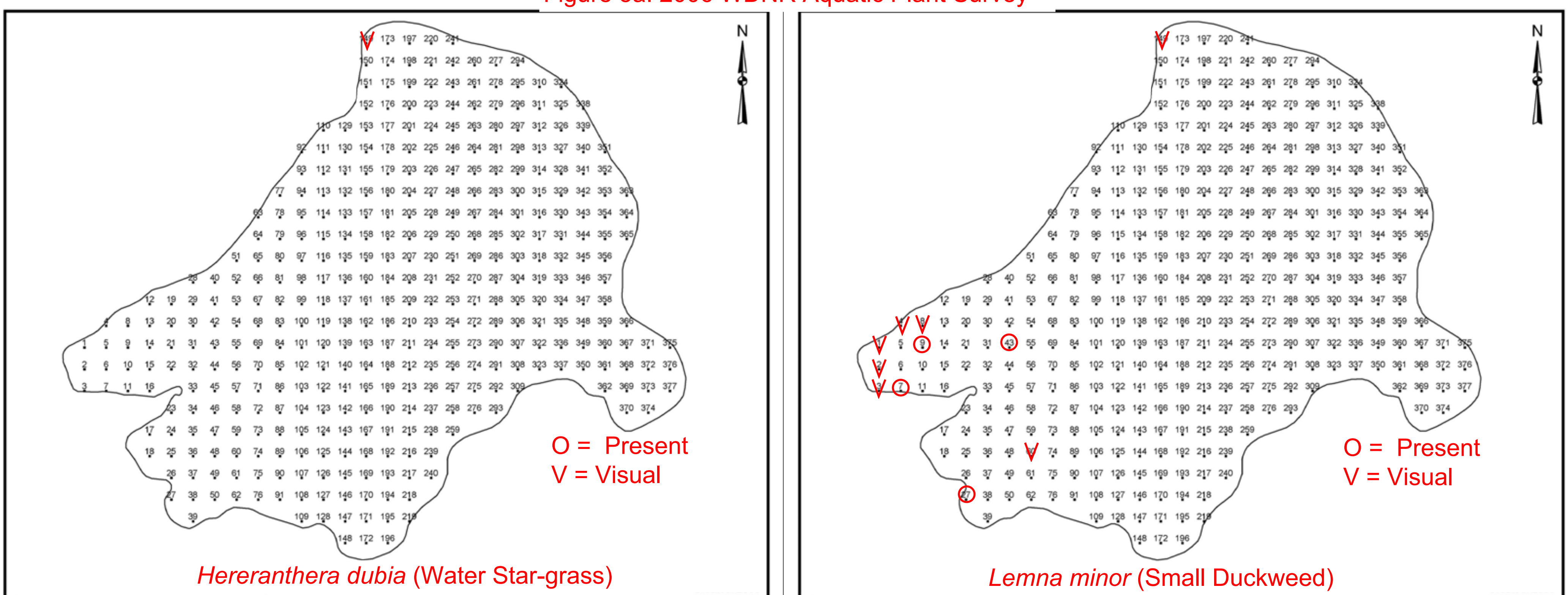
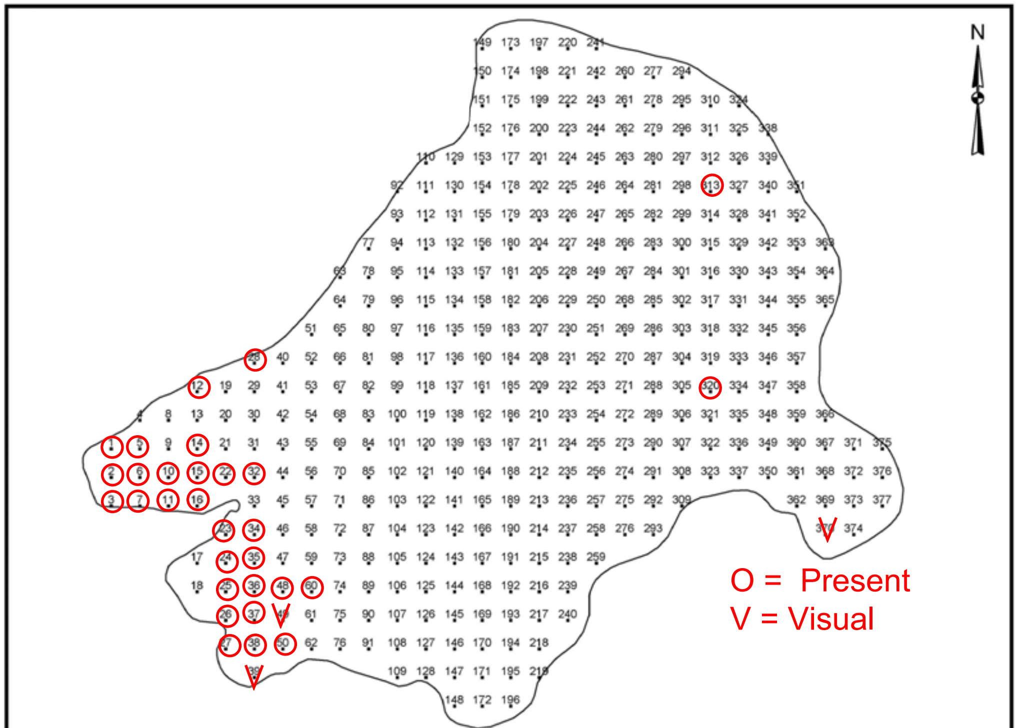
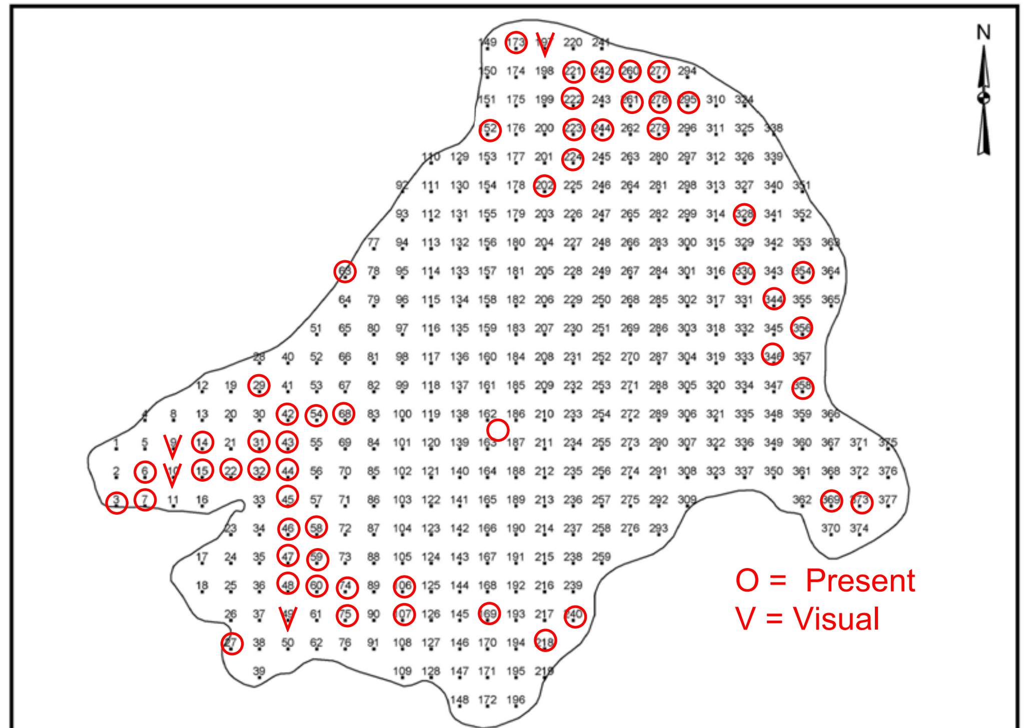


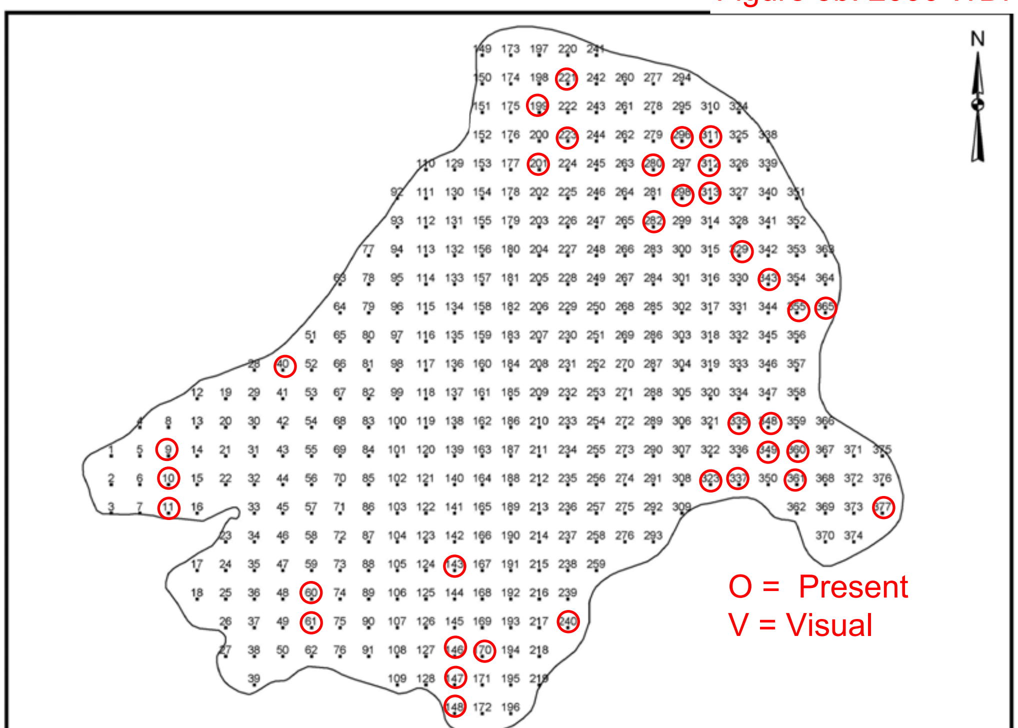
Figure 5b: 2006 WDNR Aquatic Plant Survey



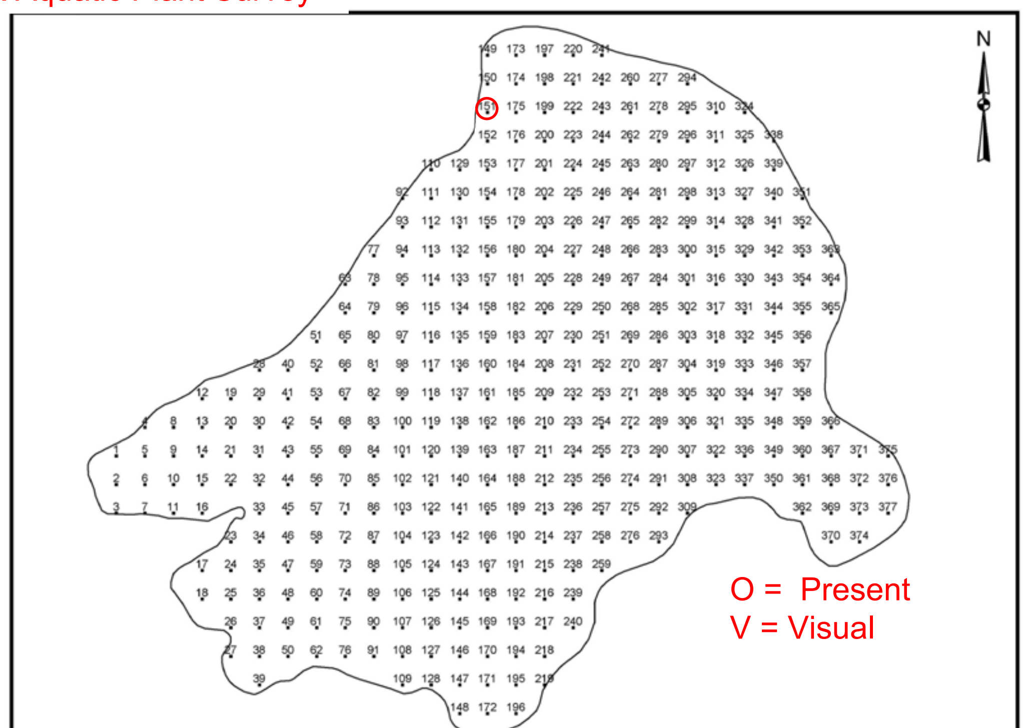
Lemna trisulca (Forked Duckweed)



Myriophyllum spicatum x sibericum (Hybrid Watermilfoil)



Myriophyllum sp. (Watermilfoil)



Najas flexilis (Bushy Pondweed)

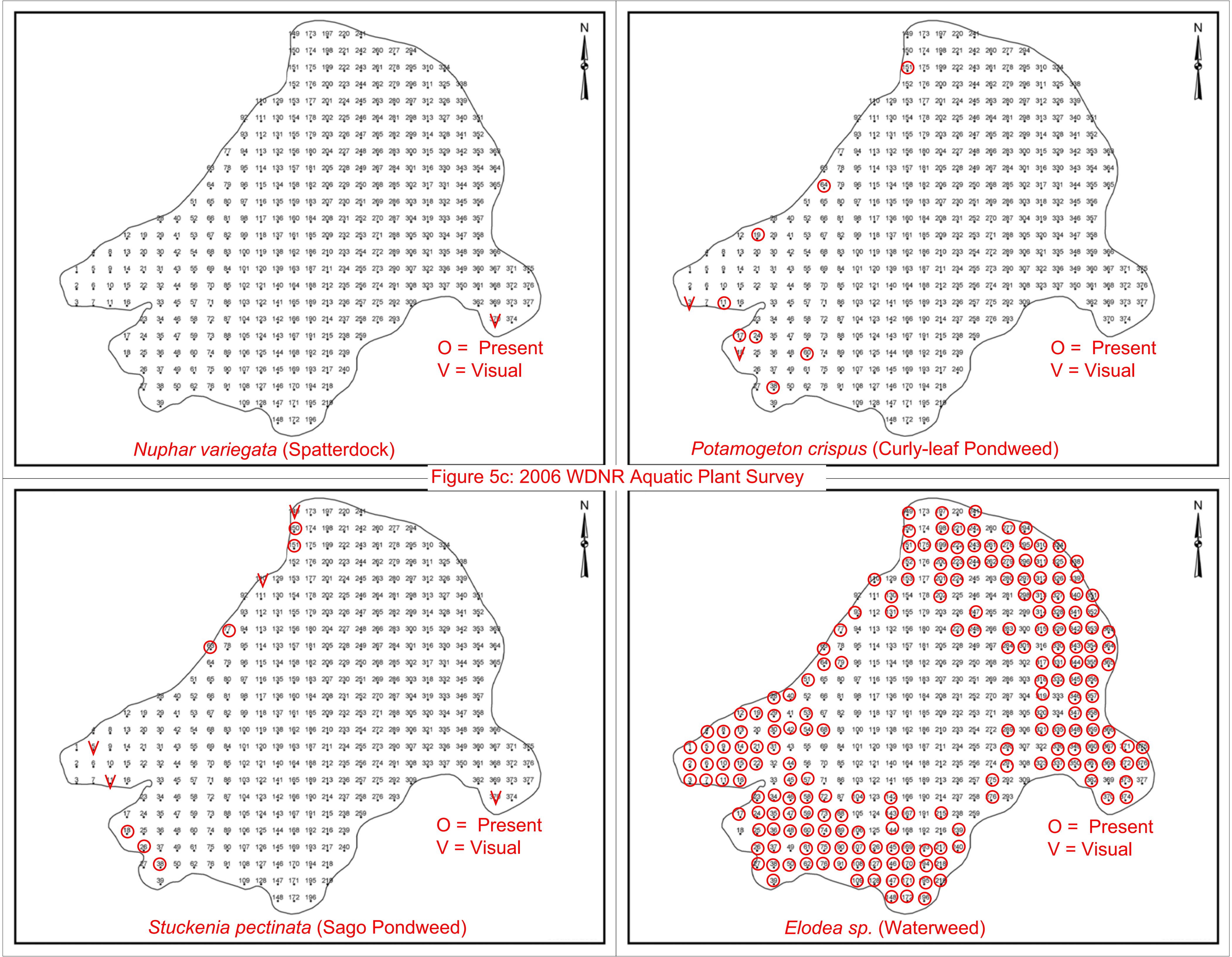
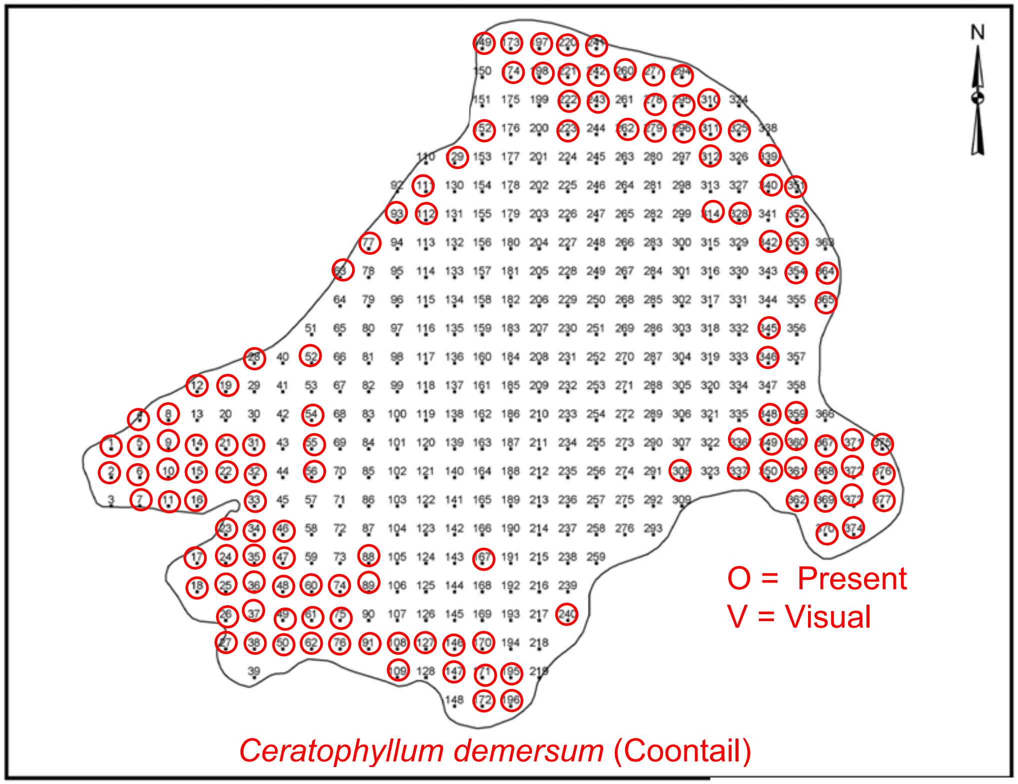


Figure 5c: 2006 WDNR Aquatic Plant Survey



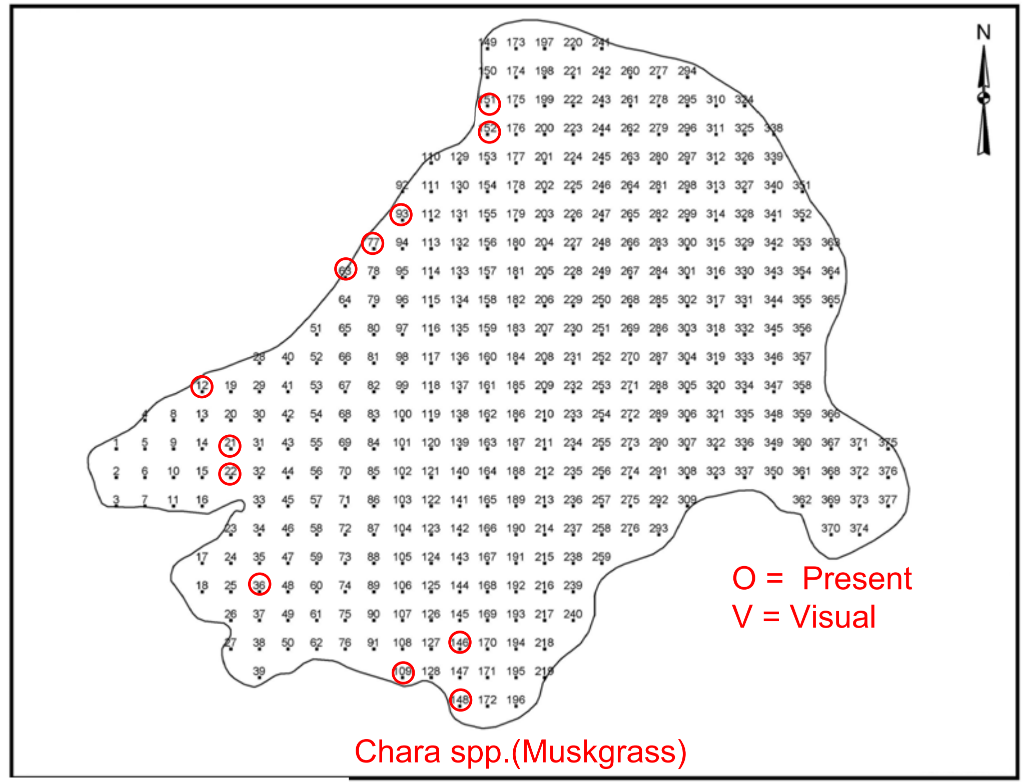
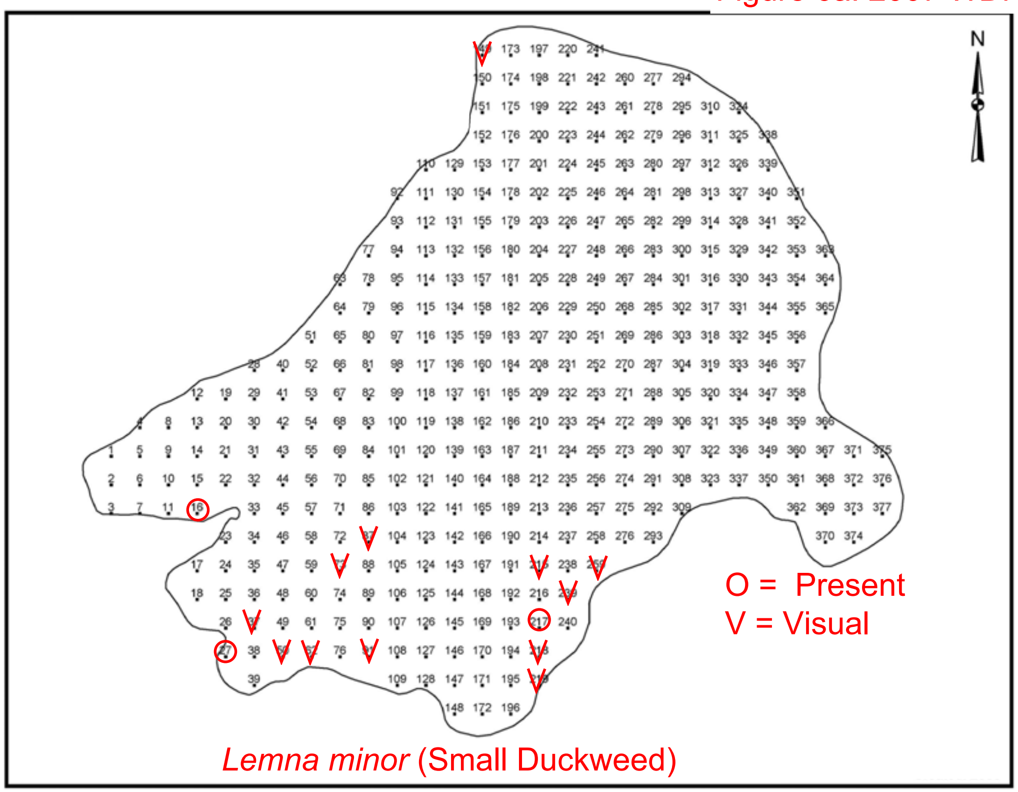
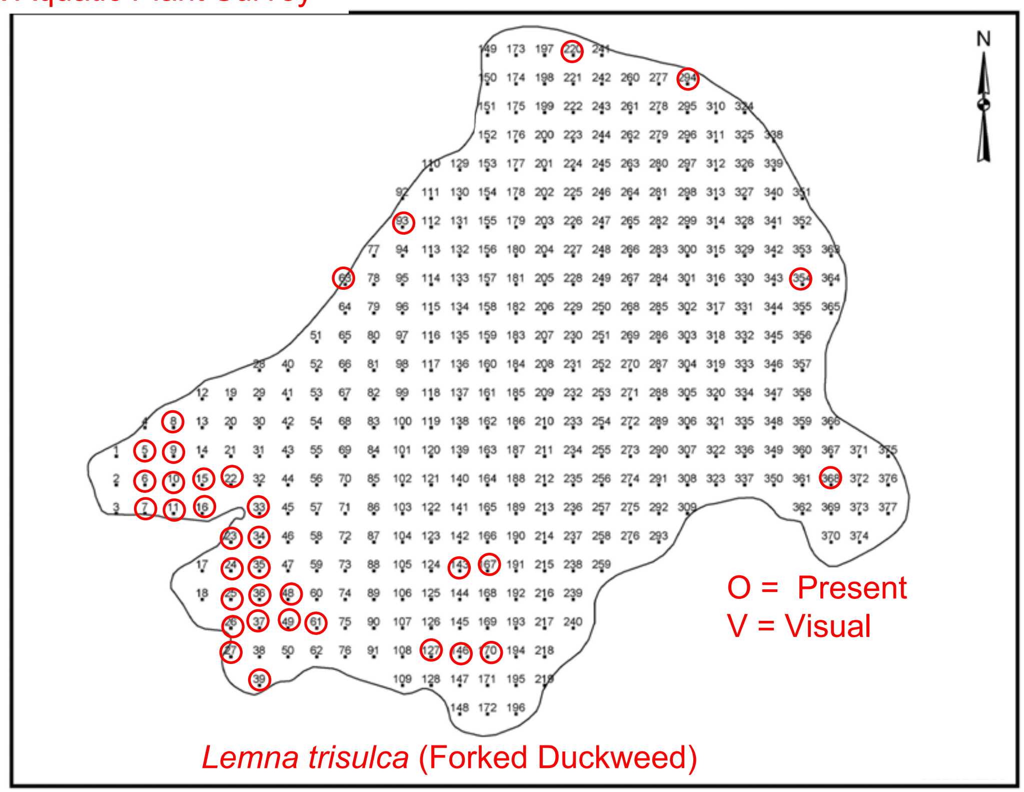
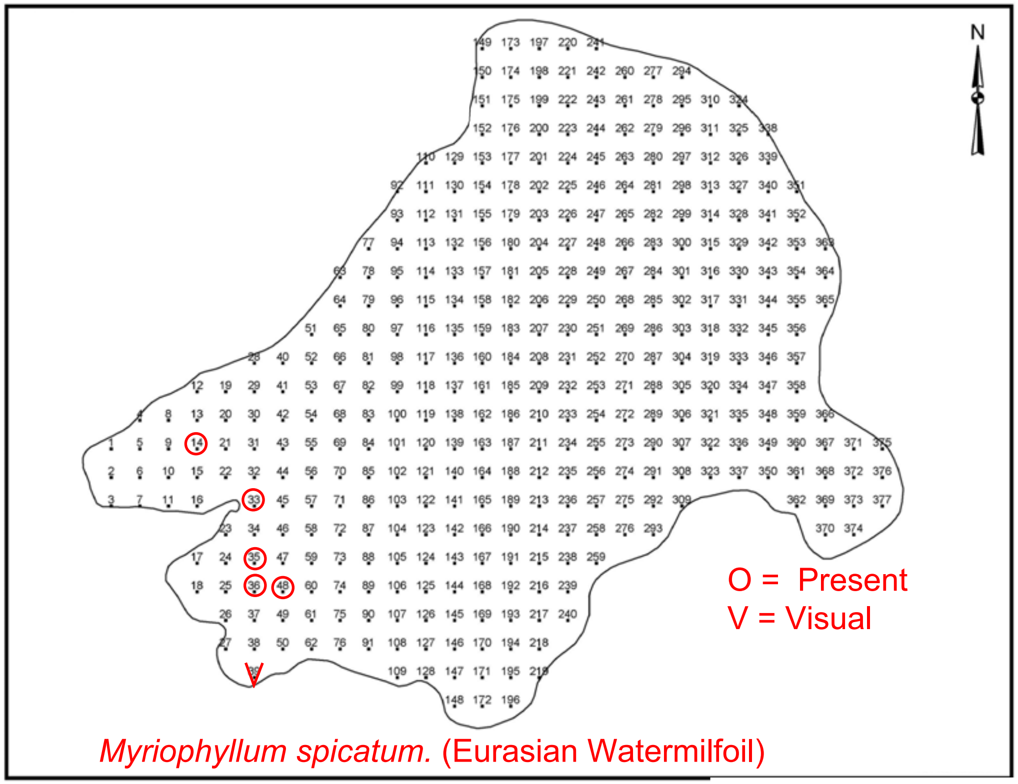
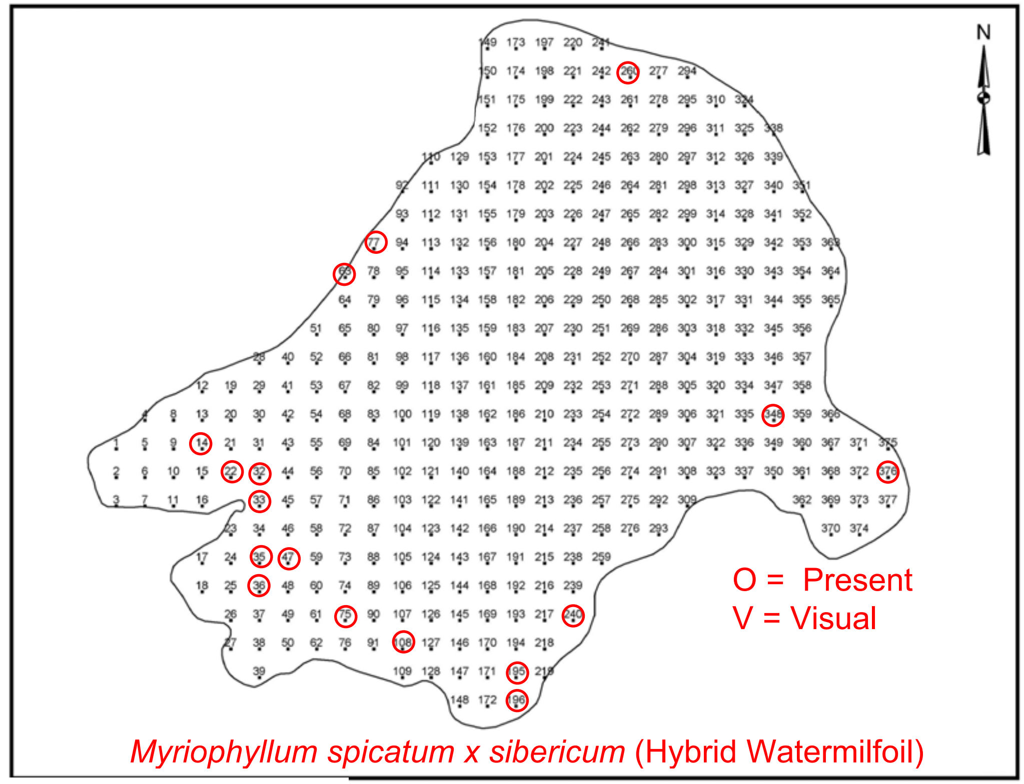


Figure 6a: 2007 WDNR Aquatic Plant Survey









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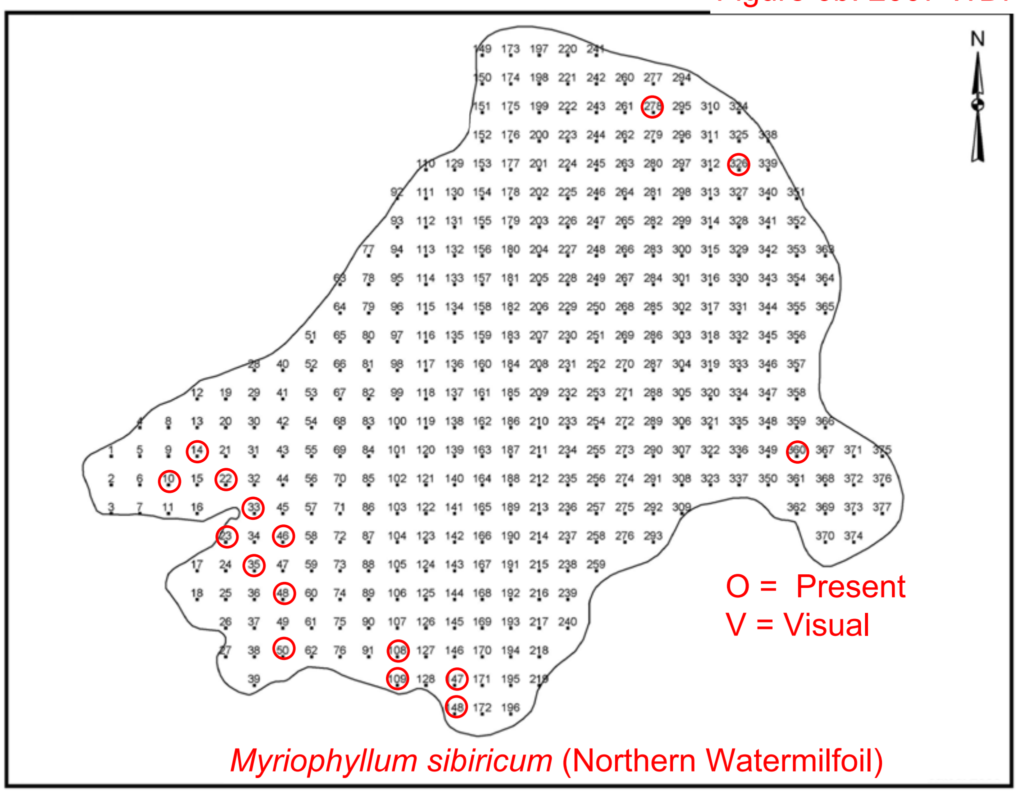
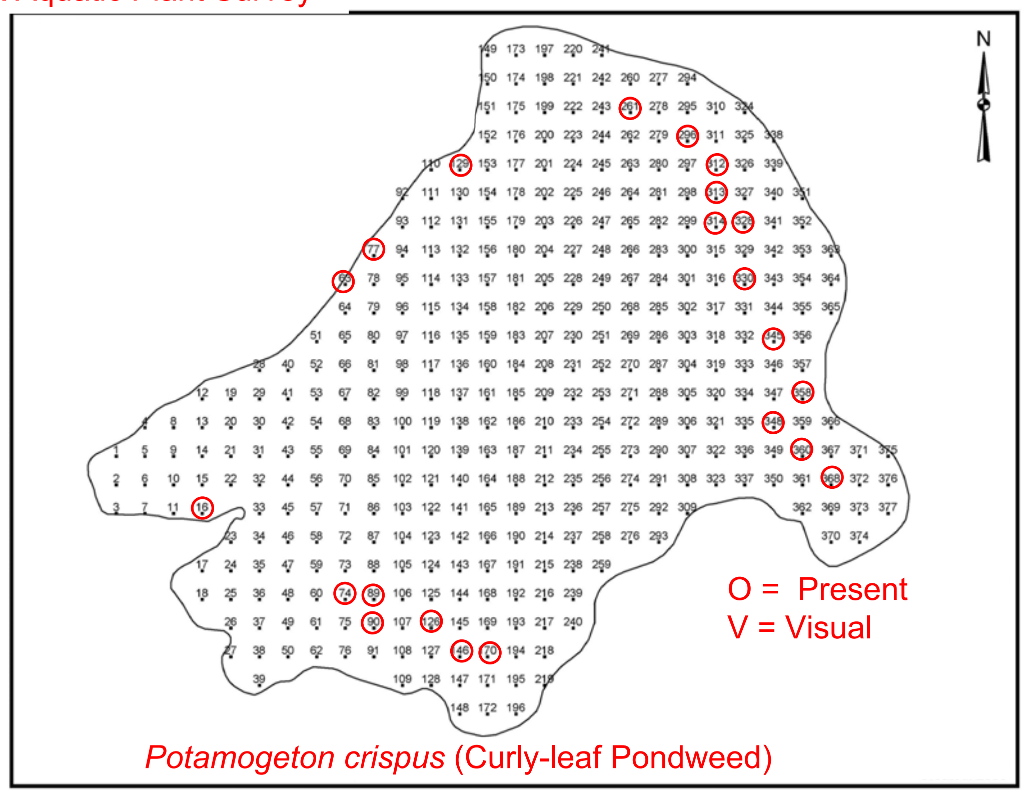
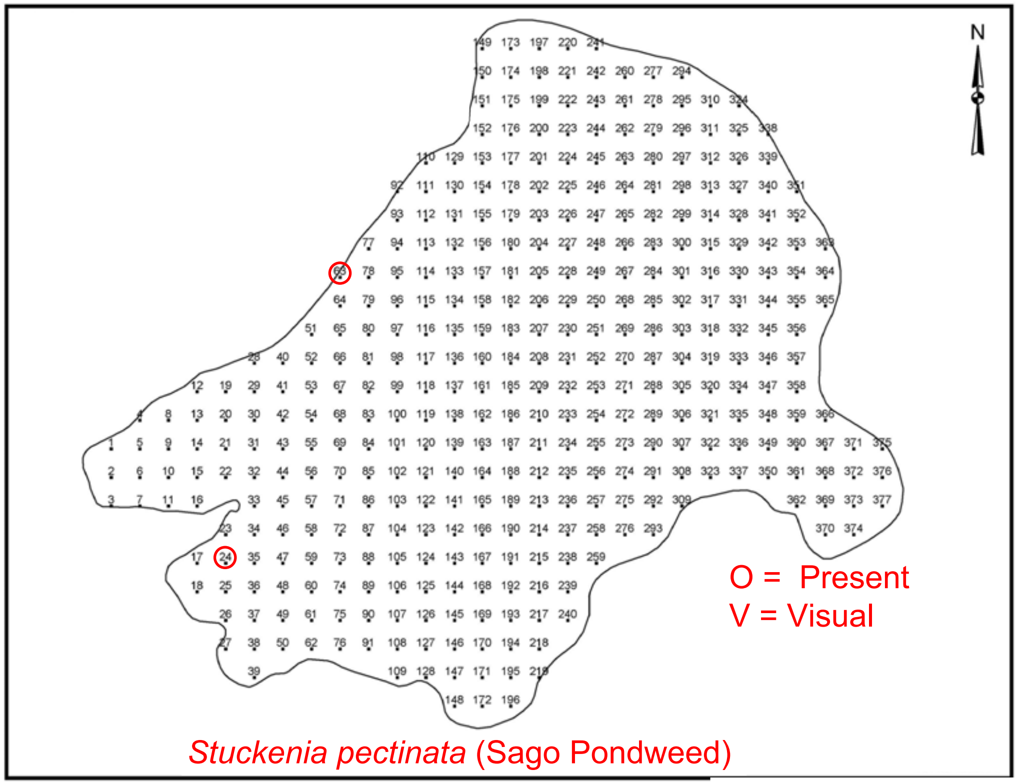






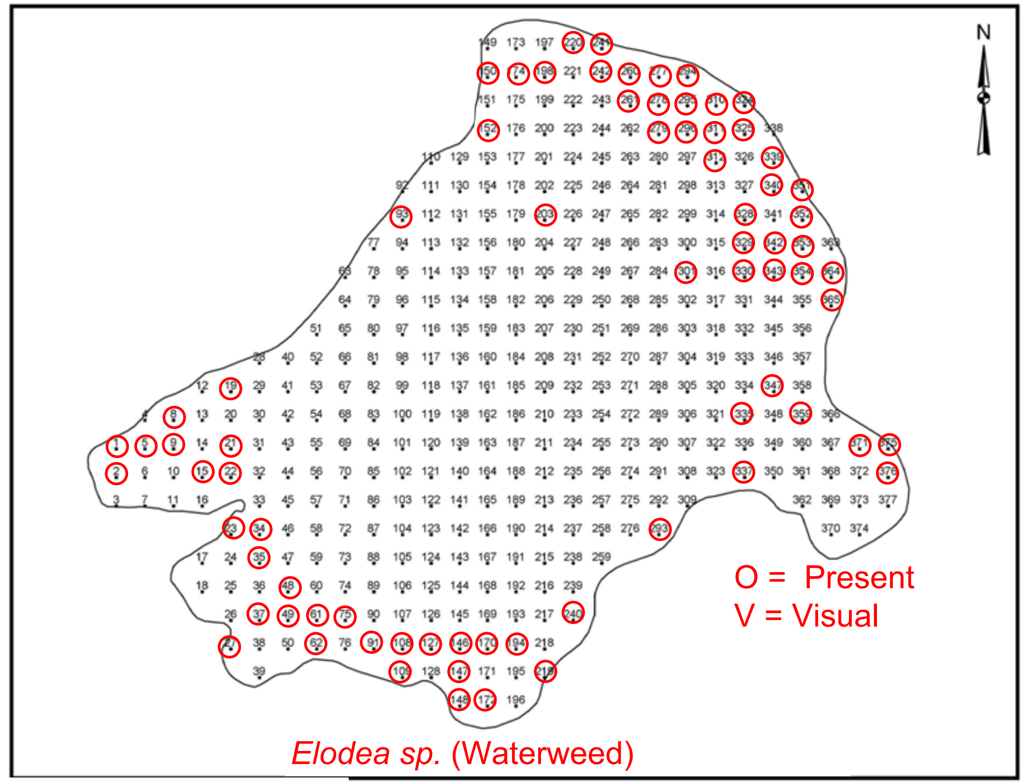
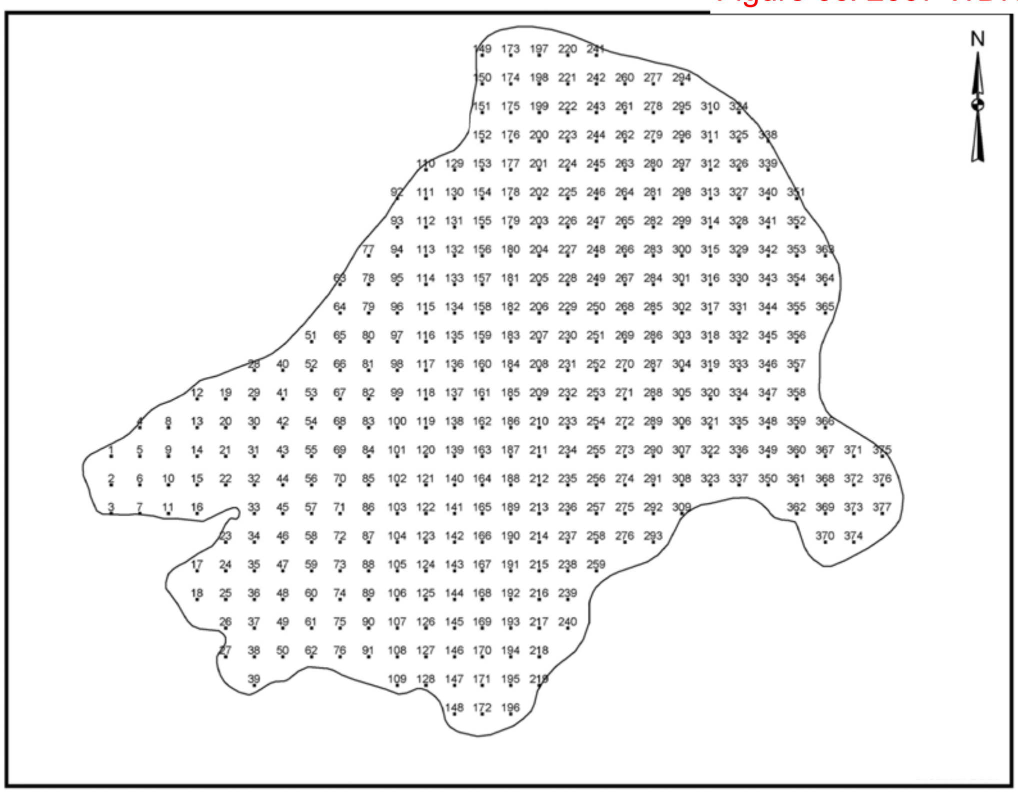
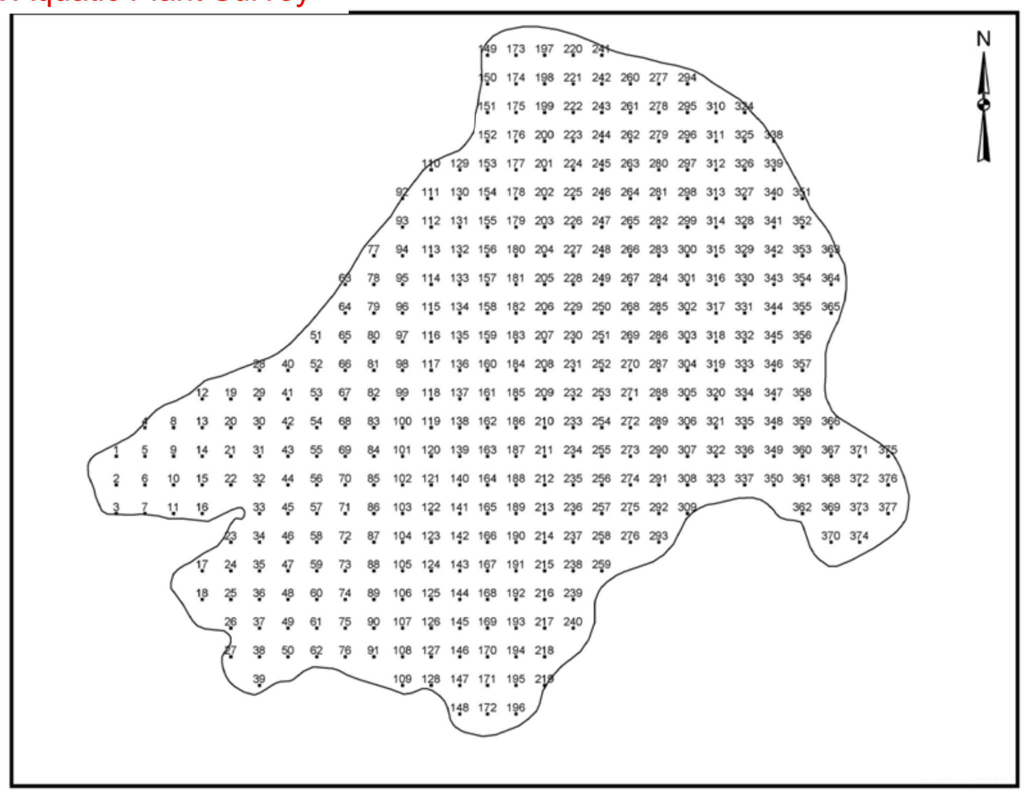
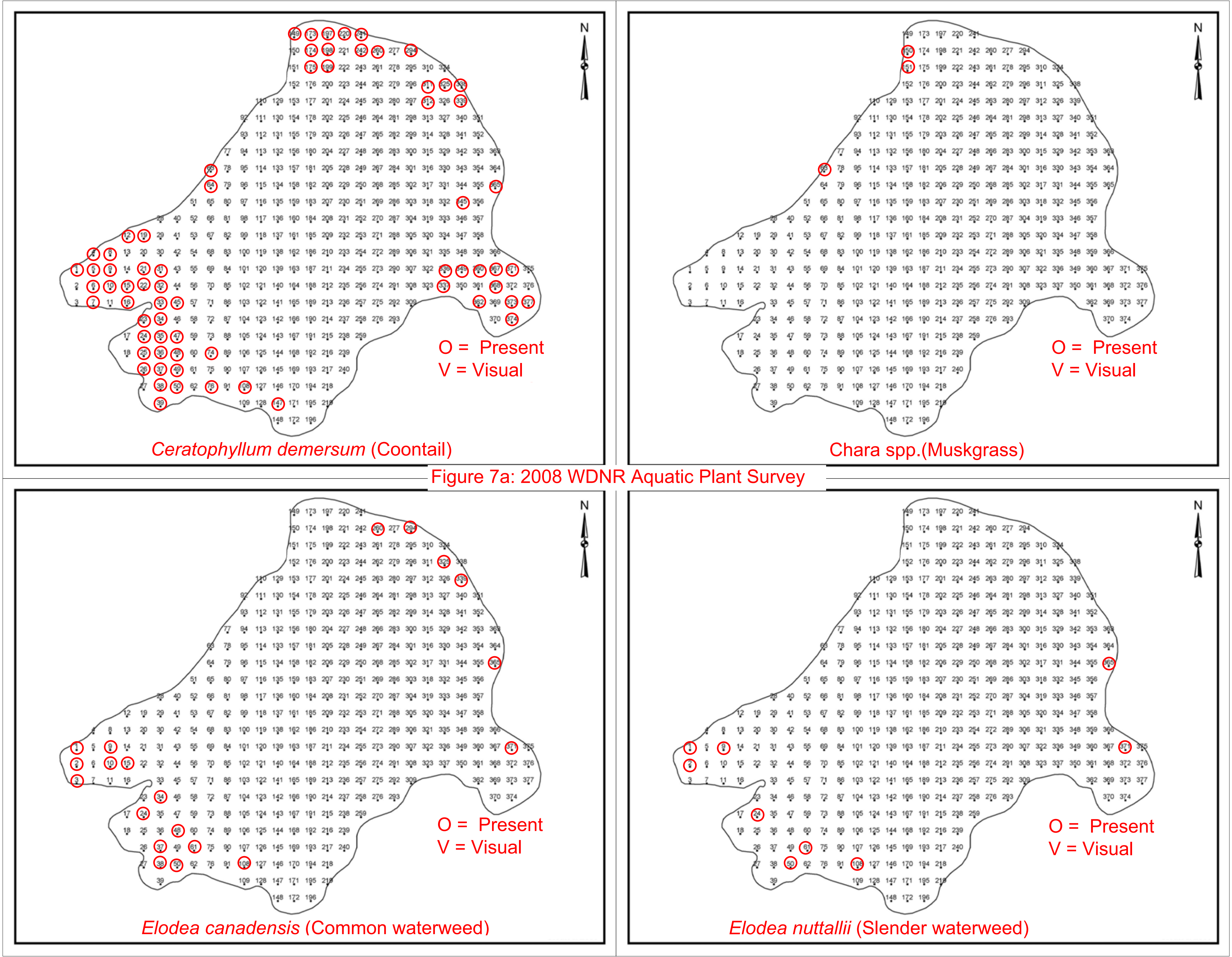


Figure 6c: 2007 WDNR Aquatic Plant Survey







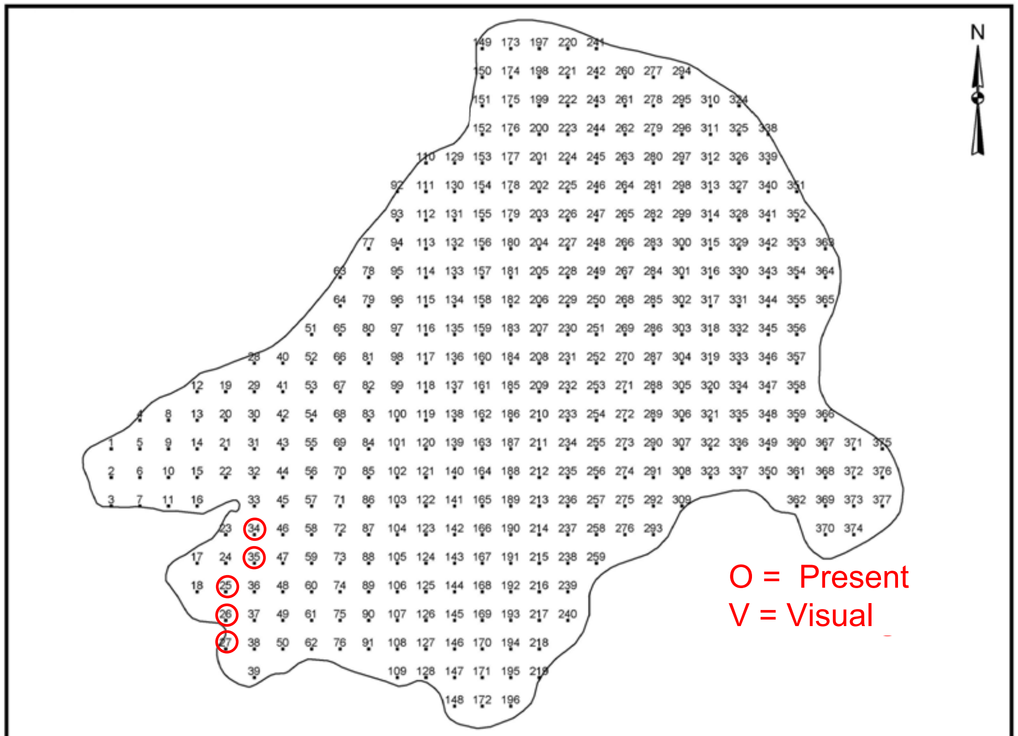
Ceratophyllum demersum (Coontail)

Chara spp.(Muskgrass)

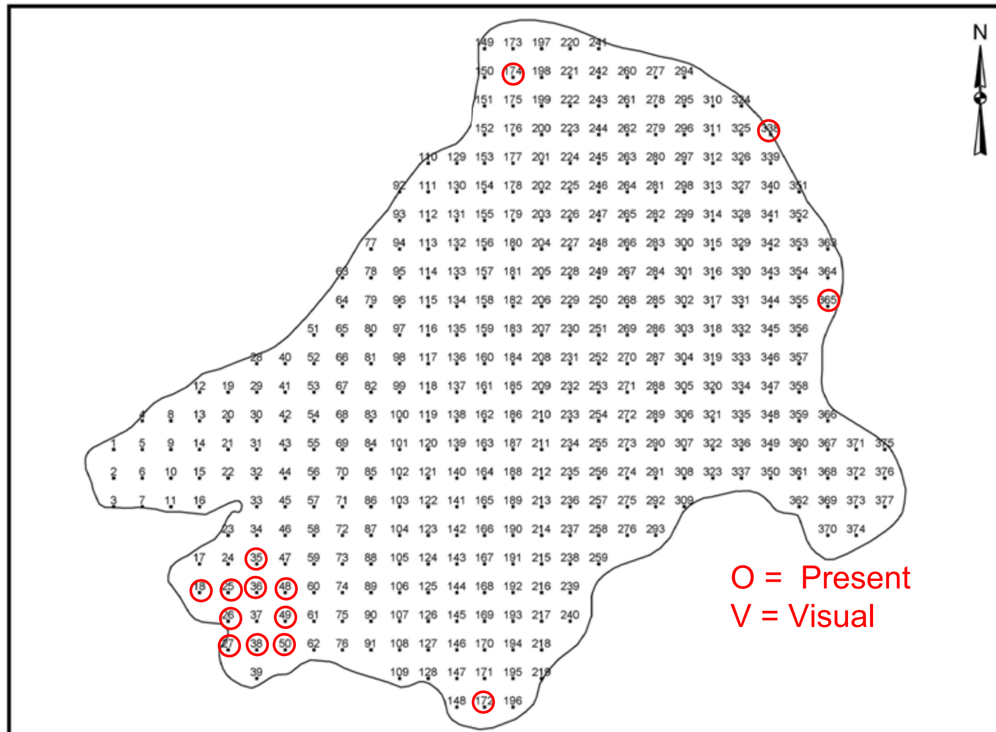
Elodea canadensis (Common waterweed)

Elodea nuttallii (Slender waterweed)

Figure 7a: 2008 WDNR Aquatic Plant Survey

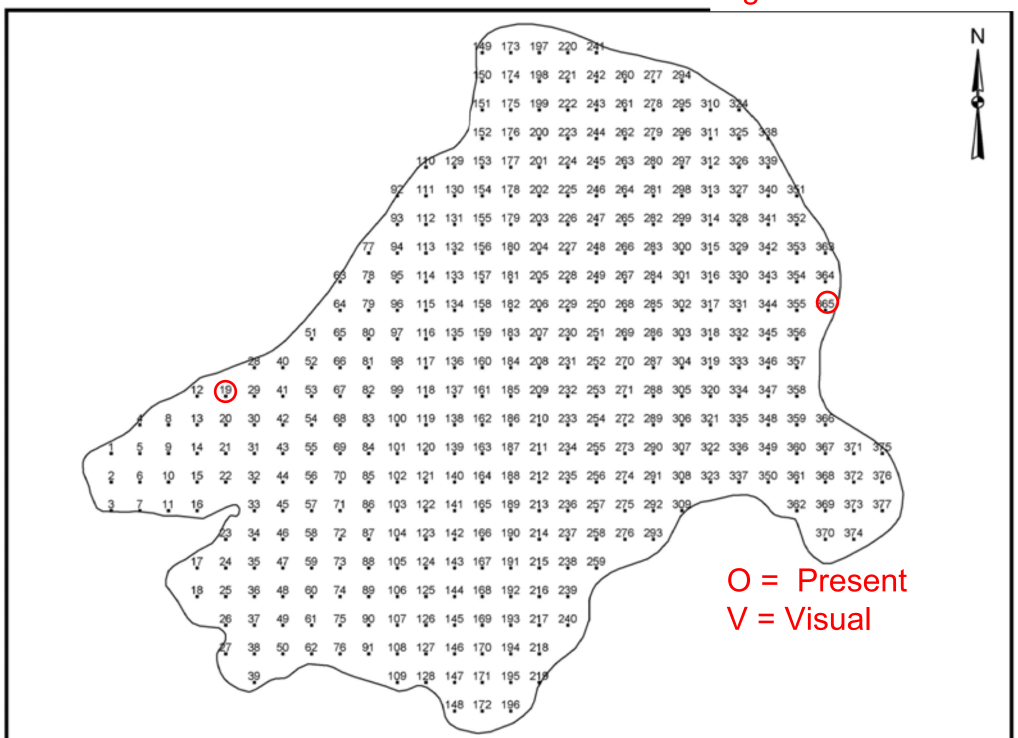


Lemna minor (Small Duckweed)

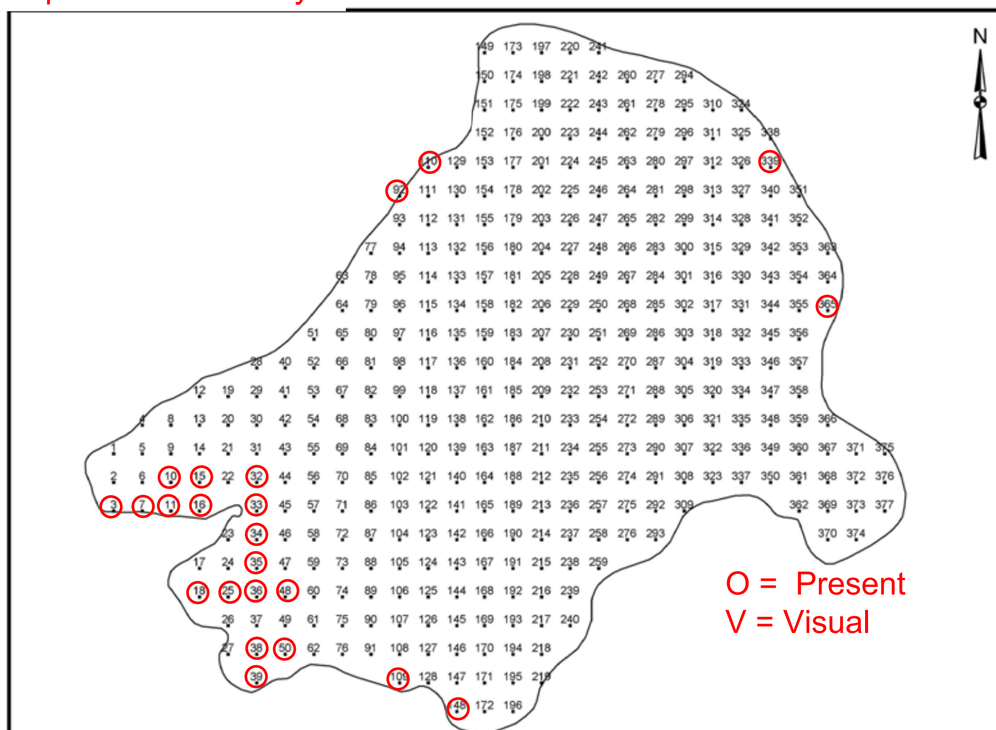


Lemna trisulca (Forked Duckweed)

Figure 7b: 2008 WDNR Aquatic Plant Survey



Myriophyllum sibiricum (Northern Watermilfoil)



Myriophyllum spicatum. (Eurasian Watermilfoil)

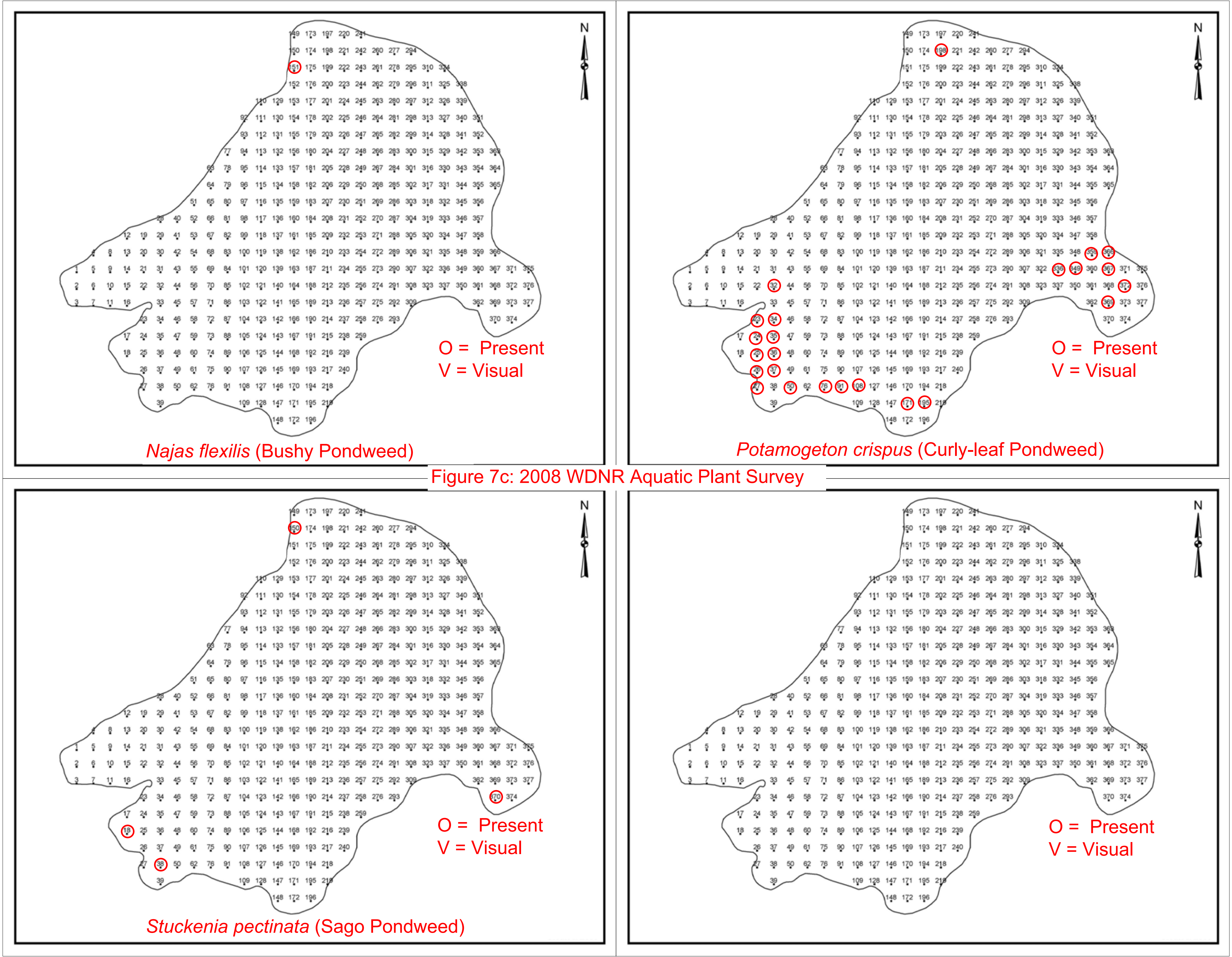
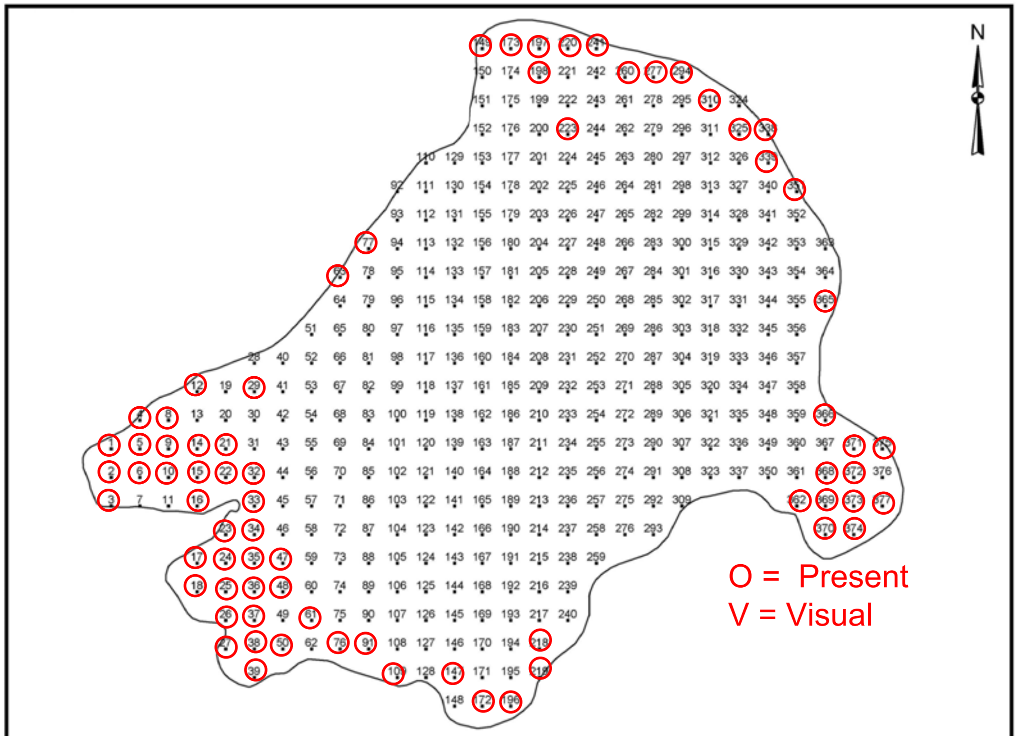
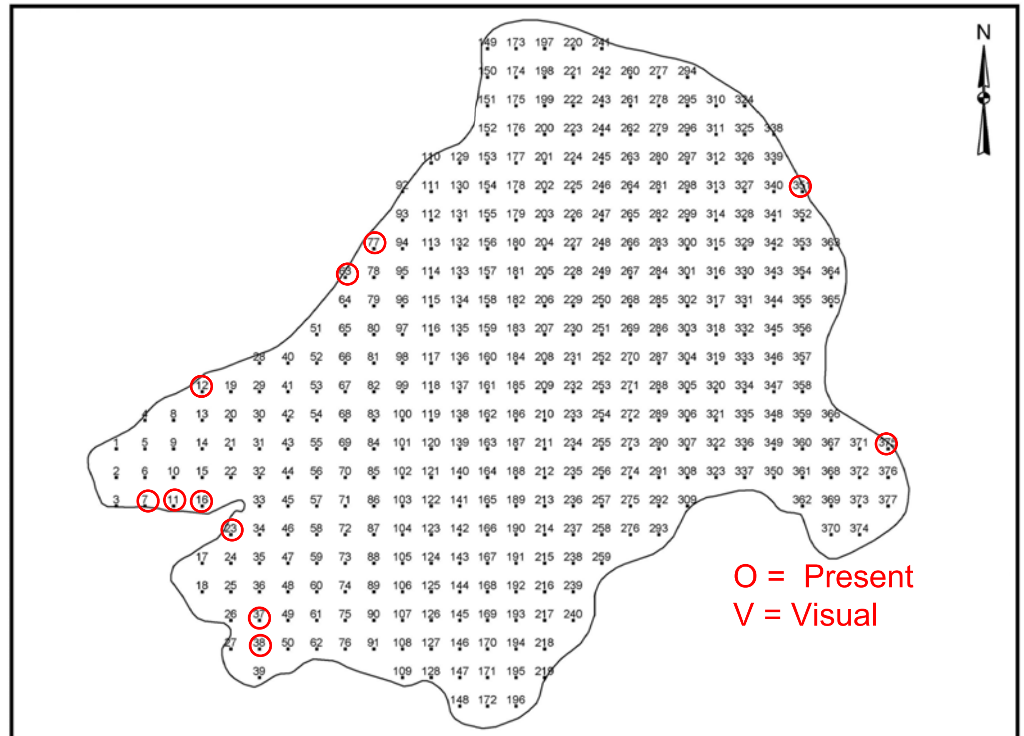


Figure 7c: 2008 WDNR Aquatic Plant Survey

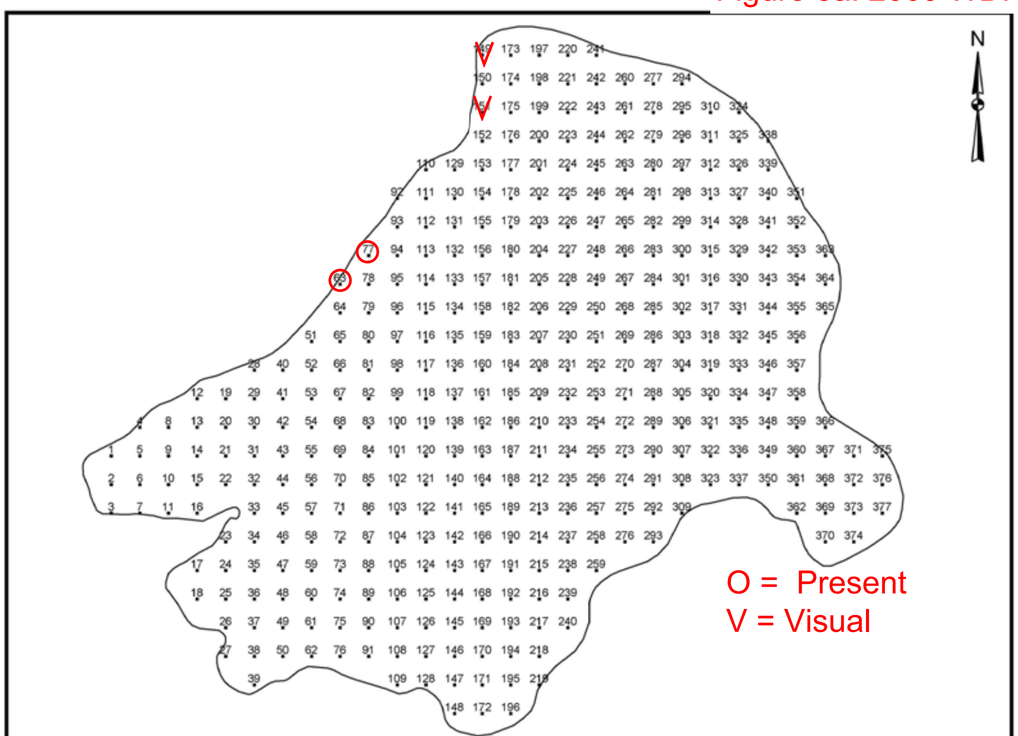


Ceratophyllum demersum (Coontail)

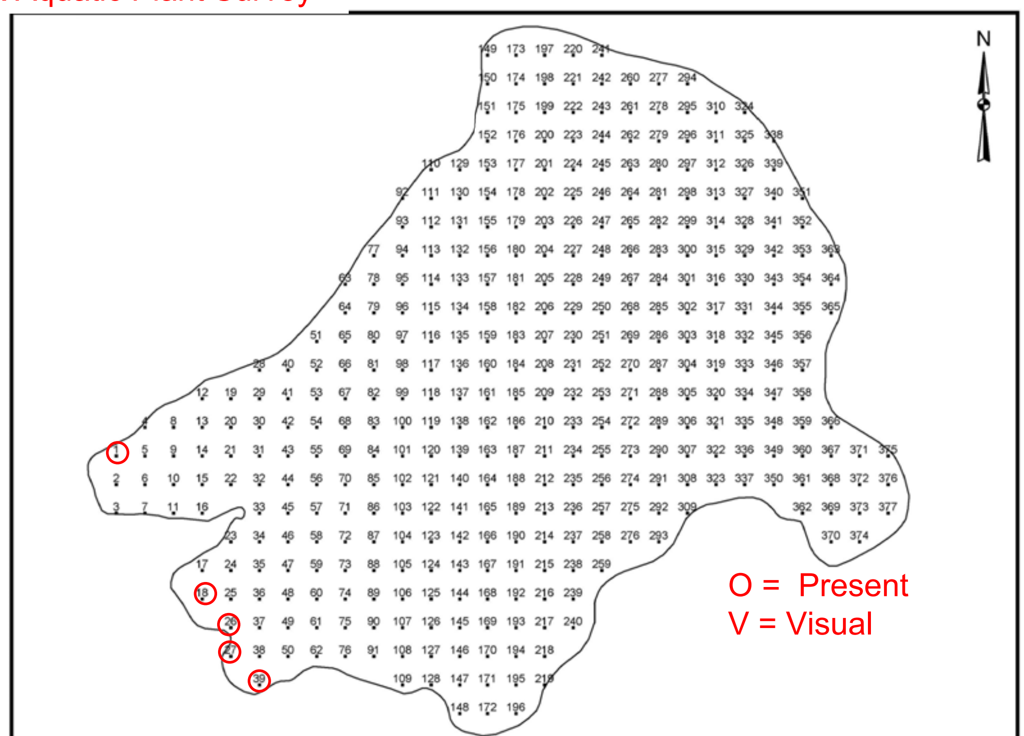


Chara spp.(Muskgrass)

Figure 8a: 2009 WDNR Aquatic Plant Survey

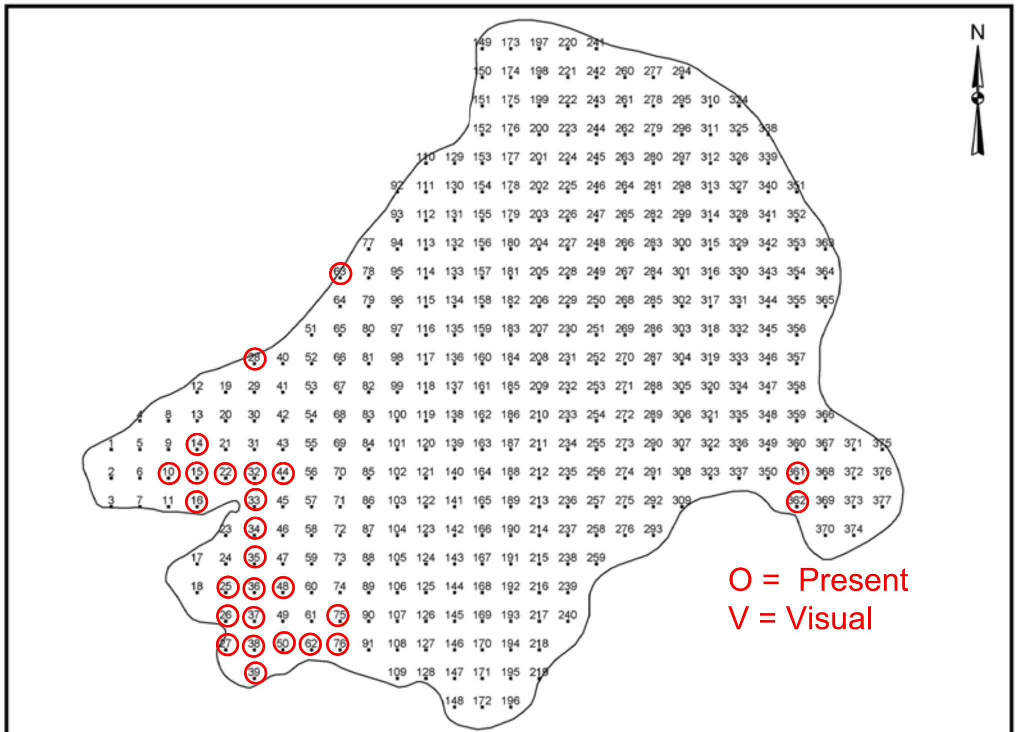


Hereranthera dubia (Water Star-grass)

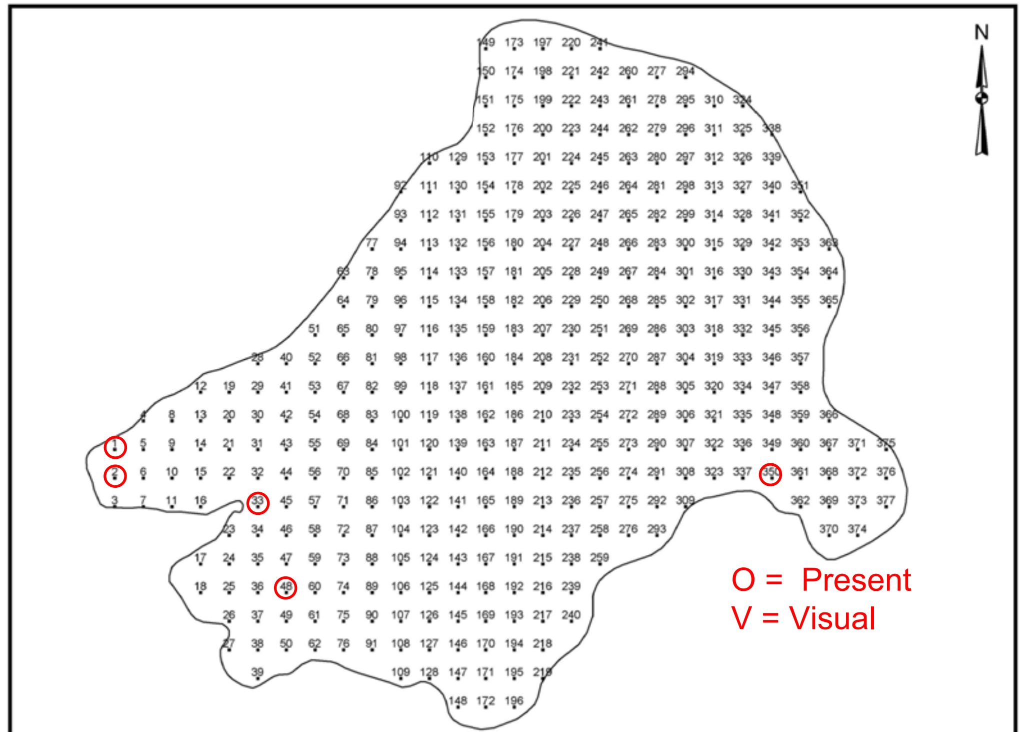


Lemna minor (Small Duckweed)

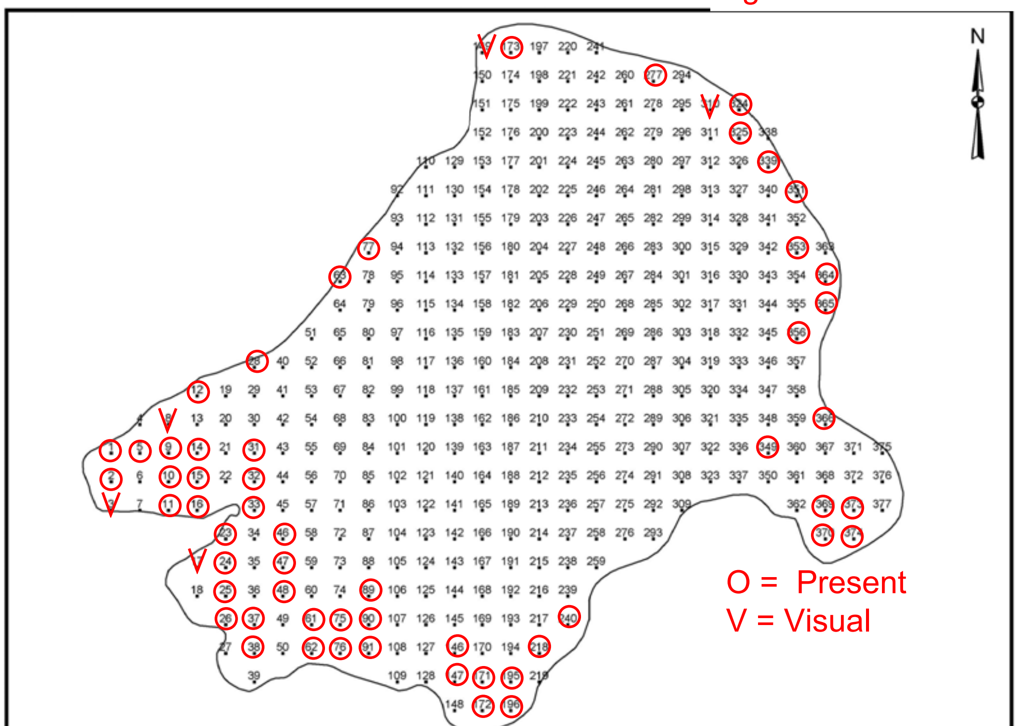
Figure 8b: 2009 WDNR Aquatic Plant Survey



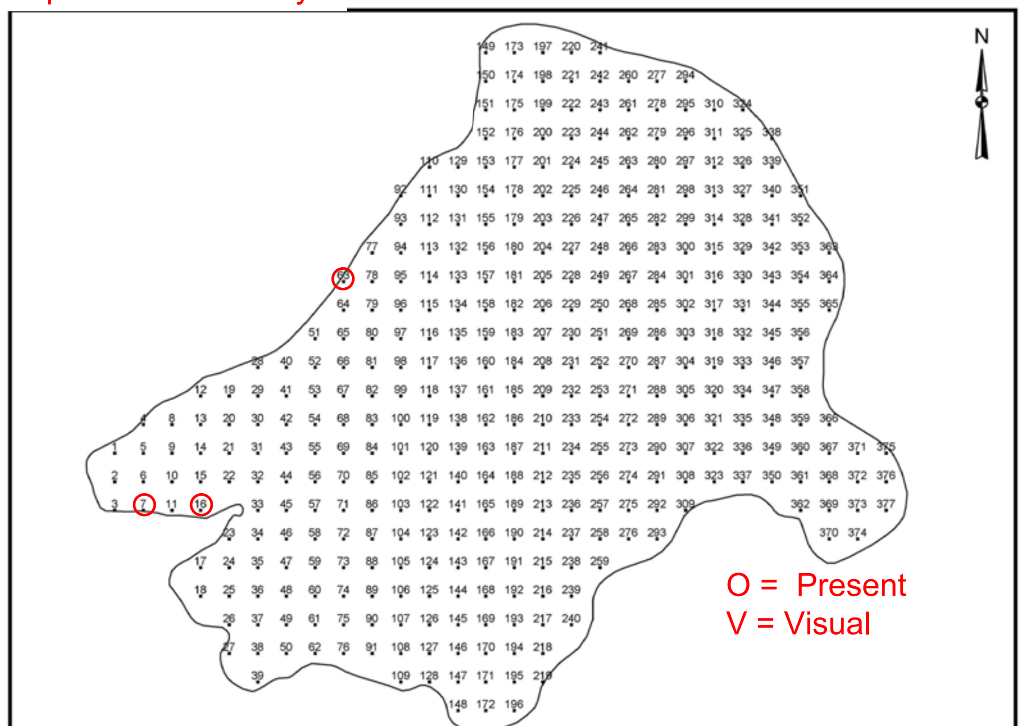
Lemna trisulca (Forked Duckweed)



Myriophyllum sibiricum (Northern Watermilfoil)



Myriophyllum spicatum (Eurasian Watermilfoil)



Najas flexilis (Bushy Pondweed)

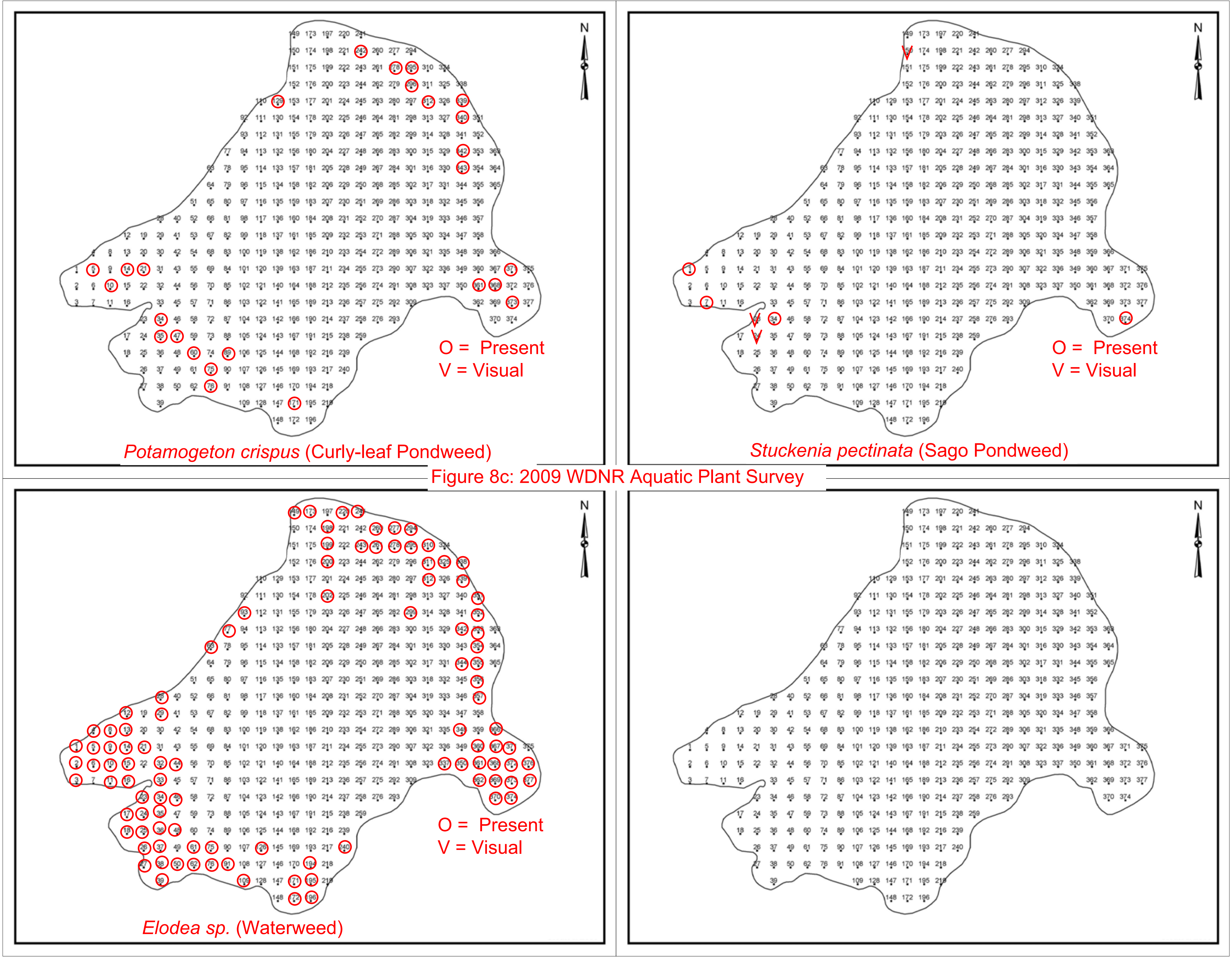


Figure 8c: 2009 WDNR Aquatic Plant Survey

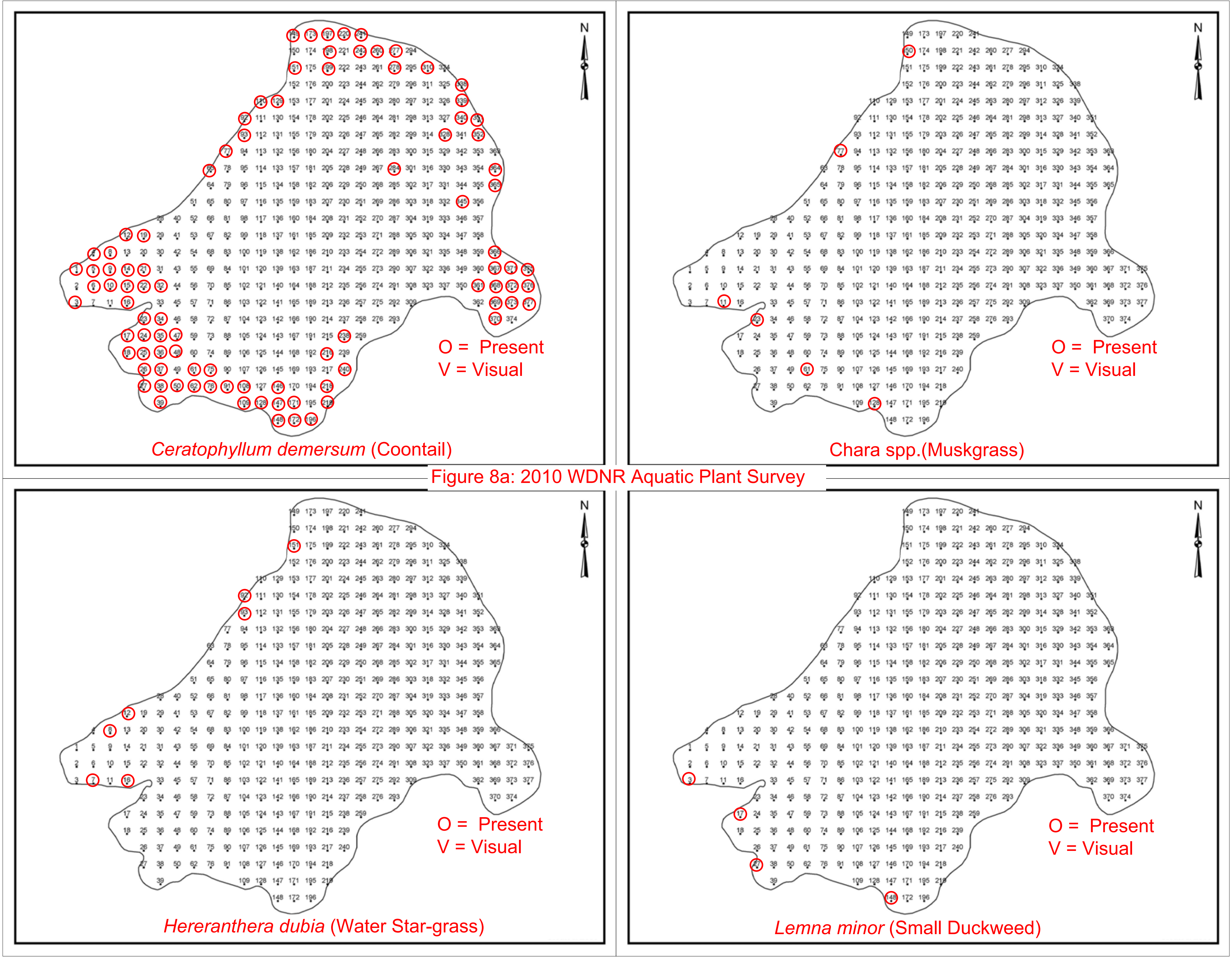
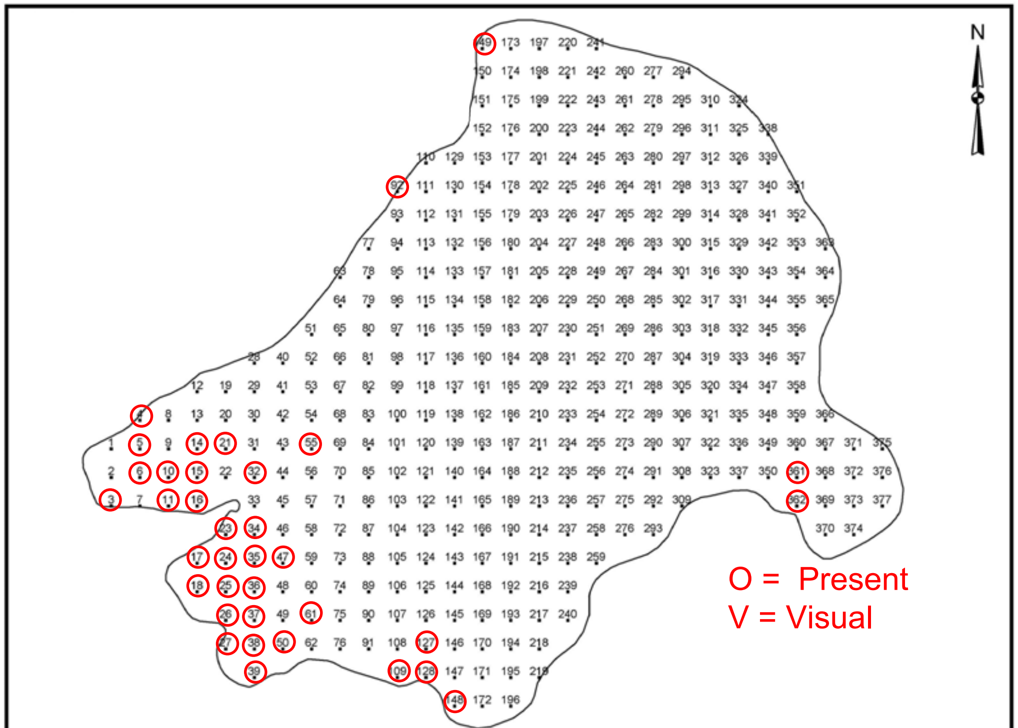
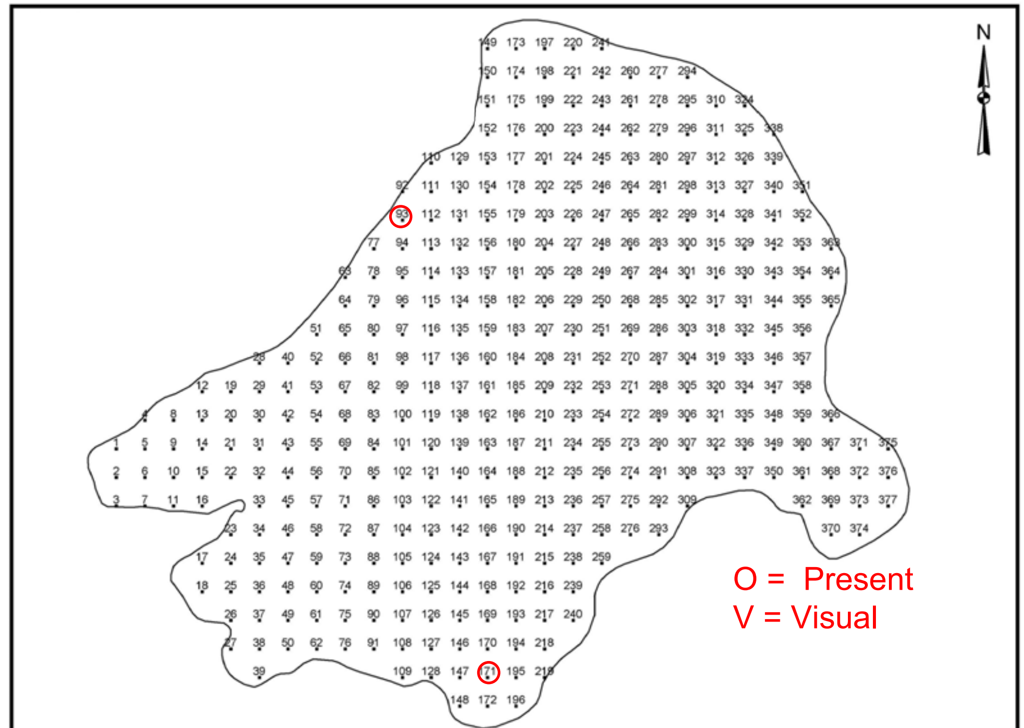


Figure 8a: 2010 WDNR Aquatic Plant Survey

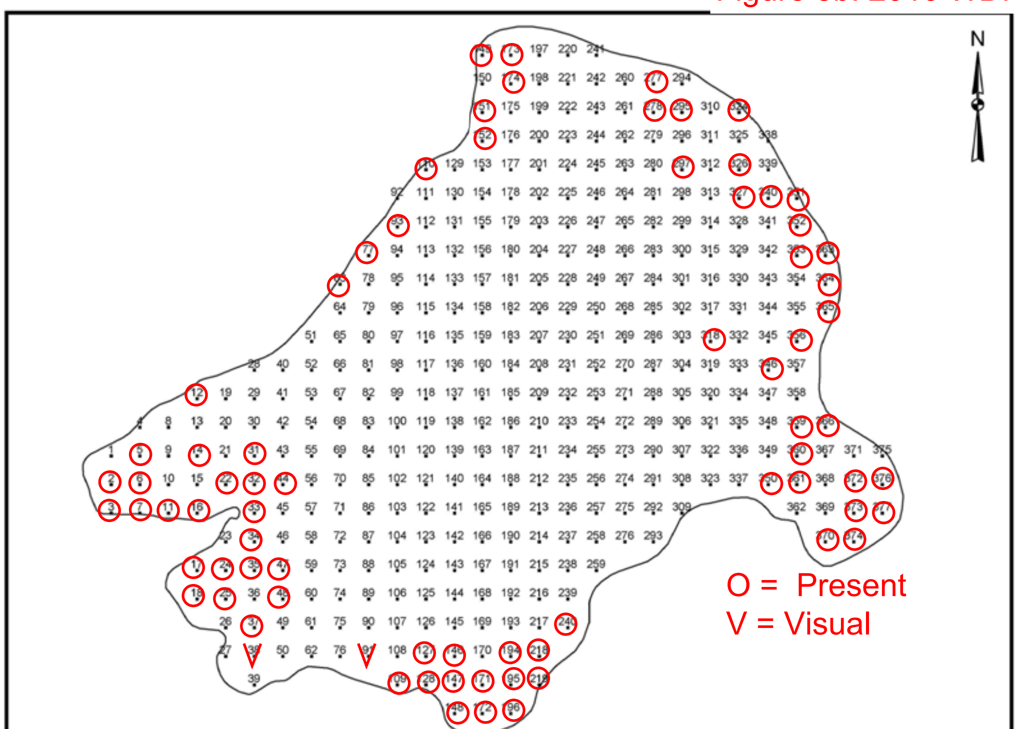
Figure 8b: 2010 WDNR Aquatic Plant Survey



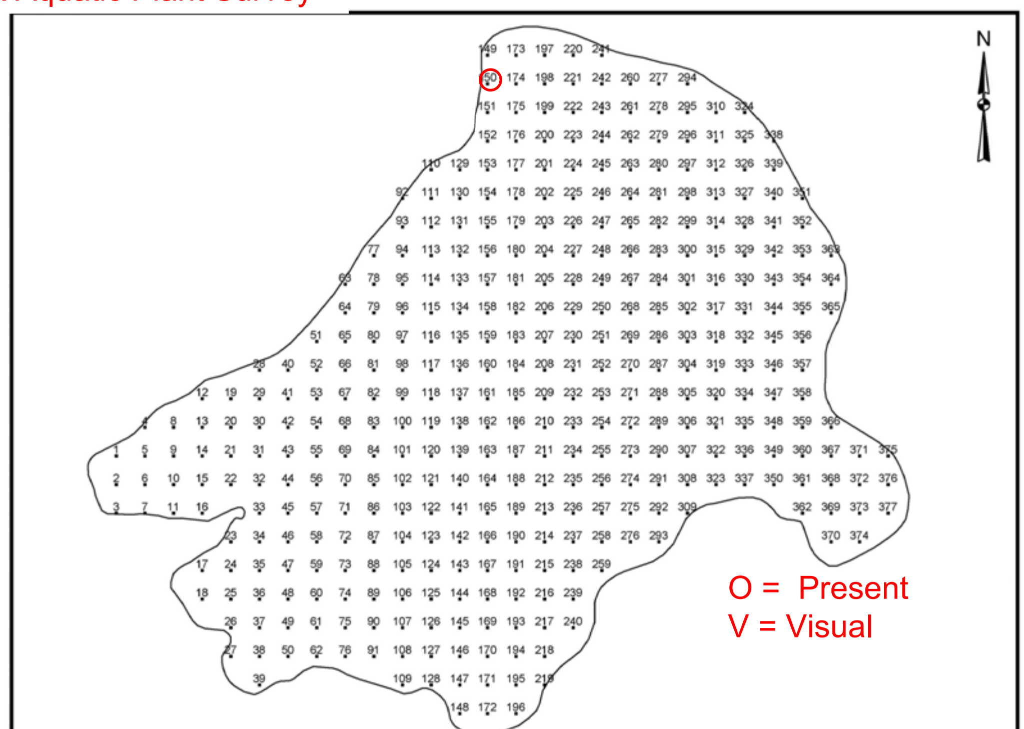
Lemna trisulca (Forked Duckweed)



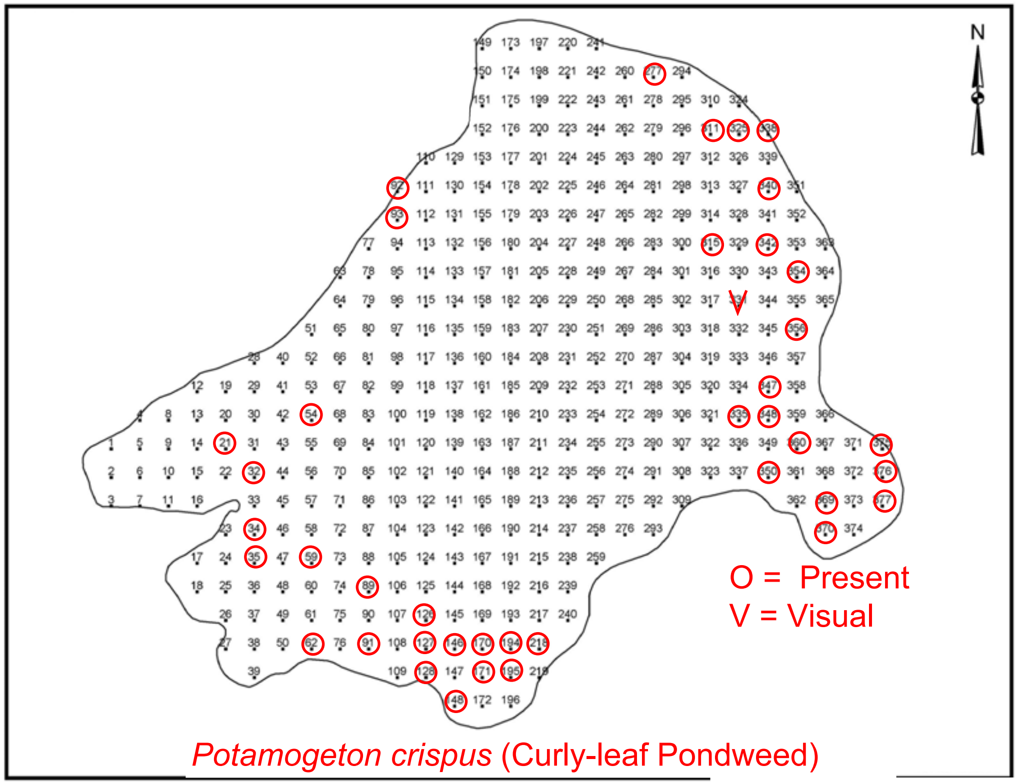
Myriophyllum sibiricum (Northern Watermilfoil)



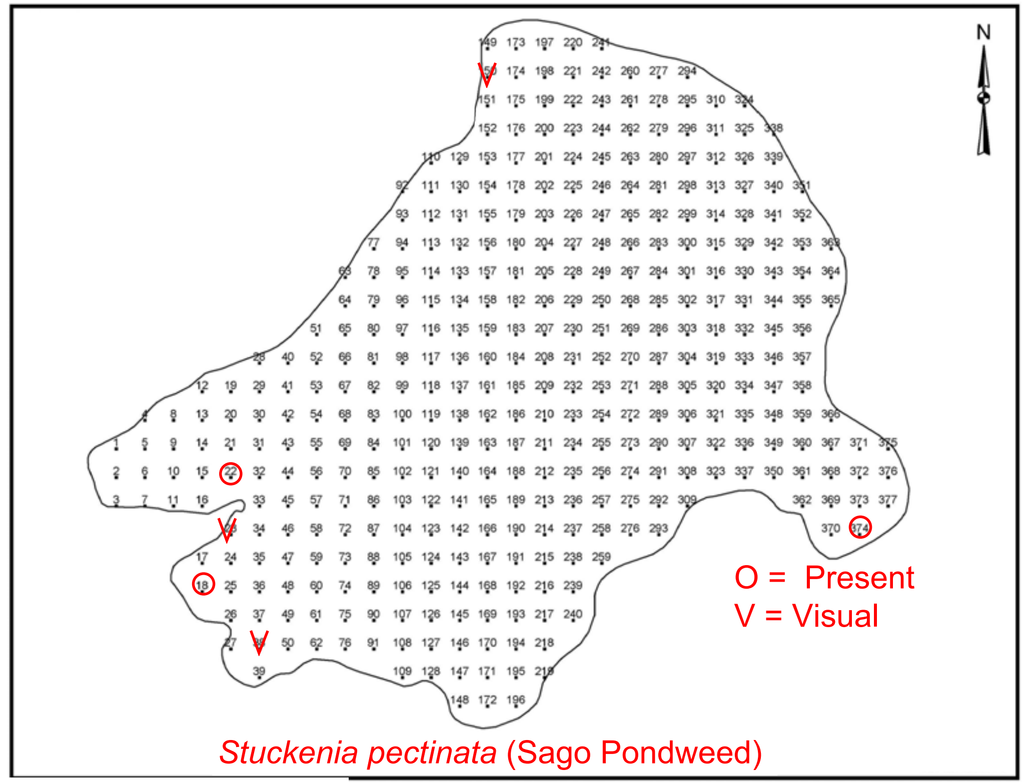
Myriophyllum spicatum (Eurasian Watermilfoil)



Najas flexilis (Bushy Pondweed)

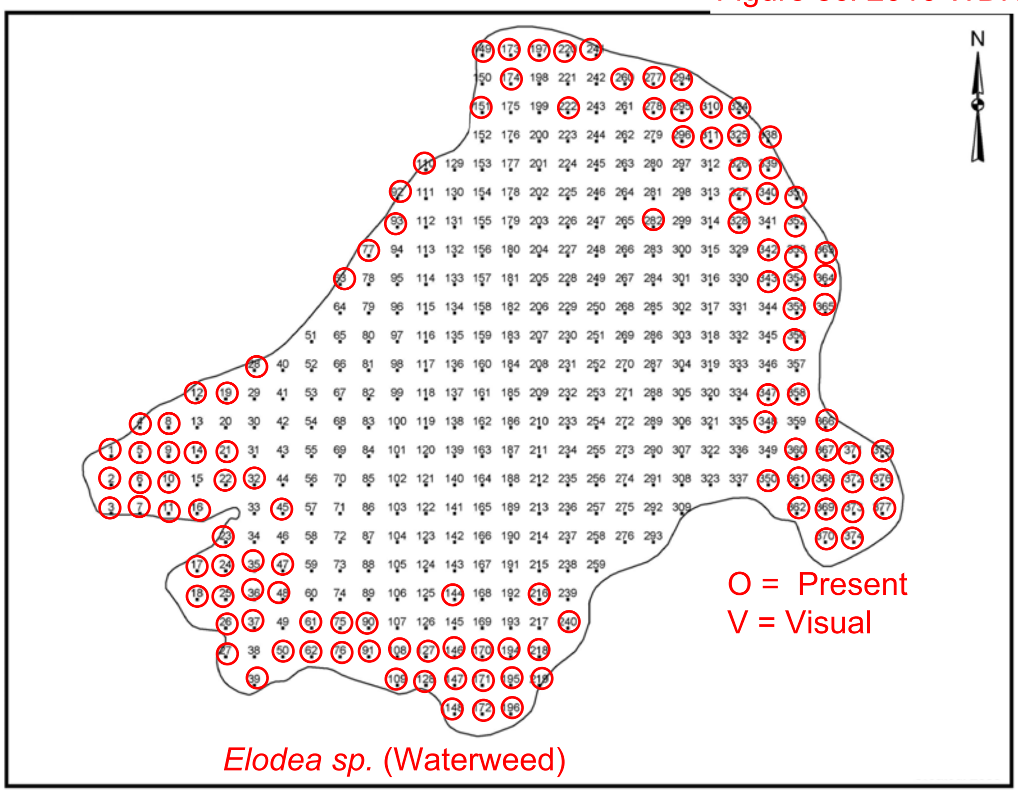


Potamogeton crispus (Curly-leaf Pondweed)

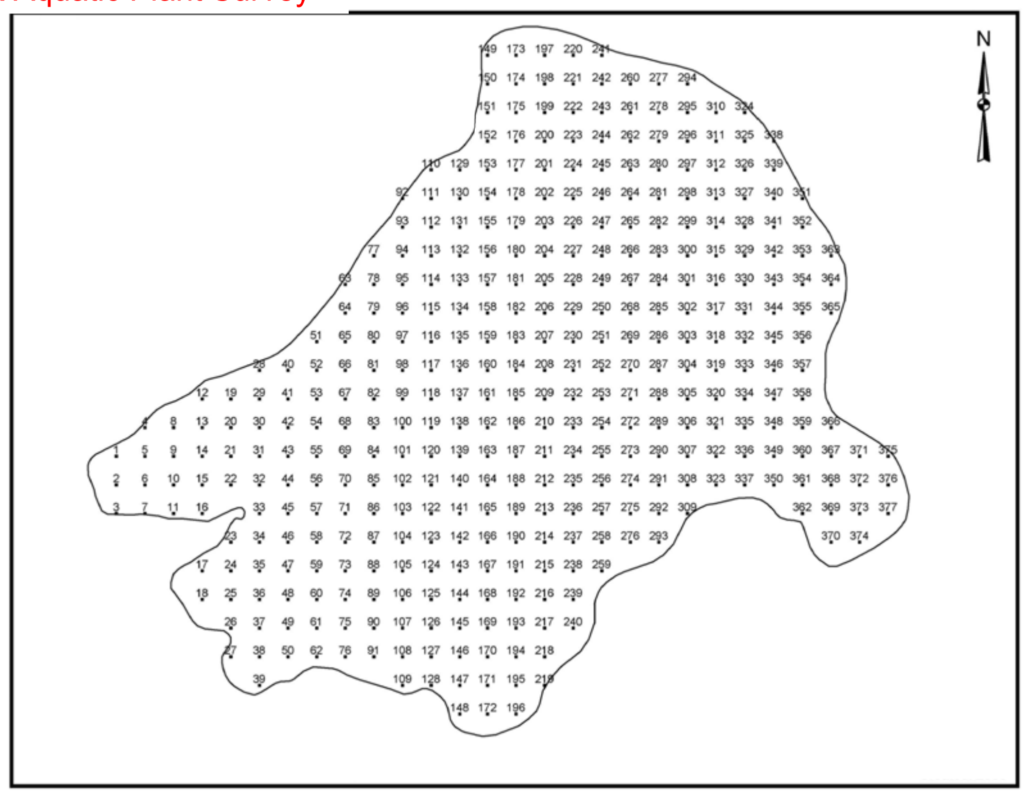


Stuckenia pectinata (Sago Pondweed)

Figure 8c: 2010 WDNR Aquatic Plant Survey



Elodea sp. (Waterweed)



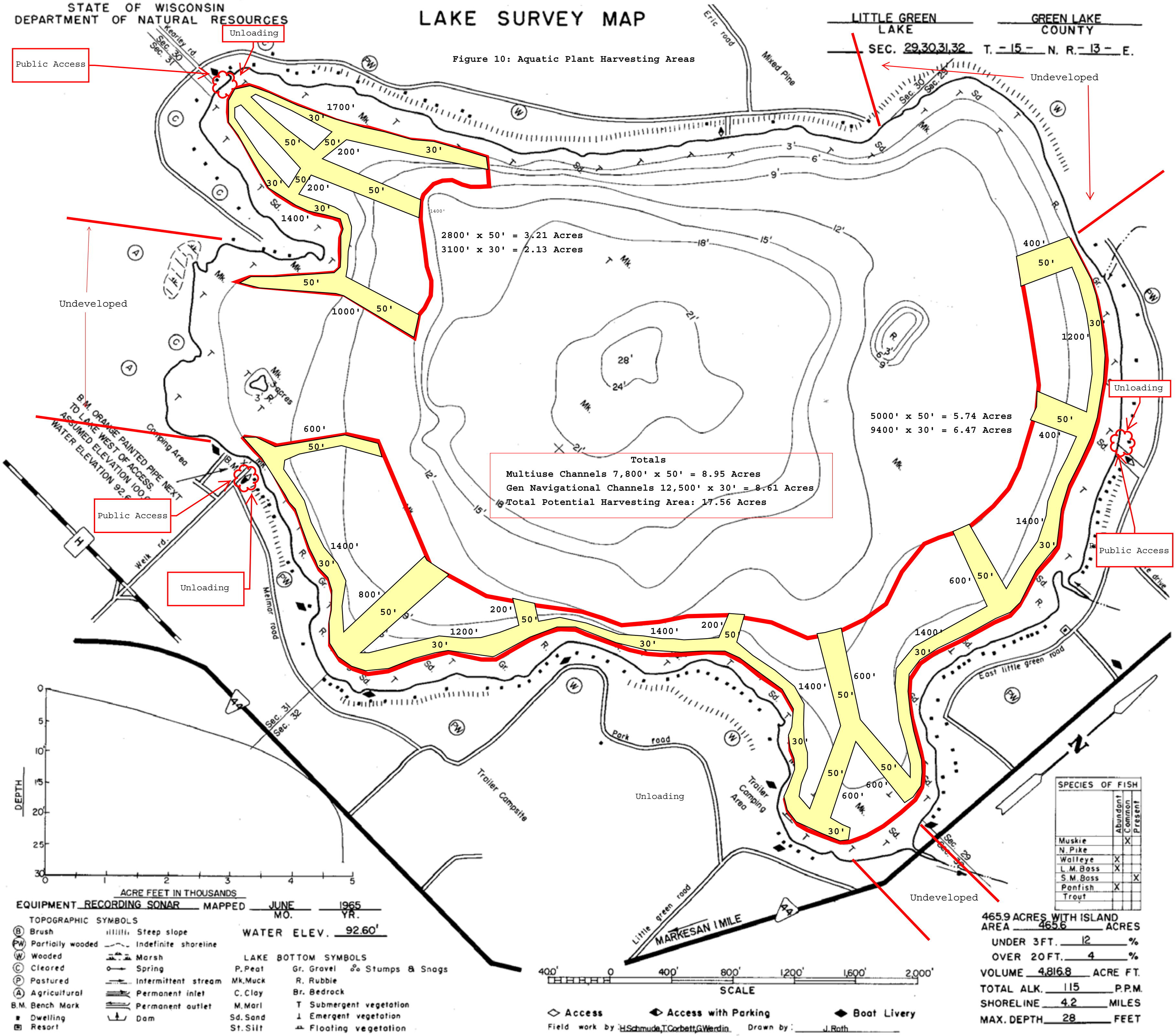


Figure 10: Aquatic Plant Harvesting Areas

TABLES

Table 1: Taxa Detected During 2005 - 2010 WDNR Aquatic Plant Survey's, Little Green Lake, Green Lake County, Wisconsin

Genus	Species	ID	Common Name	Category
Ceratophyllum	*demersum*	1	Coontail	Submersed
Chara	*spp.*	2	Muskgrasse	Submersed
Elodea	*canadensis or spp.*	3	Elodea	Submersed
Elodea	*nuttallii*	4	Slender waterweed	Submersed
Heteranthera	*dubia*	5	Water star-grass	Submersed
Lemna	*minor*	6	Small Duckweed	Free Floating
Lemna	*trisulca*	7	Forked Duckweed	Free Floating
Myriophyllum	*spicatum*	8	Eurasian watermilfoil	Submersed
Myriophyllum	*sibericum*	9	Northern watermilfoil	Submersed
Myriophyllum	*spicatum X sibericum*	10	Hybrid watermilfoil	Submersed
Najas	*flexilis*	11	Bushy Pondweed	Submersed
Nuphar	*variegata*	12	Spatterdock	Floating-Leaf
Potamogeton	*crispus*	13	Curlyleaf Pondweed	Submersed
Stuckenia	*pectinata*	14	Sago Pondweed	Submersed
filamentous algae		15	filamentous algae	Algae
Nyphaea	*odorata*	Visual - Boat Survey	White water lily	Floating-Leaf
Typha	*sp.*	Visual - Boat Survey	Cattail	Emergent
Sparganium	*eurycarpum*	Visual - Boat Survey	Common Bur-Reed	Emergent

Table 2 : Aquatic Plant Community Statistics, Little Green Lake, Green Lake County, Wisconsin

Aquatic Plant Community Statistics	June 22, 2005	July 31 and August 2, 2006	July 5 and 6, 2007	July 2, 2008	June 30, 2009	June 30, 2010
Frequency of Occurrence (Percent Vegetated Intercept Points)	67.44	73.14	53.4	56.3	62.6	58
Simpson Diversity Index	0.75	0.79	0.79	0.79	0.81	0.82
Maximum Depth of Plants (Feet)	16	20	16	15	13	15.5
Taxonomic Richness (Number Taxa)	7	11	11	13	12	12
Mean Intercept Point Taxonomic Richness (Taxa/Intercept Point) shallower than max depth	1.28	1.98	1.29	1.27	1.64	1.73
Mean Intercept Point **Native** Taxonomic Richness (Taxa/Intercept Point) shallower than max depth	0.45	1.42	1.13	1.05	1.22	1.27
Mean Intercept Point Taxonomic Richness (Taxa/Intercept Point) vegetated points only	---	2.71	2.38	2.26	2.62	2.98
Mean Intercept Point **Native** Taxonomic Richness (Native Taxa/Intercept Point) vegetated points only	---	2.43	2.12	1.91	2.11	2.38

Table 3: 2005 Aquatic Plant Taxa-Specific Statistics, Little Green Lake, Green Lake County, Wisconsin

Species ID	Genus	Species	Common Name	Number of Intercept Points Where Detected	Visual Sightings	Frequency of Occurrence (Shallower than max depth)	Frequency of Occurrence (Within vegetated areas)	Relative Frequency of Occurrence	Average Density
1	*Ceratophyllum*	*demersum*	Coontail	44	1	17.1%	25.3%	13.4%	---
2	*Chara*	*spp.*	Muskgrasse	5	---	1.9%	2.8%	1.5%	---
3	*Elodea*	*canadensis or spp.*	Elodea	50	---	19.4%	28.7%	15.2%	---
4	*Elodea*	*nuttallii*	Slender waterweed	---	---	---	---	---	---
5	*Heteranthera*	*dubia*	Water star-grass	0	1	0.0%	0.0%	0.0%	---
6	*Lemna*	*minor*	Small Duckweed	0	1	0.0%	0.0%	0.0%	---
7	*Lemna*	*trisulca*	Forked Duckweed	14	1	8.0%	5.4%	4.3%	---
8	*Myriophyllum*	*spicatum*	Eurasian watermilfoil	---	---	---	---	---	---
9	*Myriophyllum*	*sibericum*	Northern watermilfoil	---	---	---	---	---	---
10	*Myriophyllum*	*spicatum X sibericum*	Hybrid watermilfoil	119	7	46.1%	68.4%	36.2%	
11	*Najas*	*flexilis*	Bushy Pondweed	---	---	---	---	---	---
12	*Nuphar*	*variegata*	Spatterdock	---	---	---	---	---	---
13	*Potamogeton*	*crispus*	Curlyleaf Pondweed	93	2	36.0%	53.4%	28.3%	---
14	*Stuckenia*	*pectinata*	Sago Pondweed	3	3	1.6%	2.3%	1.2%	---
15	*filamentous algae*			---	---	---	---	---	---

* 377 Sample Points

Table 4: 2006 Aquatic Plant Taxa-Specific Statistics, Little Green Lake, Green Lake County, Wisconsin

Species ID	Genus	Species	Common Name	Number of Intercept Points Where Detected	Visual Sightings	Frequency of Occurrence (Shallower than max depth)	Frequency of Occurrence (Within vegetated areas)	Relative Frequency of Occurrence	Average Density
1	*Ceratophyllum*	*demersum*	Coontail	140	2	45.3%	62.0%	22.9%	2.0
2	*Chara*	*spp.*	Muskgrasse	9	---	2.9%	4.0%	1.5%	2.0
3	*Elodea*	*canadensis or spp.*	Elodea	205	1	66.3%	90.7%	33.5%	2.0
4	*Elodea*	*nuttallii*	Slender waterweed	---	---	---	---	---	---
5	*Heteranthera*	*dubia*	Water star-grass	---	1	---	---	---	---
6	*Lemna*	*minor*	Small Duckweed	4	7	1.3%	1.8%	0.7%	1.0
7	*Lemna*	*trisulca*	Forked Duckweed	32	---	10.4%	14.2%	5.2%	1.0
8	*Myriophyllum*	*spicatum*	Eurasian watermilfoil	55	4	17.8%	24.3%	9.0%	1.0
9	*Myriophyllum*	*sibericum*	Northern watermilfoil	---	---	---	---	---	---
10	*Myriophyllum*	*spicatum X sibericum*	Hybrid watermilfoil	---	---	---	---	---	---
11	*Najas*	*flexilis*	Bushy Pondweed	1	---	0.3%	0.4%	1.1%	1.0
12	*Nuphar*	*variegata*	Spatterdock	---	1	---	---	---	---
13	*Potamogeton*	*crispus*	Curlyleaf Pondweed	8	2	2.6%	3.5%	1.3%	2.0
14	*Stuckenia*	*pectinata*	Sago Pondweed	7	5	2.3%	3.1%	1.1%	1.0
15	*filamentous algae*			112	2	36.3%	49.6%	18.3%	1.0

* 377 Sample Points

Table 5: 2007 Aquatic Plant Taxa-Specific Statistics, Little Green Lake, Green Lake County, Wisconsin

Species ID	Genus	Species	Common Name	Number of Intercept Points Where Detected	Visual Sightings	Frequency of Occurrence (Shallower than max depth)	Frequency of Occurrence (Within vegetated areas)	Relative Frequency of Occurrence	Average Density
1	*Ceratophyllum*	*demersum*	Coontail	129	---	46.7%	86.6%	36.3%	1.3
2	*Chara*	*spp.*	Muskgrasse	12	---	4.4%	8.1%	3.4%	1.4
3	*Elodea*	*canadensis or spp.*	Elodea	75	---	27.2%	50.3%	21.1%	1.1
4	*Elodea*	*nuttallii*	Slender waterweed	---	---	---	---	---	---
5	*Heteranthera*	*dubia*	Water star-grass	---	1	---	---	---	---
6	*Lemna*	*minor*	Small Duckweed	4	12	1.5%	2.7%	1.1%	1.0
7	*Lemna*	*trisulca*	Forked Duckweed	38	---	13.8%	25.5%	10.7%	1.0
8	*Myriophyllum*	*spicatum*	Eurasian watermilfoil	5	1	1.8%	3.4%	1.4%	1.2
9	*Myriophyllum*	*sibericum*	Northern watermilfoil	16	---	5.8%	10.7%	4.5%	1.1
10	*Myriophyllum*	*spicatum X sibericum*	Hybrid watermilfoil	17	---	6.2%	11.4%	4.8%	1.0
11	*Najas*	*flexilis*	Bushy Pondweed	---	---	---	---	---	---
12	*Nuphar*	*variegata*	Spatterdock	---	---	---	---	---	---
13	*Potamogeton*	*crispus*	Curlyleaf Pondweed	22	---	8.0%	14.8%	6.2%	1.0
14	*Stuckenia*	*pectinata*	Sago Pondweed	3	---	1.1%	2.0%	0.8%	1.0
15	*filamentous algae*			34	---	12.3%	22.8%	9.6%	1.0

* 377 Sample Points

Table 6: 2008 Aquatic Plant Taxa-Specific Statistics, Little Green Lake, Green Lake County, Wisconsin

Species ID	Genus	Species	Common Name	Number of Intercept Points Where Detected	Visual Sightings	Frequency of Occurrence (Shallower than max depth)	Frequency of Occurrence (Within vegetated areas)	Relative Frequency of Occurrence	Average Density
1	*Ceratophyllum*	*demersum*	Coontail	72	---	37.9%	67.3%	29.8%	0.0
2	*Chara*	*spp.*	Muskgrasse	3	---	1.6%	2.9%	1.2%	1.0
3	*Elodea*	*canadensis or spp.*	Elodea	13	---	6.8%	12.2%	5.4%	1.1
4	*Elodea*	*nuttallii*	Slender waterweed	9	---	4.7%	8.4%	3.7%	1.0
5	*Heteranthera*	*dubia*	Water star-grass	---	---	---	---	---	---
6	*Lemna*	*minor*	Small Duckweed	5	---	2.6%	4.7%	2.1%	1.0
7	*Lemna*	*trisulca*	Forked Duckweed	15	---	7.9%	14.0%	6.2%	1.0
8	*Myriophyllum*	*spicatum*	Eurasian watermilfoil	16	10	8.4%	15.0%	6.6%	1.3
9	*Myriophyllum*	*sibericum*	Northern watermilfoil	3	---	1.7%	2.8%	1.2%	1.0
10	*Myriophyllum*	*spicatum X sibericum*	Hybrid watermilfoil	---	---	---	---	---	---
11	*Najas*	*flexilis*	Bushy Pondweed	1	---	0.5%	0.9%	0.4%	1.0
12	*Nuphar*	*variegata*	Spatterdock	---	---	---	---	---	---
13	*Potamogeton*	*crispus*	Curlyleaf Pondweed	27	---	14.2%	25.2%	11.2%	1.0
14	*Stuckenia*	*pectinata*	Sago Pondweed	4	---	2.1%	3.7%	1.7%	1.0
15	*filamentous algae*			73	---	38.4%	68.2%	30.2%	1.3

* 377 Sample Points

Table 7: 2009 Aquatic Plant Taxa-Specific Statistics, Little Green Lake, Green Lake County, Wisconsin

Species ID	Genus	Species	Common Name	Number of Intercept Points Where Detected	Visual Sightings	Frequency of Occurrence (Shallower than max depth)	Frequency of Occurrence (Within vegetated areas)	Relative Frequency of Occurrence	Average Density
1	*Ceratophyllum*	*demersum*	Coontail	71	1	35.0%	55.9%	21.3%	1.8
2	*Chara*	*spp.*	Muskgrasse	11	---	5.4%	8.7%	3.3%	1.6
3	*Elodea*	*canadensis or spp.*	Elodea	103	1	50.7%	81.1%	30.9%	1.8
4	*Elodea*	*nuttallii*	Slender waterweed	---	---	---	---	---	---
5	*Heteranthera*	*dubia*	Water star-grass	2	2	1.0%	1.6%	0.6%	1.5
6	*Lemna*	*minor*	Small Duckweed	5	---	2.5%	3.9%	1.5%	1.0
7	*Lemna*	*trisulca*	Forked Duckweed	24		11.8%	18.9%	7.2%	1.1
8	*Myriophyllum*	*spicatum*	Eurasian watermilfoil	62	5	30.5%	48.8%	18.6%	1.3
9	*Myriophyllum*	*sibericum*	Northern watermilfoil	5	---	2.5%	3.9%	1.5%	1.0
10	*Myriophyllum*	*spicatum X sibericum*	Hybrid watermilfoil	---	---	---	---	---	---
11	*Najas*	*flexilis*	Bushy Pondweed	3	---	1.5%	2.4%	0.9%	1.0
12	*Nuphar*	*variegata*	Spatterdock	---	---	---	---	---	---
13	*Potamogeton*	*crispus*	Curlyleaf Pondweed	24	2	11.8%	18.9%	7.2%	1.0
14	*Stuckenia*	*pectinata*	Sago Pondweed	4	3	2.0%	3.2%	1.2%	1.0
15	*filamentous algae*			19	1	9.4%	15.0%	5.7%	1.4

* 377 Sample Points

Table 8: 2010 Aquatic Plant Taxa-Specific Statistics, Little Green Lake, Green Lake County, Wisconsin

Species ID	Genus	Species	Common Name	Number of Intercept Points Where Detected	Visual Sightings	Frequency of Occurrence (Shallower than max depth)	Frequency of Occurrence (Within vegetated areas)	Relative Frequency of Occurrence	Average Density
1	*Ceratophyllum*	*demersum*	Coontail	92	---	37.4%	64.3%	21.6%	1.59
2	*Chara*	*spp.*	Muskgrasse	6	---	2.4%	4.2%	1.4%	1.33
3	*Elodea*	*canadensis or spp.*	Elodea	118	---	48.0%	82.5%	27.7%	1.62
4	*Elodea*	*nuttallii*	Slender waterweed	---	---	---	---	---	---
5	*Heteranthera*	*dubia*	Water star-grass	7	---	2.9%	4.9%	1.6%	1.14
6	*Lemna*	*minor*	Small Duckweed	4	---	2	3	1	1.25
7	*Lemna*	*trisulca*	Forked Duckweed	34		13.8%	23.8%	8.0%	1.15
8	*Myriophyllum*	*spicatum*	Eurasian watermilfoil	74	2	30.1%	51.8%	17.4%	1.34
9	*Myriophyllum*	*sibericum*	Northern watermilfoil	2	---	0.8%	1.4%	0.5%	1.00
10	*Myriophyllum*	*spicatum X sibericum*	Hybrid watermilfoil	---	---	---	---	---	---
11	*Najas*	*flexilis*	Bushy Pondweed	1	---	0.4%	0.7%	0.2%	1.00
12	*Nuphar*	*variegata*	Spatterdock	---	---	---	---	---	---
13	*Potamogeton*	*crispus*	Curlyleaf Pondweed	40	1	16.3%	28.0%	9.4%	1.13
14	*Stuckenia*	*pectinata*	Sago Pondweed	2	2	0.8%	1.4%	0.5%	1.00
15	*filamentous algae*			46	---	18.7%	32.2%	10.8%	1.07

* 377 Sample Points

Table 9: Floristic Quality Index, Little Green Lake, Green Lake County, Wisconsin

June 22, 2005

Species	Common Name	Coefficient of Conservatism C	Present	Coefficient of Conservatism C
Ceratophyllum demersum	Coontail	3	1	3
Chara	Muskgrasses	7	1	7
Elodea canadensis	Common waterweed	3	1	3
Elodea nuttallii	Slender waterweed	7	0	0
Lemna minor	Small duckweed	5	1	5
Lemna trisulca	Forked Duckweed	6	1	6
Myriophyllum sibericum	Northern water-milfoil	7	0	0
Najas flexilis	Bushy pondweed	6	0	0
Nuphar variegata	Spatterdock	6	0	0
Nymphaea odorata	White water lily	6	0	0
Sparganium eurycarpum	Common bur-reed	5	0	0
Stuckenia pectinata	Sago pondweed	3	1	3
Typha latifolia	Broad-leaved cattail	1	0	0
Zosterella dubia	Water star-grass	6	1	6

N 7
Mean C 4.71
Floristic Quality Index (FQI) 12.47

July 31 and August 2, 2006

Species	Common Name	Coefficient of Conservatism C	Present	Coefficient of Conservatism C
Ceratophyllum demersum	Coontail	3	1	3
Chara	Muskgrasses	7	1	7
Elodea canadensis	Common waterweed	3	1	3
Elodea nuttallii	Slender waterweed	7	0	0
Lemna minor	Small duckweed	5	1	5
Lemna trisulca	Forked Duckweed	6	1	6
Myriophyllum sibericum	Northern water-milfoil	7	0	0
Najas flexilis	Bushy pondweed	6	1	6
Nuphar variegata	Spatterdock	6	1	6
Nymphaea odorata	White water lily	6	0	0
Sparganium eurycarpum	Common bur-reed	5	0	0
Stuckenia pectinata	Sago pondweed	3	1	3
Typha latifolia	Broad-leaved cattail	1	0	0
Zosterella dubia	Water star-grass	6	1	6

N 9
Mean C 5.00
Floristic Quality Index (FQI) 15.00

July 5 and 6, 2007

Species	Common Name	Coefficient of Conservatism C	Present	Coefficient of Conservatism C
Ceratophyllum demersum	Coontail	3	1	3
Chara	Muskgrasses	7	1	7
Elodea canadensis	Common waterweed	3	1	3
Elodea nuttallii	Slender waterweed	7	0	0
Lemna minor	Small duckweed	5	1	5
Lemna trisulca	Forked Duckweed	6	1	6
Myriophyllum sibericum	Northern water-milfoil	7	1	7
Najas flexilis	Bushy pondweed	6	0	0
Nuphar variegata	Spatterdock	6	1	6
Nymphaea odorata	White water lily	6	1	6
Sparganium eurycarpum	Common bur-reed	5	0	0
Stuckenia pectinata	Sago pondweed	3	1	3
Typha latifolia	Broad-leaved cattail	1	0	0
Zosterella dubia	Water star-grass	6	0	0

N 9
Mean C 5.11
Floristic Quality Index (FQI) 15.33

July 2, 2008

Species	Common Name	Coefficient of Conservatism C	Present	Coefficient of Conservatism C
Ceratophyllum demersum	Coontail	3	1	3
Chara	Muskgrasses	7	1	7
Elodea canadensis	Common waterweed	3	1	3
Elodea nuttallii	Slender waterweed	7	1	7
Lemna minor	Small duckweed	5	1	5
Lemna trisulca	Forked Duckweed	6	1	6
Myriophyllum sibericum	Northern water-milfoil	7	1	7
Najas flexilis	Bushy pondweed	6	1	6
Nuphar variegata	Spatterdock	6	1	6
Nymphaea odorata	White water lily	6	1	6
Sparganium eurycarpum	Common bur-reed	5	0	0
Stuckenia pectinata	Sago pondweed	3	1	3
Typha latifolia	Broad-leaved cattail	1	0	0
Zosterella dubia	Water star-grass	6	0	0

N 11
Mean C 5.36
Floristic Quality Index (FQI) 17.79

June 30, 2009

Species	Common Name	Coefficient of Conservatism C	Present	Coefficient of Conservatism C
Ceratophyllum demersum	Coontail	3	1	3
Chara	Muskgrasses	7	1	7
Elodea canadensis	Common waterweed	3	1	3
Elodea nuttallii	Slender waterweed	7	0	0
Lemna minor	Small duckweed	5	1	5
Lemna trisulca	Forked Duckweed	6	1	6
Myriophyllum sibericum	Northern water-milfoil	7	1	7
Najas flexilis	Bushy pondweed	6	1	6
Nuphar variegata	Spatterdock	6	1	6
Nymphaea odorata	White water lily	6	1	6
Sparganium eurycarpum	Common bur-reed	5	1	5
Stuckenia pectinata	Sago pondweed	3	1	3
Typha latifolia	Broad-leaved cattail	1	1	1
Zosterella dubia	Water star-grass	6	1	6

N 13
Mean C 4.92
Floristic Quality Index (FQI) 17.75

June 30, 2010

Species	Common Name	Coefficient of Conservatism C	Present	Coefficient of Conservatism C
Ceratophyllum demersum	Coontail	3	1	3
Chara	Muskgrasses	7	1	7
Elodea canadensis	Common waterweed	3	1	3
Elodea nuttallii	Slender waterweed	7	0	0
Lemna minor	Small duckweed	5	1	5
Lemna trisulca	Forked Duckweed	6	1	6
Myriophyllum sibericum	Northern water-milfoil	7	1	7
Najas flexilis	Bushy pondweed	6	1	6
Nuphar variegata	Spatterdock	6	1	6
Nymphaea odorata	White water lily	6	1	6
Sparganium eurycarpum	Common bur-reed	5	1	5
Stuckenia pectinata	Sago pondweed	3	1	3
Typha latifolia	Broad-leaved cattail	1	1	1
Zosterella dubia	Water star-grass	6	1	6

N 13
Mean C 4.92
Floristic Quality Index (FQI) 17.75

Table 10 : Milfoil spp., CLP, Coontail, and Elodea Community Statistics, Little Green Lake, Green Lake County, Wisconsin

Aquatic Plant Community Statistics	June 22, 2005	July 31 and August 2, 2006	July 5 and 6, 2007	July 2, 2008	June 30, 2009	June 30, 2010
Frequency of Occurrence (Percent Vegetated Intercept Points)	67.44	73.14	53.4	56.3	62.6	58
Simpson Diversity Index	0.75	0.79	0.79	0.79	0.81	0.82
Maximum Depth of Plants (Feet)	16	20	16	15	13	15.5
Taxonomic Richness (Number Taxa)	7	11	11	13	12	12
Milfoil spp. (Frequency of Occurance in areas shallower than max depth)	46.1%	17.8%	6.2%	8.4%	30.5%	30.1%
CLP (Frequency of Occurance in areas shallower than max depth)	36.0%	2.6%	8.0%	14.2%	11.8%	16.3%
Coontail (Frequency of Occurance in areas shallower than max depth)	17.1%	45.3%	46.7%	37.9%	35.0%	37.4%
Elodea (Frequency of Occurance in areas shallower than max depth)	19.4%	66.3%	27.2%	6.8%	50.7%	48.0%

APPENDIX A

2005-2010 WDNR AQUATIC PLANT SURVEY STATISTICS

Survey Date June 22, 2005

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1		**STATS**	Total vegetation	*Myriophyllum spicatum* ,Eurasian water m	*Potamogeton crispus* ,Curly-leaf pondwee	*Myriphyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed	sp2	sp3	sp4
2	Little Green Lake	**INDIVIDUAL SPECIES STATS:**														
3	Green Lake County	**Frequency of occurrence within vegetated areas (%)**		0.0	53.4	68.4	25.287	2.8736	0	0	8.046	2.2989	28.736	0	0	0
4	WBIC: 162500	**Frequency of occurrence at sites shallower than maximum depth of plants**		0.0	36.0	46.1	17.054	1.938	0	0	5.4264	1.5504	19.38	0	0	0
5		**Relative Frequency (%)**		0.0	28.3	36.2	13.4	1.5	0.0	0.0	4.3	1.2	15.2	0.0	0.0	0.0
6	Survey Date:	Relative Frequency (squared)	0.25	0.0	0.1	0.1	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
7	06.22.2005 KW TA	**Number of sites where species found**		0	93	119	44	5	0	0	14	4	50	0	0	0
8		**# visuals**			2	7	1		1	1	1	3				
9		**present (visual or collected)**			present	present	present	present	present	present	present	present	present			
10		**Average Rake Fullness (EWM, CLP only)**			1.0	1.4										
11																
12		**SUMMARY STATS:**														
13		**Total number of points sampled**	**272**													
14		**Total number of sites with vegetation**	**174**													
15		**Total number of sites shallower than maximum depth of plants**	**258**													
16		**Frequency of occurrence at sites shallower than maximum depth of plants**	**67.44**													
17		**Simpson Diversity Index**	**0.75**													
18		**Maximum depth of plants (ft)**	**16.00**													
19		**Number of sites sampled using rake on Rope (R)**	**11**													
20		**Number of sites sampled using rake on Pole (P)**	**261**													
21		**Average number of species per site**	**1.28**													
22		**Average number of native species per site**	**0.45**													
23		**Species Richness**	**7**													
24		**Species Richness (including visuals)**	**9**													
25																
26		**MAX DEPTH VERIFIED**	**16.00**													

Survey Date July 31 and August 2, 2006

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1		**STATS**	Total vegetation	*Myriophyllum spicatum*, Eurasian water mil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum sp.**, Water milfoil	*Elodea sp.***, Waterweed	sp3	sp4
2	**Lake Name**	Little Green																
3	**County**	Green Lake																
4	**WBIC**	162500																
5	**Survey Date**	07/31 & 08/02/2006																
6		**INDIVIDUAL SPECIES STATS:**																
7		**Frequency of occurrence within vegetated areas (%)**		24.34	3.54	49.56	61.95	3.98		1.77	14.16	0.44		3.10	17.26	90.71		
8		**Frequency of occurrence at sites shallower than maximum depth of plants**		17.80	2.59	36.25	45.31	2.91		1.29	10.36	0.32		2.27	12.62	66.34		
9		**Relative Frequency (%)**		9.0	1.3	18.3	22.9	1.5		0.7	5.2	0.2		1.1	6.4	33.5		
10		Relative Frequency (squared)	0.21	0.01	0.00	0.03	0.05	0.00		0.00	0.00	0.00		0.00	0.00	0.11		
11		**Number of sites where species found**		55	8	112	140	9		4	32	1		7	39	205		
12		**Average Rake Fullness**		1	2	1	2	2		1	1	1		1	1	2		
13		**#visual sightings**		4	2	2	2		1	7	3		1	5		1		
14		**present (visual or collected)**		present	present	present	present	present	present	present	present	present	present	present	present	present		
15																		
16		**SUMMARY STATS:**																
17		**Total number of points sampled**	**317**															
18		**Total number of sites with vegetation**	**226**															
19		**Total number of sites shallower than maximum depth of plants**	**309**															
20		**Frequency of occurrence at sites shallower than maximum depth of plants**	**73.14**															
21		**Simpson Diversity Index**	**0.79**															
22		**Maximum depth of plants (ft)**	**20.00**															
23		**Number of sites sampled using rake on Rope (R)**	**40**															
24		**Number of sites sampled using rake on Pole (P)**	**273**															
25		**Average number of all species per site (shallower than max depth)**	**1.98**															
26		**Average number of all species per site (veg. sites only)**	**2.71**															
27		**Average number of native species per site (shallower than max depth)**	**1.42**															
28		**Average number of native species per site (veg. sites only)**	**2.43**															
29		**Species Richness**	**11**															
30		**Species Richness (including visuals)**	**13**															
31																		
32																		

Survey Date: July 5 and 6, 2007

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1		**STATS**	Total vegetation	*Myriophyllum spicatum X sibericum* , Hybri	*Myriophyllum spicatum* ,Eurasian water mi	*Potamogeton crispus* ,Curly-leaf pondweed	filamentous algae	Ceratophyllum demersum, Coontail	Chara, Muskgrasses	Lemna minor, Small duckweed	Lemna trisulca, Forked duckweed	Myriophyllum sibiricum, Northern water milfoil	Stuckenia pectinata, Sago pondweed	Elodea sp., Waterweed	sp3	sp4
2	**Lake**	Little Green														
3	**County**	Green Lake														
4	**WBIC**	162500														
5	**Date**	7/5/2007 - 7/6/2007														
6		**INDIVIDUAL SPECIES STATS:**														
7		**Frequency of occurrence within vegetated areas (%)**		11.41	3.36	14.77	22.82	86.58	8.05	2.68	25.50	10.74	2.01	50.34		
8		**Frequency of occurrence at sites shallower than maximum depth of plants**		6.16	1.81	7.97	12.32	46.74	4.35	1.45	13.77	5.80	1.09	27.17		
9		**Relative Frequency (%)**		4.8	1.4	6.2	9.6	36.3	3.4	1.1	10.7	4.5	0.8	21.1		
10		Relative Frequency (squared)	0.21	0.00	0.00	0.00	0.01	0.13	0.00	0.00	0.01	0.00	0.00	0.04		
11		**Number of sites where species found**		17	5	22	34	129	12	4	38	16	3	75		
12		**Average Rake Fullness**	1.36	1.00	1.20	1.00	1.03	1.30	1.42	1.00	1.03	1.06	1.00	1.09		
13		**#visual sightings**			1					12						
14		**present (visual or collected)**		present	present	present	present	present	present	present	present	present	present	present		
15																
16		**EXOTICS SPECIES STATS:**														
17		**# at surface**			0	0										
18		**# within 1 ft of surface**			0	0										
19		**# > 1 ft from surface**			6	22										
20		**# sparse**			1	0										
21		**# dense**			0	0										
22		**# unknown**			5	22										
23																
24		**SUMMARY STATS:**														
25		**Total number of points sampled**	**312**													
26		**Total number of sites with vegetation**	**149**													
27		**Total number of sites shallower than maximum depth of plants**	**276**													
28		**Frequency of occurrence at sites shallower than maximum depth of plants**	**53.99**													
29		**Simpson Diversity Index**	**0.79**													
30		**Maximum depth of plants (ft)**	**16.00**													
31		**Number of sites sampled using rake on Rope (R)**	**29**													
32		**Number of sites sampled using rake on Pole (P)**	**253**													
33		**Average number of all species per site (shallower than max depth)**	**1.29**													
34		**Average number of all species per site (veg. sites only)**	**2.38**													
35		**Average number of native species per site (shallower than max depth)**	**1.13**													
36		**Average number of native species per site (veg. sites only)**	**2.12**													
37		**Species Richness**	**11**													
38		**Species Richness (including visuals)**	**11**													

Survey Date: July 2, 2008

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1		**STATS**	Total vegetation	*Myriophyllum spicatum* ,Eurasian water mil	*Potamogeton crispus* ,Curly-leaf pondweed	filamentous algae	Ceratophyllum demersum, Coontail	Chara, Muskgrasses	Elodea canadensis, Common waterweed	Elodea nuttallii, Slender waterweed	Lemna minor, Small duckweed	Lemna trisulca, Forked duckweed	moss	Myriophyllum sibiricum, Northern water milfoil	Najas flexilis, Bushy pondweed	Stuckenia pectinata, Sago pondweed	sp6	sp7	sp8
2	**Lake**	Little Green																	
3	**County**	Green Lake																	
4	**WBIC**	162500																	
5	**Survey Date**	07/02/08																	
6		**INDIVIDUAL SPECIES STATS:**																	
7		**Frequency of occurrence within vegetated areas (%)**		14.95	25.23	68.22	67.29	2.80	12.15	8.41	4.67	14.02	0.93	2.80	0.93	3.74			
8		**Frequency of occurrence at sites shallower than maximum depth of plants**		8.42	14.21	38.42	37.89	1.58	6.84	4.74	2.63	7.89	0.53	1.58	0.53	2.11			
9		**Relative Frequency (%)**		6.6	11.2	30.2	29.8	1.2	5.4	3.7	2.1	6.2	0.4	1.2	0.4	1.7			
10		Relative Frequency (squared)	0.21	0.00	0.01	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
11		**Number of sites where species found**		16	27	73	72	3	13	9	5	15	1	3	1	4			
12		**Average Rake Fullness**	1.26	1.31	1.00	1.25	1.29	1.00	1.08	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
13		**#visual sightings**		10															
14		**present (visual or collected)**		present	present	present	present	present	present	present	present	present	present	present	present	present			
15																			
16		**EXOTICS SPECIES STATS:**																	
17		**# at surface**		18	4														
18		**# within 1 ft of surface**		0	0														
19		**# > 1 ft from surface**		8	23														
20		**# sparse**		2	0														
21		**# dense**		16	5														
22		**# unknown**		8	22														
23																			
24		**SUMMARY STATS:**																	
25		**Total number of points sampled**	**198**																
26		**Total number of sites with vegetation**	**107**																
27		**Total number of sites shallower than maximum depth of plants**	**190**																
28		**Frequency of occurrence at sites shallower than maximum depth of plants**	**56.32**																
29		**Simpson Diversity Index**	**0.79**																
30		**Maximum depth of plants (ft)**	**15.00**																
31		**Number of sites sampled using rake on Rope (R)**	**0**																
32		**Number of sites sampled using rake on Pole (P)**	**191**																
33		**Average number of all species per site (shallower than max depth)**	**1.27**																
34		**Average number of all species per site (veg. sites only)**	**2.26**																
35		**Average number of native species per site (shallower than max depth)**	**1.05**																
36		**Average number of native species per site (veg. sites only)**	**1.91**																
37		**Species Richness**	**13**																
38		**Species Richness (including visuals)**	**13**																

Survey Date: June 30, 2009

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		**STATS**	Total vegetation	*Myriophyllum spicatum*, Eurasian water mil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp3	sp4
2	**Lake**	Little Green Lake															
3	**County**	Green Lake															
4	**WBIC**	162500															
5	**Survey Date**	06/30/09															
6		**INDIVIDUAL SPECIES STATS:**															
7		**Frequency of occurrence within vegetated areas (%)**		48.82	18.90	14.96	55.91	8.66	1.57	3.94	18.90	3.94	2.36	3.15	81.10		
8		**Frequency of occurrence at sites shallower than maximum depth of plants**		30.54	11.82	9.36	34.98	5.42	0.99	2.46	11.82	2.46	1.48	1.97	50.74		
9		**Relative Frequency (%)**		18.6	7.2	5.7	21.3	3.3	0.6	1.5	7.2	1.5	0.9	1.2	30.9		
10		Relative Frequency (squared)	0.19	0.03	0.01	0.00	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.10		
11		**Number of sites where species found**		62	24	19	71	11	2	5	24	5	3	4	103		
12		**Average Rake Fullness**	1.94	1.27	1.04	1.42	1.82	1.55	1.50	1.00	1.08	1.00	1.00	1.00	1.76		
13		**#visual sightings**		5	2	1	1		2					3	1		
14		**present (visual or collected)**		present	present	present	present	present	present	present	present	present	present	present	present		
15																	
16		**EXOTICS SPECIES STATS:**															
17		**# at surface**		5	1												
18		**# within 1 ft of surface**		27	1												
19		**# > 1 ft from surface**		35	24												
20		**# sparse**		26	4												
21		**# dense**		14	0												
22		**# unknown**		27	22												
23																	
24		**SUMMARY STATS:**															
25		**Total number of points sampled**	**249**														
26		**Total number of sites with vegetation**	**127**														
27		**Total number of sites shallower than maximum depth of plants**	**203**														
28		**Frequency of occurrence at sites shallower than maximum depth of plants**	**62.56**														
29		**Simpson Diversity Index**	**0.81**														
30		**Maximum depth of plants (ft)**	**13.00**														
31		**Number of sites sampled using rake on Rope (R)**	**5**														
32		**Number of sites sampled using rake on Pole (P)**	**235**														
33		**Average number of all species per site (shallower than max depth)**	**1.64**														
34		**Average number of all species per site (veg. sites only)**	**2.62**														
35		**Average number of native species per site (shallower than max depth)**	**1.22**														
36		**Average number of native species per site (veg. sites only)**	**2.11**														
37		**Species Richness**	**12**														
38		**Species Richness (including visuals)**	**12**														
39																	
40		**SPECIES RICHNESS INCLUDES FIL. ALGAE**															

Survey Date: June 30, 2010

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1		**STATS**	Total vegetation	*Myriophyllum spicatum*, Eurasian water mi	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	Ceratophyllum demersum, Coontail	Chara, Muskgrasses	Heteranthera dubia, Water star-grass	Lemna minor, Small duckweed	Lemna trisulca, Forked duckweed	Myriophyllum sibiricum, Northern water milfoil	Najas flexilis, Bushy pondweed	Stuckenia pectinata, Sago pondweed	sp1 Elodea sp.	sp2	sp3
2	**Lake**	Little Green															
3	**County**	Green Lake															
4	**WBIC**	162500															
5	**Survey Date**	06/30/10															
6		**INDIVIDUAL SPECIES STATS:**															
7		**Frequency of occurrence within vegetated areas (%)**		51.75	27.97	32.17	64.34	4.20	4.90	2.80	23.78	1.40	0.70	1.40	82.52		
8		**Frequency of occurrence at sites shallower than maximum depth of plants**		30.08	16.26	18.70	37.40	2.44	2.85	1.63	13.82	0.81	0.41	0.81	47.97		
9		**Relative Frequency (%)**		17.4	9.4	10.8	21.6	1.4	1.6	0.9	8.0	0.5	0.2	0.5	27.7		
10		Relative Frequency (squared)	0.18	0.03	0.01	0.01	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.08		
11		**Number of sites where species found**		74	40	46	92	6	7	4	34	2	1	2	118		
12		**Average Rake Fullness**	1.74	1.34	1.13	1.07	1.59	1.33	1.14	1.25	1.15	1.00	1.00	1.00	1.62		
13		**#visual sightings**		2	1									2			
14		**present (visual or collected)**		present	present	present	present	present	present	present	present	present	present	present	present		
15																	
16		**EXOTICS SPECIES STATS:**															
17		**# at surface**		20	0												
18		**# within 1 ft of surface**		21	4												
19		**# > 1 ft from surface**		35	37												
20		**# sparse**		32	7												
21		**# dense**		17	0												
22		**# unknown**		27	34												
23																	
24		**SUMMARY STATS:**															
25		**Total number of sites sampled**	**257**														
26		**Total number of sites with vegetation**	**143**														
27		**Total number of sites shallower than maximum depth of plants**	**246**														
28		**Frequency of occurrence at sites shallower than maximum depth of plants**	**58.13**														
29		**Simpson Diversity Index**	**0.82**														
30		**Maximum depth of plants (ft)**	**15.50**														
31		**Number of sites sampled using rake on Rope (R)**	**0**														
32		**Number of sites sampled using rake on Pole (P)**	**252**														
33		**Average number of all species per site (shallower than max depth)**	**1.73**														
34		**Average number of all species per site (veg. sites only)**	**2.98**														
35		**Average number of native species per site (shallower than max depth)**	**1.27**														
36		**Average number of native species per site (veg. sites only)**	**2.38**														
37		**Species Richness**	**12**														
38		**Species Richness (including visuals)**	**12**														
39																	
40																	

APPENDIX B

2005-2010 WDNR AQUATIC PLANT SURVEY ENTRY DATA

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
2	Little Green Lake	1	43.7356	-88.9969	3.5	M	P				2	1					1				
3	Green Lake County	2	43.7349	-88.9969	3	M	P				1	1					1	1			
4	WBIC: 162500	3	43.7343	-88.9969	2	M	P			1	1	1					1				
5		4	43.7362	-88.996	3.5	M	P				1	1						1			
6	Survey Date:	5	43.7356	-88.996	4.5	M	P				1	1									
7	06.22.2005 KW TA	6	43.7349	-88.9961	4	M	P				1	1									
8		7	43.7343	-88.9961	2	M	P					1									
9	Entered:	8	43.7362	-88.9952	5.5	M	P				1	1						1			
10	10.06.2005 KW	9	43.7356	-88.9952	6	M	P														
11		10	43.7349	-88.9952	5	M	P				2	1									
12		11	43.7343	-88.9952	3	M	P				1	1									
13		12	43.7368	-88.9943	5.5	M	P				2	1									
14		13	43.7362	-88.9943	9.5	M	P				1										
15		14	43.7355	-88.9943	7	M	P														
16		15	43.7349	-88.9943	5	M	P				3	1									
17		16	43.7343	-88.9943	2.5	M	P				2	1									
18		17	43.733	-88.9943				NONNAVIGABLE (PLANTS)			V										
19		18	43.7324	-88.9944				NONNAVIGABLE (PLANTS)			V										
20		19	43.7368	-88.9934	8	M	P			1											
21		20	43.7362	-88.9934	14	M	P														
22		21	43.7355	-88.9934	8	M	P				1										
23		22	43.7349	-88.9934	5	M	P				2	1									
24		23	43.7336	-88.9935	4.5	M	P				3	1				1					
25		24	43.733	-88.9935	4.5	M	P				2	1									
26		25	43.7324	-88.9935	4.5	M	P				2	1				V					
27		26	43.7318	-88.9935	3	M	P				3					1	V				
28		27	43.7311	-88.9935	2.5	M	P			V	2					1	V	1			
29		28	43.7374	-88.9925	8.5	M	P														
30		29	43.7368	-88.9925	15	M	P				1										
31		30	43.7362	-88.9926	13	M	P														
32		31	43.7355	-88.9926	8	M	P														
33		32	43.7349	-88.9926	5.5	M	P				2	1						1			

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
34		33	43.7343	-88.9926	4	R	P				2							1			
35		34	43.7336	-88.9926	6	M	P			1	1										
36		35	43.733	-88.9926	5.5	M	P				2	1				1					
37		36	43.7324	-88.9926	5	M	P			1	3	1				1		1			
38		37	43.7318	-88.9926	4	M	P				2	1				1		1			
39		38	43.7311	-88.9926	3	M	P				2	1			V	1	V	1			
40		39	43.7305	-88.9926				NONNAVIGABLE (PLANTS)			V										
41		40	43.7374	-88.9917	13	M	P			1	1	1									
42		41	43.7368	-88.9917	13	M	P														
43		42	43.7362	-88.9917	12	M	P				1										
44		43	43.7355	-88.9917	12	M	P														
45		44	43.7349	-88.9917	9	M	P			1	1										
46		45	43.7343	-88.9917	9	M	P														
47		46	43.7336	-88.9917	7.5	M	P			1	2					1		1			
48		47	43.733	-88.9917	7	M	P			1		1									
49		48	43.7324	-88.9917	5.5	M	P				2	1									
50		49	43.7317	-88.9918	4.5	M	P				2	1									
51		50	43.7311	-88.9918	4.5	M	P			1	V	1						1			
52		51	43.738	-88.9908	12	M	P				1										
53		52	43.7374	-88.9908	16	M	P														
54		53	43.7368	-88.9908	15	M	P														
55		54	43.7361	-88.9908	12	M	P			1	1										
56		55	43.7355	-88.9908	15	M	P														
57		56	43.7349	-88.9908	15	M	P				1	1						1			
58		57	43.7343	-88.9908	12	M	P														
59		58	43.7336	-88.9909	11	M	P				1										
60		59	43.733	-88.9909	11	M	P				1										
61		60	43.7324	-88.9909	10	M	R														
62		61	43.7317	-88.9909	6.5	M	P														
63		62	43.7311	-88.9909	6	M	P			1	1	1				1		1			
64		63	43.7393	-88.9899	3	M	P						1								
65		64	43.7387	-88.9899	12	M	P				1										

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia*,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca*,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
66		65	43.738	-88.9899	15	M	P														
67		66	43.7374	-88.9899	17	M	P														
68		67	43.7368	-88.9899	14	M	P														
69		68	43.7361	-88.9899	14	M	P														
70		69	43.7355	-88.99	16	M	R														
71		70	43.7349	-88.99	17	M	R														
72		71	43.7342	-88.99	15	M	P														
73		72	43.7336	-88.99	14	M	P														
74		73	43.733	-88.99	12	M	P														
75		74	43.7324	-88.99	9.5	M	P			1											
76		75	43.7317	-88.99	9	M	P			1								1			
77		76	43.7311	-88.99	6.5	M	P			1	1										
78		77	43.7399	-88.989	7.5	S	P				1										
79		78	43.7393	-88.989	14	S	P														
80		79	43.7387	-88.989	17	M	R														
81		80	43.738	-88.989				DEEP													
82		81	43.7374	-88.9891				DEEP													
83		82	43.7368	-88.9891				DEEP													
84		83	43.7361	-88.9891				DEEP													
85		84	43.7355	-88.9891				DEEP													
86		85	43.7349	-88.9891				DEEP													
87		86	43.7342	-88.9891				DEEP													
88		87	43.7336	-88.9891	15	M	P														
89		88	43.733	-88.9891	13	M	P														
90		89	43.7323	-88.9891	11	M	P				1										
91		90	43.7317	-88.9892	10	M	P				1										
92		91	43.7311	-88.9892	8	M	P			1	1										
93		92	43.7412	-88.9881	1.5	S	P			1	1	1		V				1			
94		93	43.7405	-88.9881	6	S	P														
95		94	43.7399	-88.9881	15	M	R														
96		95	43.7393	-88.9882	17	M	R														
97		96	43.7386	-88.9882				DEEP													

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
98		97	43.738	-88.9882				DEEP													
99		98	43.7374	-88.9882				DEEP													
100		99	43.7368	-88.9882				DEEP													
101		100	43.7361	-88.9882				DEEP													
102		101	43.7355	-88.9882				DEEP													
103		102	43.7349	-88.9882				DEEP													
104		103	43.7342	-88.9882				DEEP													
105		104	43.7336	-88.9883				DEEP													
106		105	43.733	-88.9883	14	M	P														
107		106	43.7323	-88.9883	12	M	P														
108		107	43.7317	-88.9883	10	M	P			1											
109		108	43.7311	-88.9883	8	M	P			1	V							1			
110		109	43.7305	-88.9883	4	M	P			1	1										
111		110	43.7418	-88.9872	2.5	S	P				1		1					1			
112		111	43.7412	-88.9873	9.5	S	P			1											
113		112	43.7405	-88.9873	16	M	P				1										
114		113	43.7399	-88.9873	17	M	P														
115		114	43.7393	-88.9873	17	M	R														
116		115	43.7386	-88.9873				DEEP													
117		116	43.738	-88.9873				DEEP													
118		117	43.7374	-88.9873				DEEP													
119		118	43.7367	-88.9873				DEEP													
120		119	43.7361	-88.9873				DEEP													
121		120	43.7355	-88.9873				DEEP													
122		121	43.7349	-88.9874				DEEP													
123		122	43.7342	-88.9874				DEEP													
124		123	43.7336	-88.9874				DEEP													
125		124	43.733	-88.9874	14	M	P														
126		125	43.7323	-88.9874	13	M	P														
127		126	43.7317	-88.9874	11	M	P			1						1					
128		127	43.7311	-88.9874	7.5	M	P			1											
129		128	43.7304	-88.9874	3	S	P			1	2										

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
130		129	43.7418	-88.9864	9	S	P														
131		130	43.7411	-88.9864	15	M	P				1										
132		131	43.7405	-88.9864				DEEP													
133		132	43.7399	-88.9864				DEEP													
134		133	43.7393	-88.9864				DEEP													
135		134	43.7386	-88.9864				DEEP													
136		135	43.738	-88.9864				DEEP													
137		136	43.7374	-88.9864				DEEP													
138		137	43.7367	-88.9865				DEEP													
139		138	43.7361	-88.9865				DEEP													
140		139	43.7355	-88.9865				DEEP													
141		140	43.7348	-88.9865				DEEP													
142		141	43.7342	-88.9865				DEEP													
143		142	43.7336	-88.9865				DEEP													
144		143	43.733	-88.9865	14	M	P														
145		144	43.7323	-88.9865	14	M	P														
146		145	43.7317	-88.9865	13	M	P			1											
147		146	43.7311	-88.9866	9	M	P			1	2							1			
148		147	43.7304	-88.9866	5	S	P				3		1								
149		148	43.7298	-88.9866	3	S	P			1	2							1			
150		149	43.7443	-88.9855				TEMPORARY OBSTACLE													
151		150	43.7437	-88.9855	3	M	P				1										
152		151	43.743	-88.9855	2.5	M	P						1								
153		152	43.7424	-88.9855	7.5	S	P			1	1							1			
154		153	43.7418	-88.9855	14	M	P														
155		154	43.7411	-88.9855	16	M	P														
156		155	43.7405	-88.9855				DEEP													
157		156	43.7399	-88.9855				DEEP													
158		157	43.7393	-88.9855				DEEP													
159		158	43.7386	-88.9856				DEEP													
160		159	43.738	-88.9856				DEEP													
161		160	43.7374	-88.9856				DEEP													

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
162		161	43.7367	-88.9856				DEEP													
163		162	43.7361	-88.9856				DEEP													
164		163	43.7355	-88.9856				DEEP													
165		164	43.7348	-88.9856				DEEP													
166		165	43.7342	-88.9856				DEEP													
167		166	43.7336	-88.9856				DEEP													
168		167	43.7329	-88.9857				DEEP													
169		168	43.7323	-88.9857	16	M	P														
170		169	43.7317	-88.9857	12	M	P														
171		170	43.7311	-88.9857	8	M	P			1											
172		171	43.7304	-88.9857	6.5	M	P			2	1										
173		172	43.7298	-88.9857	5	M	P			1	3							1			
174		173	43.7443	-88.9846	5	M	P				2	1									
175		174	43.7437	-88.9846	7	M	P			1	1										
176		175	43.743	-88.9846	9.5	M	P			1											
177		176	43.7424	-88.9846	13	M	P														
178		177	43.7418	-88.9846	15	M	P														
179		178	43.7411	-88.9846	15	M	P														
180		179	43.7405	-88.9847	15	M	P														
181		180	43.7399	-88.9847	17	M	R														
182		181	43.7392	-88.9847				DEEP													
183		182	43.7386	-88.9847				DEEP													
184		183	43.738	-88.9847				DEEP													
185		184	43.7374	-88.9847				DEEP													
186		185	43.7367	-88.9847				DEEP													
187		186	43.7361	-88.9847				DEEP													
188		187	43.7355	-88.9847				DEEP													
189		188	43.7348	-88.9848				DEEP													
190		189	43.7342	-88.9848				DEEP													
191		190	43.7336	-88.9848				DEEP													
192		191	43.7329	-88.9848				DEEP													
193		192	43.7323	-88.9848	15	M	P														

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum*,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia*,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
194		193	43.7317	-88.9848	12	M	P			1											
195		194	43.7311	-88.9848	8.5	M	P			1	1										
196		195	43.7304	-88.9848	8	M	P			1	1										
197		196	43.7298	-88.9848	5	M	P				1		1					1			
198		197	43.7443	-88.9837	6.5	M	P				1	1									
199		198	43.7436	-88.9837	8	M	P			1	1	1									
200		199	43.743	-88.9837	9.5	M	P			1											
201		200	43.7424	-88.9838	11	M	P			1	1										
202		201	43.7418	-88.9838	12	M	P														
203		202	43.7411	-88.9838	14	M	P				1										
204		203	43.7405	-88.9838	15	M	P														
205		204	43.7399	-88.9838	17	M	P														
206		205	43.7392	-88.9838				DEEP													
207		206	43.7386	-88.9838				DEEP													
208		207	43.738	-88.9838				DEEP													
209		208	43.7373	-88.9838				DEEP													
210		209	43.7367	-88.9839				DEEP													
211		210	43.7361	-88.9839				DEEP													
212		211	43.7355	-88.9839				DEEP													
213		212	43.7348	-88.9839				DEEP													
214		213	43.7342	-88.9839				DEEP													
215		214	43.7336	-88.9839				DEEP													
216		215	43.7329	-88.9839	16	M	P														
217		216	43.7323	-88.9839	15	M	P											1			
218		217	43.7317	-88.9839	10	M	P			1											
219		218	43.731	-88.9839	8.5	M	P				1										
220		219	43.7304	-88.984	4	S	P				1										
221		220	43.7443	-88.9829	6	M	P				1										
222		221	43.7436	-88.9829	8	M	P			1											
223		222	43.743	-88.9829	9	M	P			1	1										
224		223	43.7424	-88.9829	10	M	P			1											
225		224	43.7417	-88.9829	12	M	P											1			

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum*,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia*,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
226		225	43.7411	-88.9829	10	R	P														
227		226	43.7405	-88.9829	15	M	P														
228		227	43.7399	-88.9829	16	M	P														
229		228	43.7392	-88.9829				DEEP													
230		229	43.7386	-88.983				DEEP													
231		230	43.738	-88.983				DEEP													
232		231	43.7373	-88.983				DEEP													
233		232	43.7367	-88.983				DEEP													
234		233	43.7361	-88.983				DEEP													
235		234	43.7354	-88.983				DEEP													
236		235	43.7348	-88.983				DEEP													
237		236	43.7342	-88.983				DEEP													
238		237	43.7336	-88.983	17	M	P														
239		238	43.7329	-88.983	17	M	P														
240		239	43.7323	-88.9831	14	M	P														
241		240	43.7317	-88.9831	8	M	P			1								1			
242		241	43.7443	-88.982	5	M	P				1										
243		242	43.7436	-88.982	7	M	P				1										
244		243	43.743	-88.982	9	M	P			1	1										
245		244	43.7424	-88.982	9.5	M	P			1		1									
246		245	43.7417	-88.982	6.5	R	P														
247		246	43.7411	-88.982	8	R	P														
248		247	43.7405	-88.982	14	M	P														
249		248	43.7399	-88.9821	16	M	P														
250		249	43.7392	-88.9821				DEEP													
251		250	43.7386	-88.9821				DEEP													
252		251	43.738	-88.9821				DEEP													
253		252	43.7373	-88.9821				DEEP													
254		253	43.7367	-88.9821				DEEP													
255		254	43.7361	-88.9821				DEEP													
256		255	43.7354	-88.9821				DEEP													
257		256	43.7348	-88.9821				DEEP													

Survey Date: June 22, 2005

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1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
258		257	43.7342	-88.9822	16	M	R														
259		258	43.7335	-88.9822	16	M	P				1										
260		259	43.7329	-88.9822	10	R	P														
261		260	43.7436	-88.9811	5.5	M	P				2	1						1			
262		261	43.743	-88.9811	8	M	P			1											
263		262	43.7424	-88.9811	9	M	P			1											
264		263	43.7417	-88.9812	10	M	P														
265		264	43.7411	-88.9812	14	M	P														
266		265	43.7405	-88.9812	15	M	P											1			
267		266	43.7398	-88.9812	15	M	R														
268		267	43.7392	-88.9812	16	M	R														
269		268	43.7386	-88.9812				DEEP													
270		269	43.738	-88.9812				DEEP													
271		270	43.7373	-88.9812				DEEP													
272		271	43.7367	-88.9812				DEEP													
273		272	43.7361	-88.9813				DEEP													
274		273	43.7354	-88.9813				DEEP													
275		274	43.7348	-88.9813	17	M	P														
276		275	43.7342	-88.9813	16	M	P				1	1									
277		276	43.7335	-88.9813	14	M	P				1										
278		277	43.7436	-88.9803	4	M	P			1	V										
279		278	43.743	-88.9803	6.5	M	P			1	1										
280		279	43.7424	-88.9803	9.5	S	P			1	1					1					
281		280	43.7417	-88.9803	11	S	P			1											
282		281	43.7411	-88.9803	14	M	P														
283		282	43.7405	-88.9803	14	M	P														
284		283	43.7398	-88.9803				DEEP													
285		284	43.7392	-88.9803				DEEP													
286		285	43.7386	-88.9803				DEEP													
287		286	43.7379	-88.9804				DEEP													
288		287	43.7373	-88.9804				DEEP													
289		288	43.7367	-88.9804				DEEP													

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
290		289	43.7361	-88.9804				DEEP													
291		290	43.7354	-88.9804	16	M	P														
292		291	43.7348	-88.9804	15	M	P					1									
293		292	43.7342	-88.9804	14	M	P														
294		293	43.7335	-88.9804	7	R	P														
295		294	43.7436	-88.9794	4.5	M	P			1	1	V						1			
296		295	43.743	-88.9794	7	M	P				1										
297		296	43.7423	-88.9794	9	M	P			1											
298		297	43.7417	-88.9794	10	M	P			1											
299		298	43.7411	-88.9794	12	M	P														
300		299	43.7405	-88.9794	13	M	P														
301		300	43.7398	-88.9795	13	M	P														
302		301	43.7392	-88.9795	16	M	P														
303		302	43.7386	-88.9795	15	M	P														
304		303	43.7379	-88.9795	15	M	P														
305		304	43.7373	-88.9795	16	M	P				1										
306		305	43.7367	-88.9795	15	M	P														
307		306	43.736	-88.9795	15	M	P											1			
308		307	43.7354	-88.9795	15	M	P														
309		308	43.7348	-88.9795	12	S	P														
310		309	43.7342	-88.9795	3	R	P														
311		310	43.743	-88.9785	6	M	P				2										
312		311	43.7423	-88.9785	8	M	P				1										
313		312	43.7417	-88.9786	9.5	M	P			1	1										
314		313	43.7411	-88.9786	10	M	P														
315		314	43.7404	-88.9786	11	M	P														
316		315	43.7398	-88.9786	11	M	P			1											
317		316	43.7392	-88.9786	12	M	P														
318		317	43.7386	-88.9786	14	M	P				1										
319		318	43.7379	-88.9786	14	M	P														
320		319	43.7373	-88.9786	15	M	P														
321		320	43.7367	-88.9786	14	M	P														

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
322		321	43.736	-88.9786	14	M	P														
323		322	43.7354	-88.9787	13	M	P				1										
324		323	43.7348	-88.9787	9.5	M	P											1			
325		324	43.743	-88.9777	4	S	P			V	1	1									
326		325	43.7423	-88.9777	7	M	P											1			
327		326	43.7417	-88.9777	8.5	M	P														
328		327	43.7411	-88.9777	9.5	M	P				1							1			
329		328	43.7404	-88.9777	10	M	P			1											
330		329	43.7398	-88.9777	11	M	P														
331		330	43.7392	-88.9777	12	M	P			1											
332		331	43.7386	-88.9777	12	M	P														
333		332	43.7379	-88.9777	13	M	P														
334		333	43.7373	-88.9778	13	M	P														
335		334	43.7367	-88.9778	13	M	P				1										
336		335	43.736	-88.9778	12	M	P			1											
337		336	43.7354	-88.9778	11	M	P			1											
338		337	43.7348	-88.9778	8	S	P				1					1					
339		338	43.7423	-88.9768	3	S	P				1							1			
340		339	43.7417	-88.9768	7.5	M	P				1							1			
341		340	43.7411	-88.9768	8	M	P			1								1			
342		341	43.7404	-88.9768	8.5	M	P			1		1									
343		342	43.7398	-88.9768	9	M	P			1											
344		343	43.7392	-88.9769	10	M	P			1											
345		344	43.7385	-88.9769	12	M	P			1	1							1			
346		345	43.7379	-88.9769	11	M	P			1											
347		346	43.7373	-88.9769	11	M	P			1						1					
348		347	43.7367	-88.9769	11	M	P			1											
349		348	43.736	-88.9769	11	M	P			2	1										
350		349	43.7354	-88.9769	9.5	S	P			1	1										
351		350	43.7348	-88.9769	8	M	P			1											
352		351	43.7411	-88.976	4	M	P				V							1			
353		352	43.7404	-88.976	7	M	P			1								1			

Survey Date: June 22, 2005

	A	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	**Entry**	sampling point	Latitiude(need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum* ,Eurasian water-milfoil Record 1,2,3 or leave blank	*Potamogeton crispus* ,Curly-leaf pondweed Record 1,2,3 or leave blank	*Myriophyllum spicatum X sibericum*	*Ceratophyllum demersum* ,Coontail	*Chara* ,Muskgrasses	*Heteranthera dubia* ,Water star-grass	*Lemna minor* ,Small duckweed	*Lemna trisulca* ,Forked duckweed	*Stuckenia pectinata* ,Sago pondweed	*Elodea* sp., Waterweed			
354		353	43.7398	-88.976	7	M	P			1								1			
355		354	43.7392	-88.976	7.5	M	P			1	1							1			
356		355	43.7385	-88.976	9	M	P			1	1										
357		356	43.7379	-88.976	10	M	P			1	1										
358		357	43.7373	-88.976	8.5	M	P			1	1							1			
359		358	43.7366	-88.976	9	M	P			1	2										
360		359	43.736	-88.976	9	M	P			1	1										
361		360	43.7354	-88.9761	9	M	P			1											
362		361	43.7348	-88.9761	7	S	P			1	1										
363		362	43.7341	-88.9761	5	M	P			1	2										
364		363	43.7398	-88.9751	3.5	S	P				1	1						1			
365		364	43.7392	-88.9751	6	M	P			1	1	1						1			
366		365	43.7385	-88.9751	7	M	P			1	1							1			
367		366	43.736	-88.9752	7	S	P			1	2	1						1			
368		367	43.7354	-88.9752	7	M	P			2											
369		368	43.7347	-88.9752	6	M	P			1	1										
370		369	43.7341	-88.9752	5	M	P			1	2							1			
371		370	43.7335	-88.9752	4	M	P				2						1	1			
372		371	43.7354	-88.9743	6	M	P			1	2	1									
373		372	43.7347	-88.9743	6	M	P			1	2							1			
374		373	43.7341	-88.9743	5	M	P				3										
375		374	43.7335	-88.9743	4	M	P			1											
376		375	43.7354	-88.9734	5	S	P				2	1						1			
377		376	43.7347	-88.9735	5	R	P			1	1					1					
378		377	43.7341	-88.9735	4	S	P			1	2							1			

Survey Date: July 31 and August 2, 2006

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum*, Eurasian water-milfoil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum* sp.*, Water milfoil	*Elodea* sp.**, Waterweed	sp3	sp4	sp5
2	**Lake Name**	Little Green	1	43.73557	-88.99691	2.5	M	P				1				V	1					1			
3	**County**	Green Lake	2	43.73494	-88.99692	3	M	P				2	2			V	1					2			
4	**WBIC**	162500	3	43.73431	-88.99693	2	M	P		1	V	1	2			V	1					2			
5	**Date of Survey**	07/31 & 08/02/2006	4	43.73619	-88.99603	3	M	P				1	2			V						2			
6	**field workers names**	Jen Hauxwell	5	43.73556	-88.99604	4	M	P				1	2				1			V		2			
7	**field workers names**	Tim Asplund	6	43.73493	-88.99605	3.5	M	P		1			2				1					2			
8	**field workers names**	Scott Van Egeren	7	43.7343	-88.99606	2	M	P		1		1	2			1	1					2			
9			8	43.73618	-88.99516	4.5	M	P					3			V						1			
10			9	43.73555	-88.99517	5.5	M	P		V		1	3			1					1	3			
11			10	43.73492	-88.99518	4.5	M	P		V			3				1				1	1			
12			11	43.73429	-88.99519	2.5	M	P			1	1	3	1			1			V	1	1			
13			12	43.73681	-88.99428	4.5	M	P				1	3				1					2			
14			13	43.73618	-88.99429	8	M	P				1										1			
15			14	43.73555	-88.9943	6	M	P		1		2	3				1					1			
16			15	43.73492	-88.99431	4.5	M	P		1		1	3				1					1			
17			16	43.73429	-88.99432	2.5	M	P				1	2				2					2			
18			17	43.73303	-88.99434	3.5	M	P			2	1	1				1					2			
19			18	43.7324	-88.99436	3	M	P			V	1	2				1			1					
20			19	43.7368	-88.99341	7.5	M	P			2	2	1									3			
21			20	43.73617	-88.99342	13.5	M	P					1												
22			21	43.73554	-88.99343	7.5	M	P				1	3									2			
23			22	43.73491	-88.99344	4.5	M	P		2		1	2	3			1					1			
24			23	43.73365	-88.99347	3.5	M	P				1	2				2					2			
25			24	43.73302	-88.99348	4.5	M	P			1		3				1					2			
26			25	43.73239	-88.99349	4	M	P				1	2				1					2			
27			26	43.73176	-88.9935	3.5	M	P					1				1			1		1			
28			27	43.73113	-88.99351	1.5	M	P		1		1	1			1	2					2			
29			28	43.73742	-88.99253	6.5	M	P				1	3				1					2			
30			29	43.73679	-88.99254	10	M	P		1		1	1									2			
31			30	43.73616	-88.99255	12.5	M	P				1	1									1			
32			31	43.73553	-88.99256	7	M	P		1		1	2									2			
33			32	43.7349	-88.99258	5	M	P		2			3				1								
34			33	43.73427	-88.99259	2	R	P																	
35			34	43.73364	-88.9926	5	M	P		2			3				1					1			
36			35	43.73301	-88.99261	4.5	M	P					2				1				1	3			
37			36	43.73238	-88.99262	4.5	M	P				1	3				1				2	2			
38			37	43.73175	-88.99263	3.5	M	P					3				1				1	2			
39			38	43.73112	-88.99264	2	M	P			1	1	1				1			1		2			
40			39	43.73049	-88.99265	2	M	P									V					V			
41			40	43.73741	-88.99166	11	M	P				1									1	2			
42			41	43.73678	-88.99167	16		P																	
43			42	43.73615	-88.99168	11	M	P		1		1	1									1			
44			43	43.73552	-88.9917	12.5	M	P		1		1	2			1									

Survey Date: July 31 and August 2, 2006

1	A Entry	I	J sampling point	K Latitude (need electronic copy of site locations)	L Longitude (need electronic copy of site locations)	M Depth (ft)	N Dominant sediment type (M=muck, S=Sand, R=Rock)	O Sampled holding rake pole (P) or rake rope (R)?	P comments	Q *Myriophyllum spicatum*, Eurasian water-milfoil	R *Potamogeton crispus*, Curly-leaf pondweed	S filamentous algae	T *Ceratophyllum demersum*, Coontail	U *Chara*, Muskgrasses	V *Heteranthera dubia*, Water star-grass	W *Lemna minor*, Small duckweed	X *Lemna trisulca*, Forked duckweed	Y *Najas flexilis*, Bushy pondweed	Z *Nuphar variegata*, Spatterdock	AA *Stuckenia pectinata*, Sago pondweed	AB *Myriophyllum* sp.*, Water milfoil	AC *Elodea* sp.**, Waterweed	AD sp3	AE sp4	AF sp5
45			44	43.73489	-88.99171	8.5	M	P		2		1	1									2			
46			45	43.73426	-88.99172	8	M	P		1		2	1									3			
47			46	43.73363	-88.99173	6.5	M	P		2		2										3			
48			47	43.733	-88.99174	6.5	M	P		1		1										2			
49			48	43.73237	-88.99175	5	M	P		2			2	1			1					2			
50			49	43.73174	-88.99176	3	R	P		V			V				V								
51			50	43.73111	-88.99177	4	M	P					3				2					2			
52			51	43.73804	-88.99078	11.5	M	P					1									2			
53			52	43.73741	-88.99079	15.5	M	P					1												
54			53	43.73678	-88.99081	14	M	P														1			
55			54	43.73615	-88.99082	10.5	M	P		1		2	1									1			
56			55	43.73552	-88.99083	14	M	P					1												
57			56	43.73489	-88.99084	13	M	P																	
58			57	43.73426	-88.99085	11.5	M	P		2		1	2									1			
59			58	43.73363	-88.99086	10.5	M	P		1		2										2			
60			59	43.733	-88.99087	8.5	M	P		2		2										2			
61			60	43.73237	-88.99088	7	M	P			2	2	2			V	1				2	3			
62			61	43.73174	-88.99089	6	M	P					1								1	3			
63			62	43.7311	-88.9909	4.5	M	P				1										1			
64			63	43.73929	-88.98989	1.5	S	P		1		1								1		2			
65			64	43.73866	-88.9899	12.5	M	P			2											1			
66			65	43.73803	-88.98991	16.5	M	P																	
67			66	43.7374	-88.98993	18		R																	
68			67	43.73677	-88.98994	14	M	P					1												
69			68	43.73614	-88.98995	12.5	M	P		2		1										1			
70			69	43.73551	-88.98996	15.5		P																	
71			70	43.73488	-88.98997	17		R																	
72			71	43.73425	-88.98998	14.5		P																	
73			72	43.73362	-88.98999	12.5	M	P					1									2			
74			73	43.73299	-88.99	10.5	M	P				1	1									3			
75			74	43.73236	-88.99001	5	M	P		1		1	V									3			
76			75	43.73173	-88.99002	8	M	P		1		1										3			
77			76	43.7311	-88.99003	5.5	M	P				2										3			
78			77	43.73991	-88.98901	3.5	S	P				1	2	1						2		1			
79			78	43.73928	-88.98902	14	S	P																	
80			79	43.73865	-88.98904	18	M	P					1									1			
81			80	43.73802	-88.98905	20.5	M	R																	
82			81	43.73739	-88.98906	17.5	M	P					1												
83			82	43.73676	-88.98907	16.5	M	P																	
84			83	43.73613	-88.98908	20	M	R					1												
85			84	43.7355	-88.98909	20		R																	
86			85	43.73487	-88.9891	18		R																	
87			86	43.73424	-88.98911	18		R																	

Survey Date: July 31 and August 2, 2006

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum*, Eurasian water-milfoil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum* sp.*, Water milfoil	*Elodea* sp.**, Waterweed	sp3	sp4	sp5
88			87	43.73361	-88.98912	18.5	M	R					1												
89			88	43.73298	-88.98913	12.5	M	P														1			
90			89	43.73235	-88.98914	10	M	P				2										3			
91			90	43.73172	-88.98915	10	M	P				2										3			
92			91	43.73109	-88.98916	7	M	P				1	2									3			
93			92	43.74116	-88.98812				TERRESTRIAL																
94			93	43.74053	-88.98813	3	S	P						3								3			
95			94	43.7399	-88.98814	13	S	P					1												
96			95	43.73927	-88.98816	18.5	M	R																	
97			96	43.73864	-88.98817	22	M	R																	
98			97	43.73801	-88.98818	20	M	R																	
99			98	43.73738	-88.98819	20	M	R																	
100			99	43.73675	-88.9882	18	M	R																	
101			100	43.73612	-88.98821	21.5	M	R																	
102			101	43.73549	-88.98822	23	M	R																	
103			102	43.73486	-88.98823	23	M	R																	
104			103	43.73423	-88.98824	20	M	R																	
105			104	43.7336	-88.98825	20	M	R				1										1			
106			105	43.73297	-88.98826	13.5	M	P				1													
107			106	43.73234	-88.98827	12.5	M	P		2			2									2			
108			107	43.73171	-88.98828	10	M	P		1		2										3			
109			108	43.73108	-88.98829	8	M	P				1										3			
110			109	43.73045	-88.9883	4.5	S	P				1										3			
111			110	43.74179	-88.98724	2.5	S	P					3							V		2			
112			111	43.74116	-88.98725	10.5	S	P																	
113			112	43.74053	-88.98726	14.5	M	P					1												
114			113	43.7399	-88.98728	7	M	P																	
115			114	43.73927	-88.98729				DEEP																
116			115	43.73864	-88.9873				DEEP																
117			116	43.73801	-88.98731				DEEP																
118			117	43.73738	-88.98732				DEEP																
119			118	43.73675	-88.98733				DEEP																
120			119	43.73612	-88.98734				DEEP																
121			120	43.73549	-88.98735				DEEP																
122			121	43.73486	-88.98736				DEEP																
123			122	43.73422	-88.98737	20	M	R																	
124			123	43.73359	-88.98738	18	M	P																	
125			124	43.73296	-88.98739	14	M	P																	
126			125	43.73233	-88.9874	14	M	P																	
127			126	43.7317	-88.98741	11	M	P				1										2			
128			127	43.73107	-88.98742	7.5	M	P				1	2									3			
129			128	43.73044	-88.98743	3.5	S	P				1										3			
130			129	43.74178	-88.98637	7.5	M	P					3												

Survey Date: July 31 and August 2, 2006

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum*, Eurasian water-milfoil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum* sp.*, Water milfoil	*Elodea* sp.**, Waterweed	sp3	sp4	sp5
131			130	43.74115	-88.98639	13.5	M	P														1			
132			131	43.74052	-88.9864	16	M	P														1			
133			132	43.73989	-88.98641	16			DEEP																
134			133	43.73926	-88.98642				DEEP																
135			134	43.73863	-88.98643				DEEP																
136			135	43.738	-88.98644				DEEP																
137			136	43.73737	-88.98645				DEEP																
138			137	43.73674	-88.98646				DEEP																
139			138	43.73611	-88.98647				DEEP																
140			139	43.73548	-88.98648				DEEP																
141			140	43.73485	-88.98649	23	M	R																	
142			141	43.73422	-88.9865	21	M	R																	
143			142	43.73359	-88.98651	18	M	R														1			
144			143	43.73296	-88.98652	15	M	P													1	1			
145			144	43.73233	-88.98653	15	M	P					1									1			
146			145	43.7317	-88.98654	13	M	P														2			
147			146	43.73107	-88.98656	9	M	P				1									2	3			
148			147	43.73044	-88.98657	6	S	P					3	1							2	2			
149			148	43.72981	-88.98658	2.5	R	P				2		1							1	2			
150			149	43.74429	-88.98546	1.5	S	P				1	3		V	V				V		2			
151			150	43.74366	-88.98547	2	S	P				2	3							1		3			
152			151	43.74303	-88.98548	2	S	P			1							1		1		1			
153			152	43.7424	-88.98549	6	S	P		2			3	3								2			
154			153	43.74177	-88.98551	13	M	P														2			
155			154	43.74114	-88.98552	14.5	M	P																	
156			155	43.74051	-88.98553	15.5	M	P																	
157			156	43.73988	-88.98554				DEEP																
158			157	43.73925	-88.98555				DEEP																
159			158	43.73862	-88.98556				DEEP																
160			159	43.73799	-88.98557				DEEP																
161			160	43.73736	-88.98558				DEEP																
162			161	43.73673	-88.98559				DEEP																
163			162	43.7361	-88.9856				DEEP																
164			163	43.73547	-88.98561				DEEP																
165			164	43.73484	-88.98562				DEEP																
166			165	43.73421	-88.98563				DEEP																
167			166	43.73358	-88.98564	18	M	R																	
168			167	43.73295	-88.98565	16.5	M	P					1									1			
169			168	43.73232	-88.98566	15.5	M	P																	
170			169	43.73169	-88.98568	11.5	M	P		2		2										2			
171			170	43.73106	-88.98569	8.5	M	P				1									1	3			
172			171	43.73043	-88.9857	7	M	P					3									3			
173			172	43.7298	-88.98571	5	M	P					2									2			

Survey Date: July 31 and August 2, 2006

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum*, Eurasian water-milfoil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum* sp.*, Water milfoil	*Elodea* sp.**, Waterweed	sp3	sp4	sp5
174			173	43.74428	-88.98459	4.5	M	P		1			3												
175			174	43.74365	-88.9846	7	M	P					3												
176			175	43.74302	-88.98461	9.5	M	P				1	3									3			
177			176	43.74239	-88.98463	12	M	P					2												
178			177	43.74176	-88.98464	15	M	P																	
179			178	43.74113	-88.98465	14.5	M	P																	
180			179	43.7405	-88.98466	14.5	M	P																	
181			180	43.73987	-88.98467	17	M	P																	
182			181	43.73924	-88.98468	19.5			DEEP																
183			182	43.73861	-88.98469				DEEP																
184			183	43.73798	-88.9847				DEEP																
185			184	43.73735	-88.98471				DEEP																
186			185	43.73672	-88.98472				DEEP																
187			186	43.73609	-88.98473				DEEP																
188			187	43.73546	-88.98474				DEEP																
189			188	43.73483	-88.98475				DEEP																
190			189	43.7342	-88.98476				DEEP																
191			190	43.73357	-88.98477	18	M	R																	
192			191	43.73294	-88.98479	17.5	M	R																	
193			192	43.73231	-88.9848	16	M	R																	
194			193	43.73168	-88.98481	10.5	R	P				1	1									2			
195			194	43.73105	-88.98482	8.5	M	P				1										3			
196			195	43.73042	-88.98483	7	M	P					2									3			
197			196	43.72979	-88.98484	5.5	M	P				1	2									2			
198			197	43.74428	-88.98372	6	M	P		V			3									2			
199			198	43.74365	-88.98373	7.5	M	P				2	1									3			
200			199	43.74302	-88.98375	9	M	P					2								2	3			
201			200	43.74239	-88.98376	11.5	M	P				2										3			
202			201	43.74176	-88.98377	11.5	M	P				1									3	1			
203			202	43.74113	-88.98378	12.5	M	P		1		2	2									1			
204			203	43.7405	-88.98379	14	M	P														1			
205			204	43.73987	-88.9838	16.5	M	P																	
206			205	43.73924	-88.98381				DEEP																
207			206	43.73861	-88.98382				DEEP																
208			207	43.73798	-88.98383				DEEP																
209			208	43.73734	-88.98384				DEEP																
210			209	43.73671	-88.98385				DEEP																
211			210	43.73608	-88.98386				DEEP																
212			211	43.73545	-88.98387				DEEP																
213			212	43.73482	-88.98388				DEEP																
214			213	43.73419	-88.98389				DEEP																
215			214	43.73356	-88.98391	18	M	R																	
216			215	43.73293	-88.98392	17	M	P														1			

Survey Date: July 31 and August 2, 2006

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum*, Eurasian water-milfoil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum* sp.*, Water milfoil	*Elodea* sp.**, Waterweed	sp3	sp4	sp5
217			216	43.7323	-88.98393	16	M	P																	
218			217	43.73167	-88.98394	11	M	P					2									3			
219			218	43.73104	-88.98395	7	M	P		1			2									3			
220			219	43.73041	-88.98396	4	S	P																	
221			220	43.74427	-88.98286	6	M	P				1	3												
222			221	43.74364	-88.98287	7.5	M	P		1		2	3								1	3			
223			222	43.74301	-88.98288	9	M	P		1		1	1									3			
224			223	43.74238	-88.98289	10	M	P		1		2									2	2			
225			224	43.74175	-88.9829	10.5	M	P		1		3										3			
226			225	43.74112	-88.98291	9.5	R	P																	
227			226	43.74049	-88.98292	15	M	P																	
228			227	43.73986	-88.98293	17	M	P														1			
229			228	43.73923	-88.98294	17		R																	
230			229	43.7386	-88.98295	18.5			DEEP																
231			230	43.73797	-88.98296	18.5		R																	
232			231	43.73734	-88.98297	20			DEEP																
233			232	43.73671	-88.98298				DEEP																
234			233	43.73608	-88.98299				DEEP																
235			234	43.73545	-88.983				DEEP																
236			235	43.73482	-88.98302				DEEP																
237			236	43.73419	-88.98303	18.5	M	R																	
238			237	43.73356	-88.98304	17	M	P																	
239			238	43.73293	-88.98305	16.5	M	P																	
240			239	43.7323	-88.98306	13	M	P					2									1			
241			240	43.73167	-88.98307	8	M	P		1			1									3			
242			241	43.74426	-88.98199	5	M	P					3								2	1			
243			242	43.74363	-88.982	7.5	M	P		2		2	3									3			
244			243	43.743	-88.98201	8.5	M	P				2										3			
245			244	43.74237	-88.98202	9.5	M	P		1		2										2			
246			245	43.74174	-88.98203	10	S	P																	
247			246	43.74111	-88.98204	7.5	M	P																	
248			247	43.74048	-88.98205	15	M	P														1			
249			248	43.73985	-88.98206	15	M	P														1			
250			249	43.73922	-88.98207	20.5	M	R																	
251			250	43.73859	-88.98208				DEEP																
252			251	43.73796	-88.98209				DEEP																
253			252	43.73733	-88.9821				DEEP																
254			253	43.7367	-88.98211				DEEP																
255			254	43.73607	-88.98212				DEEP																
256			255	43.73544	-88.98214				DEEP																
257			256	43.73481	-88.98215				DEEP																
258			257	43.73418	-88.98216	18	M	R																	
259			258	43.73355	-88.98217	17	M	P																	

Survey Date: July 31 and August 2, 2006

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum*, Eurasian water-milfoil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum* sp.*, Water milfoil	*Elodea* sp.**, Waterweed	sp3	sp4	sp5
260			259	43.73292	-88.98218	11	R	P																	
261			260	43.74362	-88.98113	5	M	P		3		2	2												
262			261	43.74299	-88.98114	7	M	P		3		1										3			
263			262	43.74236	-88.98115	9	M	P				1	2	1								3			
264			263	43.74173	-88.98116	10.5	M	P																	
265			264	43.7411	-88.98117	13.5	M	P																	
266			265	43.74047	-88.98118	15	M	P																	
267			266	43.73984	-88.98119	15	M	P																	
268			267	43.73921	-88.9812	17	M	P																	
269			268	43.73858	-88.98121				DEEP																
270			269	43.73795	-88.98122				DEEP																
271			270	43.73732	-88.98123				DEEP																
272			271	43.73669	-88.98124				DEEP																
273			272	43.73606	-88.98126				DEEP																
274			273	43.73543	-88.98127				DEEP																
275			274	43.7348	-88.98128	17	M	R																	
276			275	43.73417	-88.98129	18	M	R														1			
277			276	43.73354	-88.9813	13.5	M	P														1			
278			277	43.74362	-88.98026	4	M	P		1		1	2									2			
279			278	43.74299	-88.98027	6.5	M	P		2		1										3			
280			279	43.74236	-88.98028	9	M	P		1		2	3									3			
281			280	43.74173	-88.98029	12	M	P					2								3	1			
282			281	43.7411	-88.9803	13.5	M	P																	
283			282	43.74046	-88.98031	13.5	M	P													1	1			
284			283	43.73983	-88.98032	14	M	P														2			
285			284	43.7392	-88.98033	15	M	P														2			
286			285	43.73857	-88.98034	17.5	M	R																	
287			286	43.73794	-88.98035	17	M	R																	
288			287	43.73731	-88.98036	17	M	R																	
289			288	43.73668	-88.98038	15	M	R																	
290			289	43.73605	-88.98039	18	M	R														2			
291			290	43.73542	-88.9804	16.5	M	P														1			
292			291	43.73479	-88.98041	15	M	P														1			
293			292	43.73416	-88.98042	14	M	P																	
294			293	43.73353	-88.98043	7	R	P																	
295			294	43.74361	-88.97939	4	S	P				2	3									3			
296			295	43.74298	-88.9794	6	M	P		3		2	3									3			
297			296	43.74235	-88.97941	8.5	M	P				1									2	3			
298			297	43.74172	-88.97942	10	M	P				V										2			
299			298	43.74109	-88.97943	11	M	P													1	2			
300			299	43.74046	-88.97944	12	M	P																	
301			300	43.73983	-88.97945	13	M	P																	
302			301	43.7392	-88.97946	14	M	P					2									1			

Survey Date: July 31 and August 2, 2006

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	*Myriophyllum spicatum*, Eurasian water-milfoil	*Potamogeton crispus*, Curly-leaf pondweed	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Najas flexilis*, Bushy pondweed	*Nuphar variegata*, Spatterdock	*Stuckenia pectinata*, Sago pondweed	*Myriophyllum* sp.*, Water milfoil	*Elodea* sp.**, Waterweed	sp3	sp4	sp5
303			302	43.73857	-88.97947	14	M	P																	
304			303	43.73794	-88.97949	14.5	M	P																	
305			304	43.73731	-88.9795	15	M	P																	
306			305	43.73668	-88.97951	18	M	R																	
307			306	43.73605	-88.97952	14	M	P																	
308			307	43.73542	-88.97953	13.5	M	P					1												
309			308	43.73479	-88.97954	13	S	P																	
310			309	43.73416	-88.97955	4	R	P																	
311			310	43.74297	-88.97853	5	M	P					3									3			
312			311	43.74234	-88.97854	8	M	P				1									2	3			
313			312	43.74171	-88.97855	8.5	M	P				2	1								2	1			
314			313	43.74108	-88.97856	9.5	M	P				1					1				2	3			
315			314	43.74045	-88.97857	10	M	P				2	1									2			
316			315	43.73982	-88.97858	11	M	P														1			
317			316	43.73919	-88.97859	12.5	M	P																	
318			317	43.73856	-88.97861	13	M	P														1			
319			318	43.73793	-88.97862	13.5	M	P				V										1			
320			319	43.7373	-88.97863	13.5	M	P														1			
321			320	43.73667	-88.97864	13	M	P					1				1					2			
322			321	43.73604	-88.97865	16	M	P														1			
323			322	43.73541	-88.97866	12.5	M	P																	
324			323	43.73478	-88.97867	9	S	P					1								1	3			
325			324	43.74296	-88.97766	3.5	M	P				1	3									1			
326			325	43.74233	-88.97767	5.5	M	P				2	1									3			
327			326	43.7417	-88.97768	8	M	P				2										3			
328			327	43.74107	-88.97769	8.5	M	P				1	1									3			
329			328	43.74044	-88.9777	9	M	P		1		1	2									3			
330			329	43.73981	-88.97771	10	M	P				2									1	2			
331			330	43.73918	-88.97773	11	M	P		2												2			
332			331	43.73855	-88.97774	11	M	P					2									2			
333			332	43.73792	-88.97775	12	M	P														2			
334			333	43.73729	-88.97776	12	M	P																	
335			334	43.73666	-88.97777	11.5	M	P																	
336			335	43.73603	-88.97778	11	M	P					1								1	2			
337			336	43.7354	-88.97779	10	M	P					1									2			
338			337	43.73477	-88.9778	8.5	M	P													1	2			
339			338	43.74232	-88.9768	3	S	P				2	2									1			
340			339	43.74169	-88.97681	6	M	P					3									3			
341			340	43.74106	-88.97682	8	M	P				1	1									1			
342			341	43.74043	-88.97683	8.5	M	P					2									3			
343			342	43.7398	-88.97685	8	M	P														3			
344			343	43.73917	-88.97686	9	M	P				2									1	3			
345			344	43.73854	-88.97687	10	M	P		2		3										3			

Survey Date: July 31 and August 2, 2006

1	A: Entry	I	J: sampling point	K: Latitude (need electronic copy of site locations)	L: Longitude (need electronic copy of site locations)	M: Depth (ft)	N: Dominant sediment type (M=muck, S=Sand, R=Rock)	O: Sampled holding rake pole (P) or rake rope (R)?	P: comments	Q: *Myriophyllum spicatum*, Eurasian water-milfoil	R: *Potamogeton crispus*, Curly-leaf pondweed	S: filamentous algae	T: *Ceratophyllum demersum*, Coontail	U: *Chara*, Muskgrasses	V: *Heteranthera dubia*, Water star-grass	W: *Lemna minor*, Small duckweed	X: *Lemna trisulca*, Forked duckweed	Y: *Najas flexilis*, Bushy pondweed	Z: *Nuphar variegata*, Spatterdock	AA: *Stuckenia pectinata*, Sago pondweed	AB: *Myriophyllum* sp.*, Water milfoil	AC: *Elodea* sp.**, Waterweed	AD: sp3	AE: sp4	AF: sp5
346			345	43.73791	-88.97688	10.5	M	P				1	1									1			
347			346	43.73728	-88.97689	10.5	M	P		2		1									1	2			
348			347	43.73665	-88.9769	10	M	P				1										2			
349			348	43.73602	-88.97691	9.5	M	P													2	3			
350			349	43.73539	-88.97692	9.5	M	P					3								3	3			
351			350	43.73476	-88.97693	8	M	P														3			
352			351	43.74106	-88.97595	5	S	P					1									1			
353			352	43.74043	-88.97597	7	M	P					1									2			
354			353	43.7398	-88.97598	7	M	P														1			
355			354	43.73917	-88.97599	7.5	M	P		1		2	1									3			
356			355	43.73854	-88.976	8.5	M	P													1	3			
357			356	43.73791	-88.97601	8.5	M	P		1			2									3			
358			357	43.73728	-88.97602	8.5	M	P														3			
359			358	43.73664	-88.97603	8	R	P		3		2										1			
360			359	43.73601	-88.97604	8.5	M	P					1									2			
361			360	43.73538	-88.97605	8	M	P					2								1	3			
362			361	43.73475	-88.97606	7	M	P													1	3			
363			362	43.73412	-88.97607	5	R	P					3									3			
364			363	43.73979	-88.97511	3	M	P				3	1									2			
365			364	43.73916	-88.97512	5	M	P					2									2			
366			365	43.73853	-88.97513	5.5	M	P					3								1	1			
367			366	43.73601	-88.97517	5.5	M	P					3									2			
368			367	43.73538	-88.97518	7	M	P					1									3			
369			368	43.73475	-88.97519	7	M	P					1									1			
370			369	43.73412	-88.9752	5	M	P		2			2												
371			370	43.73349	-88.97521	4	M	P					3				V		V	V		2			
372			371	43.73537	-88.97431	6	M	P					3									1			
373			372	43.73474	-88.97432	5	M	P				1	2									2			
374			373	43.73411	-88.97433	4.5	M	P		2			3									3			
375			374	43.73348	-88.97435	3.5	M	P					3									3			
376			375	43.73536	-88.97344	4.5	S	P					3									1			
377			376	43.73473	-88.97345	4	R	P				1	3									3			
378			377	43.7341	-88.97347	4	M	P				2	1								1	3			

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum* , Hybrid water-milfoil	*Myriophyllum spicatum* , Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* Curly-leaf pondweed	POTCR: At/NeAr/Below SurfAce	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Stuckenia pectinata* , Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
2	**Lake**	Little Green	1	43.73557	-88.99691	3	M	P		1								1	1						1			
3	**County**	Green Lake	2	43.73494	-88.996921	3	M	P		1								1	1						1			
4	**WBIC**	162500	3	43.73431	-88.996931				SHALLOW																			
5	**Date**	7/5/2007 - 7/6/2007	4	43.73619	-88.996031				SHALLOW																			
6	**Field Crew**	Meghan Porzky	5	43.73556	-88.996041	5	M	P		2								1	1			1			1			
7		Shaunna Chase	6	43.73493	-88.996052	4.5	M	P		1								1	1			1						
8		Matthew Ross	7	43.7343	-88.996062	1.5	M	P		1								1	1			1						
9			8	43.73618	-88.995161	6	M	P		3									3			1			1			
10			9	43.73555	-88.995172	6	M	P		2								1	1			1			1			
11			10	43.73492	-88.995182	5	M	P		2								1	2			1	1					
12			11	43.73429	-88.995193	3	M	P		2					1	B	U	1	1			1						
13			12	43.73681	-88.994282	5	M	P		2								1	2	1								
14			13	43.73618	-88.994292	8.5	M	P																				
15			14	43.73555	-88.994303	7	M	P		2	1	2	B	U				1	2				1					
16			15	43.73492	-88.994313	5.5	M	P		2								1	2			1			1			
17			16	43.73429	-88.994324	2.5	R	P		1								1	1		1	1						
18			17	43.73303	-88.994345	4	M	P		2								1	2			2						
19			18	43.7324	-88.994356	3.5	M	P		2									2			1						
20			19	43.7368	-88.993413	8.5	M	P		1								1	1						1			
21			20	43.73617	-88.993423	14.5	M	P																				
22			21	43.73554	-88.993434	7.5	M	P		2								1	2	1					1			
23			22	43.73491	-88.993444	5	M	P		3	1							1	2	2		1	1		1			
24			23	43.73365	-88.993465	4.5	M	P		1									1			1	1		1			
25			24	43.73302	-88.993476	5	M	P		1								1	1			1		1				
26			25	43.73239	-88.993486	4.5	M	P		2								1	2			1						
27			26	43.73176	-88.993497	3.5	M	P		1								1	1			1						
28			27	43.73113	-88.993508	2	M	P		2								2	1		1	1			1			
29			28	43.73742	-88.992533	7.5	M	P		1								1	1									
30			29	43.73679	-88.992543	10.5	M	P																				
31			30	43.73616	-88.992554	14	M	P																				
32			31	43.73553	-88.992565	9	M	P		1									1									
33			32	43.7349	-88.992575	5.5	M	P		2	1								2									
34			33	43.73427	-88.992586	3	R	P		2	1	1	B	U				1	1			1	2					
35			34	43.73364	-88.992596	5.5	M	P		2									2			1			1			
36			35	43.73301	-88.992607	5	M	P		2	1	1	B	U					2			1	1		2			
37			36	43.73238	-88.992617	5	M	P		2	1	1	B	U					2	2		1						
38			37	43.73175	-88.992628	4	M	P		1								1	1		V	1			1			
39			38	43.73112	-88.992639	4	M	P		1									1									
40			39	43.73049	-88.992649	2.5	M	P		1		V	B	S							1	1						
41			40	43.73741	-88.991664	12	M	P																				
42			41	43.73678	-88.991674	16	M	R																				
43			42	43.73615	-88.991685	12.5	M	P																				
44			43	43.73552	-88.991695	12.5	M	P																				
45			44	43.73489	-88.991706	9.5	M	P																				
46			45	43.73426	-88.991717	10	M	P																				
47			46	43.73363	-88.991727	8	M	P		1									1				1					
48			47	43.733	-88.991738	7	M	P		2	1							1	2									

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum* , Hybrid water-milfoil	*Myriophyllum spicatum* , Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus* Curly-leaf pondweed	*POTCR: At/NeAr/Below SurfAce*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Stuckenia pectinata* , Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
49			48	43.73237	-88.991748	5.5	M	P		1		1	B	U					1			1	1		1			
50			49	43.73174	-88.991759	5	M	P		1									1			1			1			
51			50	43.73111	-88.991769	4.5	M	P		1									1		V		1					
52			51	43.73804	-88.990784	12	M	P																				
53			52	43.73741	-88.990795	16	M	R		1									1									
54			53	43.73678	-88.990805	12	M	P																				
55			54	43.73615	-88.990816	11.5	M	P		1									1									
56			55	43.73552	-88.990826	15	M	P		1									1			1						
57			56	43.73489	-88.990837	13.5	M	P		1									1									
58			57	43.73426	-88.990848	12	M	P																				
59			58	43.73363	-88.990858	12.5	M	P																				
60			59	43.733	-88.990869	10	M	P																				
61			60	43.73237	-88.990879	8	M	P		1									1									
62			61	43.73174	-88.99089	7	M	P		2									2			1			1			
63			62	43.7311	-88.9909	5.5	R	P		1								1	1		V				1			
64			63	43.73929	-88.989894	2.5	M	P		2	1				1	B	U	1	2	2		1		1				
65			64	43.73866	-88.989904	11.5	R	P																				
66			65	43.73803	-88.989915	16	M	R																				
67			66	43.7374	-88.989925	17	M	R																				
68			67	43.73677	-88.989936	15	M	P																				
69			68	43.73614	-88.989947	13	M	P																				
70			69	43.73551	-88.989957	16.5	M	R																				
71			70	43.73488	-88.989968	18	M	R																				
72			71	43.73425	-88.989978	15	M	P																				
73			72	43.73362	-88.989989	13	M	P																				
74			73	43.73299	-88.99	11.5	M	P													V							
75			74	43.73236	-88.99001	9.5	M	P		1					1	B	U		1									
76			75	43.73173	-88.990021	9	M	P		2	1								1						2			
77			76	43.7311	-88.990031	6	M	P		2									2									
78			77	43.73991	-88.989014	3	M	P		1	1				1	B	U		1	1								
79			78	43.73928	-88.989025	14	M	P																				
80			79	43.73865	-88.989035	17	M	R																				
81			80	43.73802	-88.989046	18			DEEP																			
82			81	43.73739	-88.989056	16.5	M	R																				
83			82	43.73676	-88.989067	18			DEEP																			
84			83	43.73613	-88.989078	17			DEEP																			
85			84	43.7355	-88.989088	21			DEEP																			
86			85	43.73487	-88.989099	20			DEEP																			
87			86	43.73424	-88.989109	19			DEEP																			
88			87	43.73361	-88.98912	15.5	M	R													V							
89			88	43.73298	-88.989131	12	M	P		1									1									
90			89	43.73235	-88.989141	11	M	P		1					1	B	U		1									
91			90	43.73172	-88.989152	9.5	M	P		1					1	B	U											
92			91	43.73109	-88.989162	7.5	M	P		1									1		V				1			
93			92	43.74116	-88.988124	2	S	P																				
94			93	43.74053	-88.988134	5	M	P		3									1	3		1			1			
95			94	43.7399	-88.988145	15	M	P																				

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum* , Hybrid water-milfoil	*Myriophyllum spicatum* , Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* Curly-leaf pondweed	POTCR: At/NeAr/Below SurfAce	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Stuckenia pectinata* , Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
96			95	43.73927	-88.988155	17			DEEP																			
97			96	43.73864	-88.988166				DEEP																			
98			97	43.73801	-88.988177				DEEP																			
99			98	43.73738	-88.988187				DEEP																			
100			99	43.73675	-88.988198				DEEP																			
101			100	43.73612	-88.988208				DEEP																			
102			101	43.73549	-88.988219				DEEP																			
103			102	43.73486	-88.98823				DEEP																			
104			103	43.73423	-88.98824	21			DEEP																			
105			104	43.7336	-88.988251	16	M	P																				
106			105	43.73297	-88.988261	14	M	P																				
107			106	43.73234	-88.988272	12	M	P																				
108			107	43.73171	-88.988283	10	M	P																				
109			108	43.73108	-88.988293	8	M	P		1	1								1				1		1			
110			109	43.73045	-88.988304	3	M	P		1								1	1	1			1		1			
111			110	43.74179	-88.987244	2.5	S	P																				
112			111	43.74116	-88.987254	9.5	M	P		1									1									
113			112	43.74053	-88.987265	15.5	M	P		1									1									
114			113	43.7399	-88.987276	16.5			DEEP																			
115			114	43.73927	-88.987286	20			DEEP																			
116			115	43.73864	-88.987297				DEEP																			
117			116	43.73801	-88.987307				DEEP																			
118			117	43.73738	-88.987318				DEEP																			
119			118	43.73675	-88.987329				DEEP																			
120			119	43.73612	-88.987339				DEEP																			
121			120	43.73549	-88.98735				DEEP																			
122			121	43.73486	-88.987361				DEEP																			
123			122	43.73422	-88.987371	19			DEEP																			
124			123	43.73359	-88.987382	17			DEEP																			
125			124	43.73296	-88.987392	13.5	M	P																				
126			125	43.73233	-88.987403	13	M	P																				
127			126	43.7317	-88.987414	11	M	P		1					1	B	U	1										
128			127	43.73107	-88.987424	8.5	M	P		1									1			1			1			
129			128	43.73044	-88.987435	3	R	P																				
130			129	43.74178	-88.986374	8	M	P		1					1	B	U		1									
131			130	43.74115	-88.986385	13.5	M	P																				
132			131	43.74052	-88.986396	15.5	M	P																				
133			132	43.73989	-88.986406	16.5			DEEP																			
134			133	43.73926	-88.986417	19			DEEP																			
135			134	43.73863	-88.986428				DEEP																			
136			135	43.738	-88.986438				DEEP																			
137			136	43.73737	-88.986449				DEEP																			
138			137	43.73674	-88.98646				DEEP																			
139			138	43.73611	-88.98647				DEEP																			
140			139	43.73548	-88.986481				DEEP																			
141			140	43.73485	-88.986491				DEEP																			
142			141	43.73422	-88.986502				DEEP																			

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum* , Hybrid water-milfoil	*Myriophyllum spicatum* , Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus* Curly-leaf pondweed	*POTCR: At/NeAr/Below SurfAce*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Stuckenia pectinata* , Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
143			142	43.73359	-88.986513	16.5			DEEP																			
144			143	43.73296	-88.986523	14	M	P		1												1						
145			144	43.73233	-88.986534	14	M	P																				
146			145	43.7317	-88.986545	12.5	M	P																				
147			146	43.73107	-88.986555	9	M	P		2					1	B	U		1	1		1			2			
148			147	43.73044	-88.986566	6.5	S	P		2									2				1		1			
149			148	43.72981	-88.986576	3	S	P		1										1			1		1			
150			149	43.74429	-88.985463	2	S	P		2								1	2		V							
151			150	43.74366	-88.985473	2	S	P		1										1					1			
152			151	43.74303	-88.985484	2	S	P		1								1		1								
153			152	43.7424	-88.985495	7	M	P		1									1						1			
154			153	43.74177	-88.985505	13	M	P																				
155			154	43.74114	-88.985516	15.5	M	P																				
156			155	43.74051	-88.985527	16	M	R																				
157			156	43.73988	-88.985537	17			DEEP																			
158			157	43.73925	-88.985548				DEEP																			
159			158	43.73862	-88.985558				DEEP																			
160			159	43.73799	-88.985569				DEEP																			
161			160	43.73736	-88.98558				DEEP																			
162			161	43.73673	-88.98559				DEEP																			
163			162	43.7361	-88.985601				DEEP																			
164			163	43.73547	-88.985612				DEEP																			
165			164	43.73484	-88.985622				DEEP																			
166			165	43.73421	-88.985633				DEEP																			
167			166	43.73358	-88.985644	17			DEEP																			
168			167	43.73295	-88.985654	15.5	M	P		1									1			1						
169			168	43.73232	-88.985665	15	M	P																				
170			169	43.73169	-88.985676	13	M	P																				
171			170	43.73106	-88.985686	9	M	P		1					1	B	U		1			1			1			
172			171	43.73043	-88.985697	7.5	M	P		1									1									
173			172	43.7298	-88.985707	5	M	P		2									2						1			
174			173	43.74428	-88.984593	5.5	M	P		2									2									
175			174	43.74365	-88.984604	7	M	P		3									3						1			
176			175	43.74302	-88.984615	10	M	P																				
177			176	43.74239	-88.984625	12	M	P																				
178			177	43.74176	-88.984636	14	M	P																				
179			178	43.74113	-88.984647	15	M	P																				
180			179	43.7405	-88.984657	15	M	P																				
181			180	43.73987	-88.984668	17			DEEP																			
182			181	43.73924	-88.984679				DEEP																			
183			182	43.73861	-88.984689				DEEP																			
184			183	43.73798	-88.9847				DEEP																			
185			184	43.73735	-88.984711				DEEP																			
186			185	43.73672	-88.984721				DEEP																			
187			186	43.73609	-88.984732				DEEP																			
188			187	43.73546	-88.984743				DEEP																			
189			188	43.73483	-88.984753				DEEP																			

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum*, Hybrid water-milfoil	*Myriophyllum spicatum*, Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus*, Curly-leaf pondweed	*POTCR: At/NeAr/Below SurfAce*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Stuckenia pectinata*, Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
190			189	43.7342	-88.984764				DEEP																			
191			190	43.73357	-88.984775	18			DEEP																			
192			191	43.73294	-88.984785	16	M	R																				
193			192	43.73231	-88.984796	15	M	P																				
194			193	43.73168	-88.984806	11	M	P																				
195			194	43.73105	-88.984817	9	M	P		1															1			
196			195	43.73042	-88.984828	7.5	M	P		2	1								2									
197			196	43.72979	-88.984838	5	S	P		1	1								1									
198			197	43.74428	-88.983724	6.5	M	P		2									2									
199			198	43.74365	-88.983735	8	M	P		1									1						1			
200			199	43.74302	-88.983746	10	M	P																				
201			200	43.74239	-88.983756	11	M	P																				
202			201	43.74176	-88.983767	12	M	P																				
203			202	43.74113	-88.983778	13	M	P																				
204			203	43.7405	-88.983788	15	M	P		1															1			
205			204	43.73987	-88.983799	17			DEEP																			
206			205	43.73924	-88.98381				DEEP																			
207			206	43.73861	-88.98382				DEEP																			
208			207	43.73798	-88.983831				DEEP																			
209			208	43.73734	-88.983841				DEEP																			
210			209	43.73671	-88.983852				DEEP																			
211			210	43.73608	-88.983863				DEEP																			
212			211	43.73545	-88.983873				DEEP																			
213			212	43.73482	-88.983884				DEEP																			
214			213	43.73419	-88.983895				DEEP																			
215			214	43.73356	-88.983905	17			DEEP																			
216			215	43.73293	-88.983916	16	M	R													V							
217			216	43.7323	-88.983927	14	M	P																				
218			217	43.73167	-88.983937	10	M	P		1											1							
219			218	43.73104	-88.983948	7.5	M	P													V							
220			219	43.73041	-88.983959	4	R	P		1									1		V				1			
221			220	43.74427	-88.982855	6	M	P		2									2			1			1			
222			221	43.74364	-88.982866	8	M	P		1									1									
223			222	43.74301	-88.982876	9.5	M	P		1									1									
224			223	43.74238	-88.982887	10.5	M	P		1									1									
225			224	43.74175	-88.982898	11	M	P																				
226			225	43.74112	-88.982908	9	R	P																				
227			226	43.74049	-88.982919	15		P																				
228			227	43.73986	-88.98293	18.5			DEEP																			
229			228	43.73923	-88.98294				DEEP																			
230			229	43.7386	-88.982951				DEEP																			
231			230	43.73797	-88.982962				DEEP																			
232			231	43.73734	-88.982972				DEEP																			
233			232	43.73671	-88.982983				DEEP																			
234			233	43.73608	-88.982994				DEEP																			
235			234	43.73545	-88.983004				DEEP																			
236			235	43.73482	-88.983015				DEEP																			

Survey Date: July 5 and 6, 2007

1	Entry		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum*, Hybrid water-milfoil	*Myriophyllum spicatum*, Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* Curly-leaf pondweed	POTCR: At/NeAr/Below SurfAce	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Stuckenia pectinata*, Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
237			236	43.73419	-88.983026	20			DEEP																			
238			237	43.73356	-88.983036	16	M	R																				
239			238	43.73293	-88.983047	15	M	R																				
240			239	43.7323	-88.983058	12.5	M	P													V							
241			240	43.73167	-88.983068	8	M	P		1	1								1						1			
242			241	43.74426	-88.981986	5	M	P		3									3						1			
243			242	43.74363	-88.981996	7.5	M	P		3									3						1			
244			243	43.743	-88.982007	9	M	P		1									1									
245			244	43.74237	-88.982018	10	M	P																				
246			245	43.74174	-88.982028	10.5	R	P																				
247			246	43.74111	-88.982039	9	R	P																				
248			247	43.74048	-88.98205	14	M	R																				
249			248	43.73985	-88.982061	15	M	R																				
250			249	43.73922	-88.982071				DEEP																			
251			250	43.73859	-88.982082	19			DEEP																			
252			251	43.73796	-88.982093	19			DEEP																			
253			252	43.73733	-88.982103	18.5			DEEP																			
254			253	43.7367	-88.982114	18.5			DEEP																			
255			254	43.73607	-88.982125				DEEP																			
256			255	43.73544	-88.982135				DEEP																			
257			256	43.73481	-88.982146	18			DEEP																			
258			257	43.73418	-88.982157	16	M	R																				
259			258	43.73355	-88.982167	15.5	M	R																				
260			259	43.73292	-88.982178	12	R	R													V							
261			260	43.74362	-88.981127	5.5	M	P		2									2						1			
262			261	43.74299	-88.981138	8	M	P		2	1				1	B	U								2			
263			262	43.74236	-88.981149	9.5	M	P		1									1									
264			263	43.74173	-88.981159	11	M	P																				
265			264	43.7411	-88.98117	14	M	P																				
266			265	43.74047	-88.981181	15	M	P																				
267			266	43.73984	-88.981191	15	M	P																				
268			267	43.73921	-88.981202	16	M	R																				
269			268	43.73858	-88.981213	16	M	R																				
270			269	43.73795	-88.981223	16.5	M	R																				
271			270	43.73732	-88.981234	17			DEEP																			
272			271	43.73669	-88.981245				DEEP																			
273			272	43.73606	-88.981255				DEEP																			
274			273	43.73543	-88.981266	17			DEEP																			
275			274	43.7348	-88.981277	16	M	R																				
276			275	43.73417	-88.981288	16	M	R																				
277			276	43.73354	-88.981298	13	M	P																				
278			277	43.74362	-88.980258	4	M	P		2								1	2						1			
279			278	43.74299	-88.980269	7	M	P		1									1				1		1			
280			279	43.74236	-88.980279	9	M	P		1									1						1			
281			280	43.74173	-88.98029	11	M	P																				
282			281	43.7411	-88.980301	13.5	M	P																				
283			282	43.74046	-88.980311	14	M	P																				

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum* , Hybrid water-milfoil	*Myriophyllum spicatum* , Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus* , Curly-leaf pondweed	*POTCR: At/NeAr/Below SurfAce*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Stuckenia pectinata* , Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
284			283	43.73983	-88.980322	14	M	P																				
285			284	43.7392	-88.980333	14.5	M	P																				
286			285	43.73857	-88.980344	15.5	M	R																				
287			286	43.73794	-88.980354	16	M	R																				
288			287	43.73731	-88.980365	16	M	R																				
289			288	43.73668	-88.980376	15.5	M	R																				
290			289	43.73605	-88.980386	15.5	M	R																				
291			290	43.73542	-88.980397	15	M	P																				
292			291	43.73479	-88.980408	15	M	P																				
293			292	43.73416	-88.980418	13.5	M	P																				
294			293	43.73353	-88.980429	7.5	S	P		1															1			
295			294	43.74361	-88.979389	4	M	P		1									1			1			1			
296			295	43.74298	-88.979399	6.5	M	P		1									1						1			
297			296	43.74235	-88.97941	8.5	M	P		1					1	B	U		1						1			
298			297	43.74172	-88.979421	10	M	P																				
299			298	43.74109	-88.979432	11	M	P																				
300			299	43.74046	-88.979442	12	M	P																				
301			300	43.73983	-88.979453	12.5	M	P																				
302			301	43.7392	-88.979464	13.5	M	P		1															1			
303			302	43.73857	-88.979474	13	M	P																				
304			303	43.73794	-88.979485	15	M	P																				
305			304	43.73731	-88.979496	15	M	P																				
306			305	43.73668	-88.979507	15	M	P																				
307			306	43.73605	-88.979517	15	M	P																				
308			307	43.73542	-88.979528	14	M	P																				
309			308	43.73479	-88.979539	12	M	P		1									1									
310			309	43.73416	-88.979549	3	M	P																				
311			310	43.74297	-88.97853	5.5	M	P		3								1	3						1			
312			311	43.74234	-88.978541	8	M	P		1									1						1			
313			312	43.74171	-88.978552	9	M	P		1					1	B	U		1						1			
314			313	43.74108	-88.978562	10	M	P		1					1	B	U											
315			314	43.74045	-88.978573	10.5	M	P		1					1	B	U		1									
316			315	43.73982	-88.978584	11.5	M	P																				
317			316	43.73919	-88.978595	12.5	M	P																				
318			317	43.73856	-88.978605	13	M	P																				
319			318	43.73793	-88.978616	13	M	P																				
320			319	43.7373	-88.978627	13.5	M	P																				
321			320	43.73667	-88.978637	14	M	P																				
322			321	43.73604	-88.978648	13	M	P																				
323			322	43.73541	-88.978659	12.5	M	P																				
324			323	43.73478	-88.97867	10	M	P																				
325			324	43.74296	-88.977661	3	M	P		2								1							2			
326			325	43.74233	-88.977672	6.5	M	P		2									1						2			
327			326	43.7417	-88.977682	8	M	P		1													1					
328			327	43.74107	-88.977693	9	M	P																				
329			328	43.74044	-88.977704	9.5	M	P		1					1	B	U		1						1			
330			329	43.73981	-88.977715	10	M	P		1															1			

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum* , Hybrid water-milfoil	*Myriophyllum spicatum* , Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus* Curly-leaf pondweed	*POTCR: At/NeAr/Below SurfAce*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Stuckenia pectinata* , Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
331			330	43.73918	-88.977725	10.5	M	P		1					1	B	U								1			
332			331	43.73855	-88.977736	11.5	M	P																				
333			332	43.73792	-88.977747	11.5	M	P																				
334			333	43.73729	-88.977758	12	M	P																				
335			334	43.73666	-88.977768	12	M	P		1															1			
336			335	43.73603	-88.977779	11	M	P																				
337			336	43.7354	-88.97779	11	M	P		1									1									
338			337	43.73477	-88.9778	8.5	M	P		1									1						1			
339			338	43.74232	-88.976803	4	S	P																				
340			339	43.74169	-88.976813	7	M	P		2									2						1			
341			340	43.74106	-88.976824	8	M	P		1									1						1			
342			341	43.74043	-88.976835	8	M	P																				
343			342	43.7398	-88.976845	9	M	P		1									1						1			
344			343	43.73917	-88.976856	9	M	P		1															1			
345			344	43.73854	-88.976867	10	M	P																				
346			345	43.73791	-88.976878	10	M	P		1					1	B	U		1									
347			346	43.73728	-88.976888	10.5	M	P		1									1									
348			347	43.73665	-88.976899	10.5	M	P																				
349			348	43.73602	-88.97691	10	M	P		2	1				1	B	U		2						1			
350			349	43.73539	-88.976921	9	M	P		1									1									
351			350	43.73476	-88.976931	8	M	P		1									1									
352			351	43.74106	-88.975955	5	S	P		1								1	1						1			
353			352	43.74043	-88.975966	6	M	P		2									1						2			
354			353	43.7398	-88.975976	7	M	P		1									1						1			
355			354	43.73917	-88.975987	8	M	P		1									1			1			1			
356			355	43.73854	-88.975998	8	M	P																				
357			356	43.73791	-88.976009	8.5	M	P																				
358			357	43.73728	-88.976019	8.5	S	P																				
359			358	43.73664	-88.97603	8	S	P		1					1	B	U		1						1			
360			359	43.73601	-88.976041	9	M	P		1									1									
361			360	43.73538	-88.976051	8	M	P		1					1	B	U		1				1					
362			361	43.73475	-88.976062	7	M	P		1									1									
363			362	43.73412	-88.976073	5	M	P		1									1									
364			363	43.73979	-88.975107	3.5	M	P																				
365			364	43.73916	-88.975118	6	M	P		1									1						1			
366			365	43.73853	-88.975129	6	M	P		1									1						1			
367			366	43.73601	-88.975172				TEMPORARY OBSTACLE																			
368			367	43.73538	-88.975182	7.5	M	P		1									1									
369			368	43.73475	-88.975193	6.5	M	P		1					1	B	U		1			1						
370			369	43.73412	-88.975204	5	M	P		1									1									
371			370	43.73349	-88.975215	4	M	P		1									1					1				
372			371	43.73537	-88.974313	6.5	M	P		1									1						1			
373			372	43.73474	-88.974324	6	M	P		1									1									
374			373	43.73411	-88.974335	5	M	P		2									2									
375			374	43.73348	-88.974346	3.5	M	P		1									1									
376			375	43.73536	-88.973444	3.5	R	P		1									1						1			
377			376	43.73473	-88.973455	4	R	P		1	1								1						1			

Survey Date: July 5 and 6, 2007

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum X sibericum*, Hybrid water-milfoil	*Myriophyllum spicatum*, Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus* Curly-leaf pondweed	*POTCR: At/NeAr/Below SurfAce*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Stuckenia pectinata*, Sago pondweed	*Elodea* sp., Waterweed	sp3	sp4	sp5
378			377	43.7341	-88.973466	4	M	P		1									1									

Survey Date: July 2, 2008

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Elodea nuttallii* , Slender waterweed	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	moss	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1	sp2	sp3	sp4
2	**Name**	Little Green	1	43.7355696	-88.99691015	4	M	P		2	2	A	D				1	1			1										
3	**County**	Green Lake	2	43.7349394	-88.99692067	4	M	P		1											1										
4	**WBIC**	162500	3	43.7343093	-88.99693119	2.5	M	P		1	V	A	D				1			1											
5	**Date**	07/02/08	4	43.7361922	-88.99603051	4	S	P		1							1	1													
6	**Field Crew**	Michelle Nault	5	43.735562	-88.99604104	5.5	M	P		1							1	1													
7		Jesse Schwingle	6	43.7349318	-88.99605157	5	M	P		1							1	1													
8			7	43.7343016	-88.99606209	3	S	P		1	1	A	D				1	1													
9			8	43.7361845	-88.99516138	6.5	M	P		1							1	1													
10			9	43.7355544	-88.99517192	7	M	P		2								2			1										
11			10	43.7349242	-88.99518246	5.5	M	P		2	1	A	D				1	2		1			1								
12			11	43.734294	-88.995193	3.5	S	P			V	A	D				2														
13			12	43.7368071	-88.99428171	6.5	M	P		2							1	2													
14			13	43.7361769	-88.99429226	9	M	P																							
15			14	43.7355467	-88.99430281	8	M	P																							
16			15	43.7349165	-88.99431335	6	M	P		2	1	B	U				1	2		1											
17			16	43.7342864	-88.9943239	3.5	M	P		1	V	A	D				2	1													
18			17	43.733026	-88.99434499	5	M	P		1							1	1													
19			18	43.7323958	-88.99435554	4.5	M	P		1	V	A	D					1					1				1				
20			19	43.7367994	-88.99341258	9	M	P		1								1							1						
21			20	43.7361692	-88.99342314	14.5	M	P																							
22			21	43.7355391	-88.99343369	9	M	P		1							1	1													
23			22	43.7349089	-88.99344425	6	M	P		2	2	A	D				1	1													
24			23	43.7336485	-88.99346536	5	M	P		1	V	A	U	1	B	U		1													
25			24	43.7330183	-88.99347592	5.5	M	P		3				1	B	U	1	3			1										
26			25	43.7323882	-88.99348647	5.5	M	P		2	1	A	D	1	A	D	1	2				1	1								
27			26	43.731758	-88.99349703	4.5	M	P		1				1	B	U	1	1				1	1								
28			27	43.7311278	-88.99350758	2.5	M	P		1				1	B	D	1					1	1								
29			28	43.7374219	-88.99253288	12	M	P																							
30			29	43.7367918	-88.99254345	11.5	M	P																							
31			30	43.7361616	-88.99255401	14.5	M	P																							
32			31	43.7355314	-88.99256458	7.5	M	P		1								1													
33			32	43.7349012	-88.99257515	6.5	M	P		1	1	B	U	1	B	U	1	1													
34			33	43.734271	-88.99258571	3	R	P		1	1	B	U				2	1													
35			34	43.7336409	-88.99259628	6	M	P		2	2	A	D	1	A	D		2		1		1									
36			35	43.7330107	-88.99260684	6	M	P		2	2	A	D	1	A	D	2	2				1	1								
37			36	43.7323805	-88.9926174	5.5	M	P		2	2	A	D	1	A	D	2	1					1								
38			37	43.7317503	-88.99262797	5	M	P		2				1	B	U	1	2		1											
39			38	43.7311202	-88.99263853	4.5	M	P		2	V	A	D				2	2		1			1				1				
40			39	43.73049	-88.9926491	3	M	P		1	V	A	D				1	1													
41			40	43.7374143	-88.99166374	12.5	M	P																							
42			41	43.7367841	-88.99167432				DEEP																						
43			42	43.7361539	-88.99168489	12.5	M	P																							
44			43	43.7355237	-88.99169547	12.5	M	P																							
45			44	43.7348936	-88.99170604	10	M	P																							
46			45	43.7342634	-88.99171662	9.5	M	P		1								1													
47			46	43.7336332	-88.99172719	8.5	M	P																							
48			47	43.733003	-88.99173776	8	M	P		1				1	B	U	1	1													
49			48	43.7323728	-88.99174834	6.5	M	P		2	V	A	D	1	B	U	1	2		1			1								
50			49	43.7317427	-88.99175891	5	R	P		2							2	2					1								
51			50	43.7311125	-88.99176948	5.5	M	P		2	1	B	U	1	B	U	2	2		1	1		1								
52			51	43.7380368	-88.99078402	13	S	P																							
53			52	43.7374066	-88.9907946	17.5			DEEP																						
54			53	43.7367764	-88.99080519	15.5	M	P																							
55			54	43.7361462	-88.99081577	12	M	P																							
56			55	43.7355161	-88.99082635	15.5	M	P																							

Survey Date: July 2, 2008

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Elodea nuttallii* , Slender waterweed	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	moss	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1	sp2	sp3	sp4
57			56	43.7348859	-88.99083694	15	M	P		1								1													
58			57	43.7342557	-88.99084752	13	M	P									1														
59			58	43.7336255	-88.9908581	12	M	P																							
60			59	43.7329954	-88.99086869	10.5	M	P																							
61			60	43.7323652	-88.99087927	9	M	P																							
62			61	43.731735	-88.99088985	8	M	P		1											1										
63			62	43.7311048	-88.99090043				NO INFORMATION																						
64			63	43.7392894	-88.98989368	3.5	S	P									1	1	1												
65			64	43.7386593	-88.98990427	12.5	S	P		1							1	1													
66			65	43.7380291	-88.98991487				DEEP																						
67			66	43.7373989	-88.98992546				DEEP																						
68			67	43.7367687	-88.98993605				DEEP																						
69			68	43.7361386	-88.98994665				DEEP																						
70			69	43.7355084	-88.98995724				DEEP																						
71			70	43.7348782	-88.98996783				DEEP																						
72			71	43.734248	-88.98997843				DEEP																						
73			72	43.7336179	-88.98998902				DEEP																						
74			73	43.7329877	-88.98999961	12.5	M	P																							
75			74	43.7323575	-88.9900102	10.5	M	P		1								1													
76			75	43.7317273	-88.99002079	10	M	P																							
77			76	43.7310971	-88.99003138	7.5	M	P		1				1	B	U	1	1													
78			77	43.7399119	-88.98901391	6	S	P									1														
79			78	43.7392818	-88.98902451	15			DEEP																						
80			79	43.7386516	-88.98903511				DEEP																						
81			80	43.7380214	-88.98904572				DEEP																						
82			81	43.7373912	-88.98905632				DEEP																						
83			82	43.7367611	-88.98906692				DEEP																						
84			83	43.7361309	-88.98907753				DEEP																						
85			84	43.7355007	-88.98908813				DEEP																						
86			85	43.7348705	-88.98909873				DEEP																						
87			86	43.7342403	-88.98910933				DEEP																						
88			87	43.7336102	-88.98911993				DEEP																						
89			88	43.73298	-88.98913054	14	M	P																							
90			89	43.7323498	-88.98914114	11.5	M	P																							
91			90	43.7317196	-88.98915174	10.5	M	P																							
92			91	43.7310895	-88.98916234	8.5	M	P		1				1	B	U	1														
93			92	43.7411646	-88.9881235	2.5	R	P		1	1	B	S				2														
94			93	43.7405344	-88.98813412	5.5	S	P																							
95			94	43.7399042	-88.98814473	16			DEEP																						
96			95	43.7392741	-88.98815534				DEEP																						
97			96	43.7386439	-88.98816596				DEEP																						
98			97	43.7380137	-88.98817657				DEEP																						
99			98	43.7373835	-88.98818718				DEEP																						
100			99	43.7367534	-88.98819779				DEEP																						
101			100	43.7361232	-88.98820841				DEEP																						
102			101	43.735493	-88.98821902				DEEP																						
103			102	43.7348628	-88.98822963				DEEP																						
104			103	43.7342327	-88.98824024				DEEP																						
105			104	43.7336025	-88.98825085				DEEP																						
106			105	43.7329723	-88.98826146				DEEP																						
107			106	43.7323421	-88.98827207				DEEP																						
108			107	43.731712	-88.98828268	11.5	M	P																							
109			108	43.7310818	-88.98829329	9	M	P		1				1	B	U	1	1			1										
110			109	43.7304516	-88.9883039	4.5	S	P			V	A	U				2														
111			110	43.7417871	-88.98724368	3	S	P		1	1	B	S				1														

Survey Date: July 2, 2008

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Elodea nuttallii* , Slender waterweed	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	moss	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1	sp2	sp3	sp4
112			111	43.7411569	-88.98725431	9.5	S	P		1							1	1													
113			112	43.7405267	-88.98726493	17			DEEP																						
114			113	43.7398965	-88.98727555				DEEP																						
115			114	43.7392664	-88.98728618				DEEP																						
116			115	43.7386362	-88.9872968				DEEP																						
117			116	43.738006	-88.98730742				DEEP																						
118			117	43.7373758	-88.98731804				DEEP																						
119			118	43.7367457	-88.98732866				DEEP																						
120			119	43.7361155	-88.98733929				DEEP																						
121			120	43.7354853	-88.98734991				DEEP																						
122			121	43.7348551	-88.98736053				DEEP																						
123			122	43.734225	-88.98737115				DEEP																						
124			123	43.7335948	-88.98738177				DEEP																						
125			124	43.7329646	-88.98739239				DEEP																						
126			125	43.7323344	-88.987403				DEEP																						
127			126	43.7317043	-88.98741362	12.5	M	P																							
128			127	43.7310741	-88.98742424	9.5	M	P																							
129			128	43.7304439	-88.98743486	4.5	R	P		1							1														
130			129	43.7417794	-88.98637448	7.5	S	P																							
131			130	43.7411492	-88.98638512	15	M	P																							
132			131	43.740519	-88.98639575				DEEP																						
133			132	43.7398888	-88.98640638				DEEP																						
134			133	43.7392587	-88.98641701				DEEP																						
135			134	43.7386285	-88.98642764				DEEP																						
136			135	43.7379983	-88.98643827				DEEP																						
137			136	43.7373681	-88.9864489				DEEP																						
138			137	43.736738	-88.98645954				DEEP																						
139			138	43.7361078	-88.98647017				DEEP																						
140			139	43.7354776	-88.9864808				DEEP																						
141			140	43.7348474	-88.98649142				DEEP																						
142			141	43.7342173	-88.98650205				DEEP																						
143			142	43.7335871	-88.98651268				DEEP																						
144			143	43.7329569	-88.98652331				DEEP																						
145			144	43.7323267	-88.98653394				DEEP																						
146			145	43.7316966	-88.98654457	13	M	P									1														
147			146	43.7310664	-88.98655519	9.5	M	P																							
148			147	43.7304362	-88.98656582	6	R	P		1							1	1													
149			148	43.729806	-88.98657645	4	S	P		1	V	A	D				2								1						
150			149	43.7442924	-88.98546271	3.5	S	P		1							1	1													
151			150	43.7436622	-88.98547335	2.5	S	P		1							2		1								1				
152			151	43.743032	-88.985484	3	S	P		1							2		1							1					
153			152	43.7424018	-88.98549464	7.5	S	P									1														
154			153	43.7417717	-88.98550528	15	M	P									1														
155			154	43.7411415	-88.98551592				DEEP																						
156			155	43.7405113	-88.98552656				DEEP																						
157			156	43.7398811	-88.98553721				DEEP																						
158			157	43.739251	-88.98554785				DEEP																						
159			158	43.7386208	-88.98555849				DEEP																						
160			159	43.7379906	-88.98556913				DEEP																						
161			160	43.7373604	-88.98557977				DEEP																						
162			161	43.7367303	-88.98559041				DEEP																						
163			162	43.7361001	-88.98560105				DEEP																						
164			163	43.7354699	-88.98561168				DEEP																						
165			164	43.7348397	-88.98562232				DEEP																						
166			165	43.7342095	-88.98563296				DEEP																						

Survey Date: July 2, 2008

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* ,Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Elodea nuttallii* , Slender waterweed	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	moss	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1	sp2	sp3	sp4
167			166	43.7335794	-88.9856436				DEEP																						
168			167	43.7329492	-88.98565424				DEEP																						
169			168	43.732319	-88.98566487				DEEP																						
170			169	43.7316888	-88.98567551	13.5	M	P																							
171			170	43.7310587	-88.98568615	9.5	M	P																							
172			171	43.7304285	-88.98569678	8	M	P		1				1	B	U	1														
173			172	43.7297983	-88.98570742	6.5	S	P		1							1						1								
174			173	43.7442846	-88.98459347	6	M	P		1							1	1													
175			174	43.7436545	-88.98460412	8	M	P		2								2					1								
176			175	43.7430243	-88.98461478	10.5	M	P		1							1	1													
177			176	43.7423941	-88.98462543				DEEP																						
178			177	43.7417639	-88.98463608				DEEP																						
179			178	43.7411338	-88.98464673				DEEP																						
180			179	43.7405036	-88.98465738				DEEP																						
181			180	43.7398734	-88.98466803				DEEP																						
182			181	43.7392432	-88.98467868				DEEP																						
183			182	43.7386131	-88.98468933				DEEP																						
184			183	43.7379829	-88.98469998				DEEP																						
185			184	43.7373527	-88.98471063				DEEP																						
186			185	43.7367225	-88.98472128				DEEP																						
187			186	43.7360924	-88.98473193				DEEP																						
188			187	43.7354622	-88.98474257				DEEP																						
189			188	43.734832	-88.98475322				DEEP																						
190			189	43.7342018	-88.98476387				DEEP																						
191			190	43.7335717	-88.98477452				DEEP																						
192			191	43.7329415	-88.98478516				DEEP																						
193			192	43.7323113	-88.98479581				DEEP																						
194			193	43.7316811	-88.98480645	12	S	P																							
195			194	43.7310509	-88.9848171	9.5	M	P									1														
196			195	43.7304208	-88.98482775	8	M	P		1				1	B	U	1														
197			196	43.7297906	-88.98483839	5.5	S	P									2														
198			197	43.7442769	-88.98372423	8	M	P		1								1													
199			198	43.7436467	-88.98373489	9	M	P		2				1	B	U		2													
200			199	43.7430166	-88.98374556	11	M	P		1								1													
201			200	43.7423864	-88.98375622				DEEP																						
202			201	43.7417562	-88.98376688				DEEP																						
203			202	43.741126	-88.98377754				DEEP																						
204			203	43.7404959	-88.9837882				DEEP																						
205			204	43.7398657	-88.98379886				DEEP																						
206			205	43.7392355	-88.98380952				DEEP																						
207			206	43.7386053	-88.98382018				DEEP																						
208			207	43.7379752	-88.98383083				DEEP																						
209			208	43.737345	-88.98384149				DEEP																						
210			209	43.7367148	-88.98385215				DEEP																						
211			210	43.7360846	-88.98386281				DEEP																						
212			211	43.7354545	-88.98387346				DEEP																						
213			212	43.7348243	-88.98388412				DEEP																						
214			213	43.7341941	-88.98389478				DEEP																						
215			214	43.7335639	-88.98390543				DEEP																						
216			215	43.7329338	-88.98391609				DEEP																						
217			216	43.7323036	-88.98392674				DEEP																						
218			217	43.7316734	-88.9839374	11	M	P																							
219			218	43.7310432	-88.98394805	9	M	P									1														
220			219	43.7304131	-88.98395871	5.5	S	P									1														
221			220	43.7442692	-88.982855	7	M	P		1								1													

Survey Date: July 2, 2008

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* ,Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Elodea nuttallii* , Slender waterweed	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	moss	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1	sp2	sp3	sp4
222			221	43.743639	-88.98286567	9	M	P																							
223			222	43.7430088	-88.98287634	10	M	P																							
224			223	43.7423787	-88.98288701				DEEP																						
225			224	43.7417485	-88.98289768				DEEP																						
226			225	43.7411183	-88.98290835				DEEP																						
227			226	43.7404881	-88.98291901				DEEP																						
228			227	43.739858	-88.98292968				DEEP																						
229			228	43.7392278	-88.98294035				DEEP																						
230			229	43.7385976	-88.98295102				DEEP																						
231			230	43.7379674	-88.98296169				DEEP																						
232			231	43.7373373	-88.98297235				DEEP																						
233			232	43.7367071	-88.98298302				DEEP																						
234			233	43.7360769	-88.98299369				DEEP																						
235			234	43.7354467	-88.98300435				DEEP																						
236			235	43.7348166	-88.98301502				DEEP																						
237			236	43.7341864	-88.98302569				DEEP																						
238			237	43.7335562	-88.98303635				DEEP																						
239			238	43.732926	-88.98304702				DEEP																						
240			239	43.7322958	-88.98305768	13	M	P																							
241			240	43.7316657	-88.98306834	9	M	P																							
242			241	43.7442614	-88.98198576	5.5	R	P		1								1													
243			242	43.7436313	-88.98199644	8.5	M	P		1								1													
244			243	43.7430011	-88.98200712	10	M	P																							
245			244	43.7423709	-88.9820178				DEEP																						
246			245	43.7417407	-88.98202848				DEEP																						
247			246	43.7411106	-88.98203915				DEEP																						
248			247	43.7404804	-88.98204983				DEEP																						
249			248	43.7398502	-88.98206051				DEEP																						
250			249	43.73922	-88.98207119				DEEP																						
251			250	43.7385899	-88.98208186				DEEP																						
252			251	43.7379597	-88.98209254				DEEP																						
253			252	43.7373295	-88.98210322				DEEP																						
254			253	43.7366993	-88.98211389				DEEP																						
255			254	43.7360692	-88.98212457				DEEP																						
256			255	43.735439	-88.98213524				DEEP																						
257			256	43.7348088	-88.98214592				DEEP																						
258			257	43.7341786	-88.98215659				DEEP																						
259			258	43.7335485	-88.98216727	16			DEEP																						
260			259	43.7329183	-88.98217794	12.5	R	P																							
261			260	43.7436235	-88.98112721	7	M	P		2								2		1											
262			261	43.7429933	-88.9811379	9	M	P																							
263			262	43.7423632	-88.98114859				DEEP																						
264			263	43.741733	-88.98115928				DEEP																						
265			264	43.7411028	-88.98116996				DEEP																						
266			265	43.7404726	-88.98118065				DEEP																						
267			266	43.7398425	-88.98119134				DEEP																						
268			267	43.7392123	-88.98120202				DEEP																						
269			268	43.7385821	-88.98121271				DEEP																						
270			269	43.7379519	-88.9812234				DEEP																						
271			270	43.7373218	-88.98123408				DEEP																						
272			271	43.7366916	-88.98124477				DEEP																						
273			272	43.7360614	-88.98125545				DEEP																						
274			273	43.7354312	-88.98126614				DEEP																						
275			274	43.7348011	-88.98127682				DEEP																						
276			275	43.7341709	-88.9812875	17			DEEP																						

Survey Date: July 2, 2008

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Elodea nuttallii* , Slender waterweed	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	moss	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1	sp2	sp3	sp4
277			276	43.7335407	-88.98129819	13.5	M	P																							
278			277	43.7436158	-88.98025798	5	S	P																							
279			278	43.7429856	-88.98026868	7.5	M	P																							
280			279	43.7423554	-88.98027938				DEEP																						
281			280	43.7417252	-88.98029008				DEEP																						
282			281	43.7410951	-88.98030077				DEEP																						
283			282	43.7404649	-88.98031147				DEEP																						
284			283	43.7398347	-88.98032217				DEEP																						
285			284	43.7392045	-88.98033286				DEEP																						
286			285	43.7385744	-88.98034356				DEEP																						
287			286	43.7379442	-88.98035425				DEEP																						
288			287	43.737314	-88.98036495				DEEP																						
289			288	43.7366838	-88.98037564				DEEP																						
290			289	43.7360537	-88.98038633				DEEP																						
291			290	43.7354235	-88.98039703				DEEP																						
292			291	43.7347933	-88.98040772				DEEP																						
293			292	43.7341631	-88.98041841	14.5	M	P																							
294			293	43.733533	-88.98042911	8	S	P																							
295			294	43.743608	-88.97938876	5	M	P		2							2	2		2											
296			295	43.7429778	-88.97939946	8	M	P																							
297			296	43.7423477	-88.97941017				DEEP																						
298			297	43.7417175	-88.97942088				DEEP																						
299			298	43.7410873	-88.97943158				DEEP																						
300			299	43.7404571	-88.97944229				DEEP																						
301			300	43.739827	-88.97945299				DEEP																						
302			301	43.7391968	-88.9794637				DEEP																						
303			302	43.7385666	-88.9794744				DEEP																						
304			303	43.7379364	-88.97948511				DEEP																						
305			304	43.7373063	-88.97949581				DEEP																						
306			305	43.7366761	-88.97950651				DEEP																						
307			306	43.7360459	-88.97951722	15	M	P																							
308			307	43.7354157	-88.97952792	14.5	M	P																							
309			308	43.7347856	-88.97953862	13	M	P																							
310			309	43.7341554	-88.97954932	4.5	R	P																							
311			310	43.7429701	-88.97853025	7	M	P																							
312			311	43.7423399	-88.97854096	8.5	M	P		1								1													
313			312	43.7417097	-88.97855168	10	M	P		1								1													
314			313	43.7410795	-88.97856239	11	M	P																							
315			314	43.7404494	-88.97857311	11.5	M	P																							
316			315	43.7398192	-88.97858382	15			DEEP																						
317			316	43.739189	-88.97859454				DEEP																						
318			317	43.7385588	-88.97860525				DEEP																						
319			318	43.7379287	-88.97861596				DEEP																						
320			319	43.7372985	-88.97862667				DEEP																						
321			320	43.7366683	-88.97863739				DEEP																						
322			321	43.7360382	-88.9786481	14	M	P																							
323			322	43.735408	-88.97865881	13	M	P																							
324			323	43.7347778	-88.97866952	11	M	P																							
325			324	43.7429623	-88.97766103	4.5	M	P									1														
326			325	43.7423321	-88.97767175	7.5	M	P		2								2		1											
327			326	43.7417019	-88.97768248	9	M	P																							
328			327	43.7410718	-88.9776932	10	M	P																							
329			328	43.7404416	-88.97770393	10.5	M	P																							
330			329	43.7398114	-88.97771465	11	M	P																							
331			330	43.7391813	-88.97772537	11.5	M	P																							

Survey Date: July 2, 2008

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Elodea nuttallii* , Slender waterweed	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	moss	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1	sp2	sp3	sp4
332			331	43.7385511	-88.9777361	18.5	M	P																							
333			332	43.7379209	-88.97774682	12.5	M	P																							
334			333	43.7372907	-88.97775754	13	M	P																							
335			334	43.7366606	-88.97776826	13	M	P																							
336			335	43.7360304	-88.97777898	12.5	M	P																							
337			336	43.7354002	-88.9777897	11.5	M	P		1				1	B	U	1	1													
338			337	43.73477	-88.97780042	9	M	P		1								1													
339			338	43.7423243	-88.97680255	4	S	P		1							1	1					1								
340			339	43.7416942	-88.97681328	7.5	S	P		1	1	B	U					1		1											
341			340	43.741064	-88.97682401	8.5	M	P																							
342			341	43.7404338	-88.97683475	9	M	P																							
343			342	43.7398036	-88.97684548	9.5	M	P																							
344			343	43.7391735	-88.97685621	10	M	P																							
345			344	43.7385433	-88.97686694	11	M	P																							
346			345	43.7379131	-88.97687767	11.5	M	P		1								1													
347			346	43.737283	-88.9768884	11.5	M	P																							
348			347	43.7366528	-88.97689914	11.5	M	P																							
349			348	43.7360226	-88.97690987				NO INFORMATION																						
350			349	43.7353924	-88.9769206	10	M	P		1				1	B	U		1						1							
351			350	43.7347623	-88.97693133	9	M	P																							
352			351	43.7410562	-88.97595482	5	M	P									1														
353			352	43.740426	-88.97596557	7	M	P																							
354			353	43.7397959	-88.97597631	7.5	M	P																							
355			354	43.7391657	-88.97598705	8.5	M	P																							
356			355	43.7385355	-88.97599779	9	M	P																							
357			356	43.7379053	-88.97600853	9.5	M	P																							
358			357	43.7372752	-88.97601927	9.5	M	P																							
359			358	43.736645	-88.97603001	8.5	S	P																							
360			359	43.7360148	-88.97604075	9.5	M	P		1				1	B	U															
361			360	43.7353846	-88.97605149	9	M	P		1								1													
362			361	43.7347545	-88.97606223	8.5	M	P																							
363			362	43.7341243	-88.97607297	6	M	P		1							2	1													
364			363	43.7397881	-88.97510714	4	M	P																							
365			364	43.7391579	-88.97511789	6.5	M	P		1				1	B	U															
366			365	43.7385277	-88.97512864	7	M	P		2	1	B	U				2	2		1	1		1		1						
367			366	43.736007	-88.97517163	8	R	P		1				1	B	U															
368			367	43.7353769	-88.97518238	8	M	P		1				1	B	U		1													
369			368	43.7347467	-88.97519313	7.5	M	P		1								1													
370			369	43.7341165	-88.97520388	6	M	P		1				1	B	U	1														
371			370	43.7334863	-88.97521462	4.5	M	P		1																	1				
372			371	43.7353691	-88.97431328	7	M	P		2							2	2			1										
373			372	43.7347389	-88.97432403	6.5	M	P		1				1	B	U	1														
374			373	43.7341087	-88.97433479	6	M	P		1								1													
375			374	43.7334785	-88.97434555	4.5	M	P		1							1	1													
376			375	43.7353613	-88.97344417	5.5	R	P									1														
377			376	43.7347311	-88.97345494	5	R	P									1														
378			377	43.7341009	-88.9734657	5	M	P		1							1	1													

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum*, Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus*, Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp2	sp3	sp4
2	**Name**	Little Green Lake	1	43.7355696	-88.99691015	3	M	P		3	1	N	S					2			1		1		1	3			
3	**County**	Green Lake	2	43.7349394	-88.99692067	3	M	P		2	1	N	D					1					1			2			
4	**WBIC**	162500	3	43.7343093	-88.99693119				NONNAVIGABLE (PLANTS)		V	A	D				V	V								V			
5	**Date**	06/30/09	4	43.7361922	-88.99603051	3	M	P		2							1	2								1			
6	**Field Crew**	Michelle Nault	5	43.735562	-88.99604104	4.5	M	P		3	1	N	S	V	A	S		2								3			
7		Meghan Porzky	6	43.7349318	-88.99605157	4	M	P		3								1								3			
8			7	43.7343016	-88.99606209	1.5	S	P		2							1		2					1	1				
9			8	43.7361845	-88.99516138	5.5	M	P		3	V	N	S					1								3			
10			9	43.7355544	-88.99517192	6	M	P		3	1	B	S					2								3			
11			10	43.7349242	-88.99518246	5	M	P		3	2	N	D	1	B	S		3				1				3			
12			11	43.734294	-88.995193	2.5	S	P		1	1	N	D						1							1			
13			12	43.7368071	-88.99428171	5	M	P		3	1	N	S					1	2							3			
14			13	43.7361769	-88.99429226	9	M	P		1																1			
15			14	43.7355467	-88.99430281	7	M	P		2	1	B	S	1	B	S		2				1				2			
16			15	43.7349165	-88.99431335	5	M	P		2	2	A	D					2				1				2			
17			16	43.7342864	-88.9943239	2.5	S	P		2	1	N	S					2	1					1		2			
18			17	43.733026	-88.99434499	4	M	P		2	V	N	S					2								1			
19			18	43.7323958	-88.99435554	3.5	M	P		3	2	A	D				2	3			1	1				2			
20			19	43.7367994	-88.99341258	8	M	P																					
21			20	43.7361692	-88.99342314	13	M	P																					
22			21	43.7355391	-88.99343369	8	M	P		2	1	B	U	1	B	U		2								2			
23			22	43.7349089	-88.99344425	5	M	P		2	1	B	U					2				1							
24			23	43.7336485	-88.99346536	4	S	P		3	2	N	S					2	1			1			V	2			
25			24	43.7330183	-88.99347592	4.5	M	P		3	1	A	D					2							V	3			
26			25	43.7323882	-88.99348647	4	M	P		3	2	N	D					2				1				2			
27			26	43.731758	-88.99349703	3.5	M	P		3	2	N	S				2	2			1	1				3			
28			27	43.7311278	-88.99350758	2	M	P		3							1	3			1	2				1			
29			28	43.7374219	-88.99253288	7.5	M	P		2	1	B	U													1			
30			29	43.7367918	-88.99254345	12	M	P		1								1								1			
31			30	43.7361616	-88.99255401	13	M	P																					
32			31	43.7355314	-88.99256458	8	M	P		1	1	B	U																
33			32	43.7349012	-88.99257515	5.5	M	P		3	2	B	U					2				1				3			
34			33	43.734271	-88.99258571	3	R	P		2	2	N	D					2				1	1			1			
35			34	43.7336409	-88.99259628	5	M	P		2	2	N	D	1	B	U		2				1			1	1			
36			35	43.7330107	-88.99260684	5	M	P		2	2	N	D	1	B	U		2				1				1			
37			36	43.7323805	-88.9926174	5	M	P		2							1	2				2				1			
38			37	43.7317503	-88.99262797	4	M	P		3	1	N	S					3	1			1				3			
39			38	43.7311202	-88.99263853	3.5	M	P		3	1	B	U				1	1	3			1				1			
40			39	43.73049	-88.9926491	2	M	P		2							2	2			1	1				1			
41			40	43.7374143	-88.99166374	12	M	P																					
42			41	43.7367841	-88.99167432	16.5	M	P																					
43			42	43.7361539	-88.99168489	12	M	P																					
44			43	43.7355237	-88.99169547	11.5	M	P																					
45			44	43.7348936	-88.99170604	9.5	M	P		1												1				1			
46			45	43.7342634	-88.99171662	9.5	M	P																					
47			46	43.7336332	-88.99172719	8	M	P		1	1	B	U													1			
48			47	43.733003	-88.99173776	7	M	P		2	1	B	U	1	B	U		2											
49			48	43.7323728	-88.99174834	5.5	M	P		2	1	B	U					2				1	1			2			
50			49	43.7317427	-88.99175891				TERRESTRIAL																				

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum*, Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus*, Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp2	sp3	sp4
51			50	43.7311125	-88.99176948	4.5	M	P		3								2				1				2			
52			51	43.7380368	-88.99078402	12	S	P																					
53			52	43.7374066	-88.9907946	18	M	R																					
54			53	43.7367764	-88.99080519	14	M	P																					
55			54	43.7361462	-88.99081577	11	M	P																					
56			55	43.7355161	-88.99082635	15	M	P																					
57			56	43.7348859	-88.99083694	13.5	M	P																					
58			57	43.7342557	-88.99084752	12	M	P																					
59			58	43.7336255	-88.9908581	11.5	M	P																					
60			59	43.7329954	-88.99086869	10	M	P																					
61			60	43.7323652	-88.99087927	8	M	P		1				1	B	U													
62			61	43.731735	-88.99088985	6.5	M	P		3	1	B	S					1								3			
63			62	43.7311048	-88.99090043	5	M	P		2	1	B	S									1				2			
64			63	43.7392894	-88.98989368	2.5	S	P		2	1	N	S				2	1	1	2		1		1		1			
65			64	43.7386593	-88.98990427	11.5	S	P																					
66			65	43.7380291	-88.98991487	16.5	M	R																					
67			66	43.7373989	-88.98992546	17.5	M	R																					
68			67	43.7367687	-88.98993605	15	M	P																					
69			68	43.7361386	-88.98994665	13	M	P																					
70			69	43.7355084	-88.98995724	17	M	R																					
71			70	43.7348782	-88.98996783	17.5	M	R																					
72			71	43.734248	-88.98997843	14.5	M	P																					
73			72	43.7336179	-88.98998902	13.5	M	P																					
74			73	43.7329877	-88.98999961	11.5	M	P																					
75			74	43.7323575	-88.9900102	10	M	P																					
76			75	43.7317273	-88.99002079	9	M	P		1	1	B	U	1	B	U						1				1			
77			76	43.7310971	-88.99003138	6.5	M	P		3	1	B	S	1	B	U		2				1				2			
78			77	43.7399119	-88.98901391	4	S	P		2	2	B	S					2	2	1						2			
79			78	43.7392818	-88.98902451	14	S	P																					
80			79	43.7386516	-88.98903511	17			DEEP																				
81			80	43.7380214	-88.98904572	18.5			DEEP																				
82			81	43.7373912	-88.98905632				DEEP																				
83			82	43.7367611	-88.98906692				DEEP																				
84			83	43.7361309	-88.98907753				DEEP																				
85			84	43.7355007	-88.98908813				DEEP																				
86			85	43.7348705	-88.98909873				DEEP																				
87			86	43.7342403	-88.98910933				DEEP																				
88			87	43.7336102	-88.98911993	17			DEEP																				
89			88	43.73298	-88.98913054	13	M	P																					
90			89	43.7323498	-88.98914114	12	M	P		1	1	B	U	1	B	U													
91			90	43.7317196	-88.98915174	10.5	M	P		1	1	B	U																
92			91	43.7310895	-88.98916234	8	M	P		2	1	B	U					2								1			
93			92	43.7411646	-88.9881235				TERRESTRIAL																				
94			93	43.7405344	-88.98813412	5.5	S	P		1																1			
95			94	43.7399042	-88.98814473	15	M	P																					
96			95	43.7392741	-88.98815534	17.5			DEEP																				
97			96	43.7386439	-88.98816596	19			DEEP																				
98			97	43.7380137	-88.98817657	19.5			DEEP																				
99			98	43.7373835	-88.98818718				DEEP																				

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* ,Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp2	sp3	sp4
100			99	43.7367534	-88.98819779				DEEP																				
101			100	43.7361232	-88.98820841				DEEP																				
102			101	43.735493	-88.98821902				DEEP																				
103			102	43.7348628	-88.98822963				DEEP																				
104			103	43.7342327	-88.98824024				DEEP																				
105			104	43.7336025	-88.98825085				DEEP																				
106			105	43.7329723	-88.98826146				DEEP																				
107			106	43.7323421	-88.98827207	13	M	P																					
108			107	43.731712	-88.98828268	10.5	M	P																					
109			108	43.7310818	-88.98829329	8	M	P																					
110			109	43.7304516	-88.9883039	3.5	M	P		2	2	B	S					2								2			
111			110	43.7417871	-88.98724368				SHALLOW																				
112			111	43.7411569	-88.98725431	8	S	P																					
113			112	43.7405267	-88.98726493	15.5	M	P																					
114			113	43.7398965	-88.98727555	16.5			DEEP																				
115			114	43.7392664	-88.98728618				DEEP																				
116			115	43.7386362	-88.9872968				DEEP																				
117			116	43.738006	-88.98730742				DEEP																				
118			117	43.7373758	-88.98731804				DEEP																				
119			118	43.7367457	-88.98732866				DEEP																				
120			119	43.7361155	-88.98733929				DEEP																				
121			120	43.7354853	-88.98734991				DEEP																				
122			121	43.7348551	-88.98736053				DEEP																				
123			122	43.734225	-88.98737115				DEEP																				
124			123	43.7335948	-88.98738177				DEEP																				
125			124	43.7329646	-88.98739239				DEEP																				
126			125	43.7323344	-88.987403	14	M	P																					
127			126	43.7317043	-88.98741362	12	M	P		1																1			
128			127	43.7310741	-88.98742424	9	M	P																					
129			128	43.7304439	-88.98743486	4.5	R	P																					
130			129	43.7417794	-88.98637448	8	S	P		1				1	B	U													
131			130	43.7411492	-88.98638512	13	M	P																					
132			131	43.740519	-88.98639575	17			DEEP																				
133			132	43.7398888	-88.98640638				DEEP																				
134			133	43.7392587	-88.98641701				DEEP																				
135			134	43.7386285	-88.98642764				DEEP																				
136			135	43.7379983	-88.98643827				DEEP																				
137			136	43.7373681	-88.9864489				DEEP																				
138			137	43.736738	-88.98645954				DEEP																				
139			138	43.7361078	-88.98647017				DEEP																				
140			139	43.7354776	-88.9864808				DEEP																				
141			140	43.7348474	-88.98649142				DEEP																				
142			141	43.7342173	-88.98650205				DEEP																				
143			142	43.7335871	-88.98651268				DEEP																				
144			143	43.7329569	-88.98652331				DEEP																				
145			144	43.7323267	-88.98653394				DEEP																				
146			145	43.7316966	-88.98654457	12	M	P																					
147			146	43.7310664	-88.98655519	9.5	M	P		1	1	B	U																
148			147	43.7304362	-88.98656582	6	R	P		1	1	B	U					1											

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus* ,Curly-leaf pondweed	*POTCR: At/Near/Below Surface*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp2	sp3	sp4
149			148	43.729806	-88.98657645				DOCK																				
150			149	43.7442924	-88.98546271	1.5	S	P		2	V	N	S				2	2		V						1			
151			150	43.7436622	-88.98547335	1.5	S	P									1								V				
152			151	43.743032	-88.985484	2	S	P									1			V									
153			152	43.7424018	-88.98549464	5	S	P																					
154			153	43.7417717	-88.98550528	13.5	M	P																					
155			154	43.7411415	-88.98551592	15.5	M	P																					
156			155	43.7405113	-88.98552656				DEEP																				
157			156	43.7398811	-88.98553721				DEEP																				
158			157	43.739251	-88.98554785				DEEP																				
159			158	43.7386208	-88.98555849				DEEP																				
160			159	43.7379906	-88.98556913				DEEP																				
161			160	43.7373604	-88.98557977				DEEP																				
162			161	43.7367303	-88.98559041				DEEP																				
163			162	43.7361001	-88.98560105				DEEP																				
164			163	43.7354699	-88.98561168				DEEP																				
165			164	43.7348397	-88.98562232				DEEP																				
166			165	43.7342095	-88.98563296				DEEP																				
167			166	43.7335794	-88.9856436				DEEP																				
168			167	43.7329492	-88.98565424				DEEP																				
169			168	43.732319	-88.98566487				DEEP																				
170			169	43.7316888	-88.98567551	13	M	P																					
171			170	43.7310587	-88.98568615	9	M	P																					
172			171	43.7304285	-88.98569678	7.5	M	P		2	2	B	U	1	B	U										2			
173			172	43.7297983	-88.98570742	5	M	P		3	1	A	D					2								3			
174			173	43.7442846	-88.98459347	5	M	P		2	1	B	S					2								1			
175			174	43.7436545	-88.98460412	7.5	M	P																					
176			175	43.7430243	-88.98461478	10	M	P																					
177			176	43.7423941	-88.98462543	12	M	P																					
178			177	43.7417639	-88.98463608	14.5	M	P																					
179			178	43.7411338	-88.98464673	15	M	P																					
180			179	43.7405036	-88.98465738	15	M	P																					
181			180	43.7398734	-88.98466803				DEEP																				
182			181	43.7392432	-88.98467868				DEEP																				
183			182	43.7386131	-88.98468933				DEEP																				
184			183	43.7379829	-88.98469998				DEEP																				
185			184	43.7373527	-88.98471063				DEEP																				
186			185	43.7367225	-88.98472128				DEEP																				
187			186	43.7360924	-88.98473193				DEEP																				
188			187	43.7354622	-88.98474257				DEEP																				
189			188	43.734832	-88.98475322				DEEP																				
190			189	43.7342018	-88.98476387				DEEP																				
191			190	43.7335717	-88.98477452				DEEP																				
192			191	43.7329415	-88.98478516				DEEP																				
193			192	43.7323113	-88.98479581	16	M	P																					
194			193	43.7316811	-88.98480645	11	R	P																					
195			194	43.7310509	-88.9848171	9	M	P		1																1			
196			195	43.7304208	-88.98482775	7.5	M	P		1	1	B	U													1			
197			196	43.7297906	-88.98483839	5	S	P		2	1	N	S					2								2			

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum*, Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus*, Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp2	sp3	sp4
198			197	43.7442769	-88.98372423	6.5	M	P		2								2											
199			198	43.7436467	-88.98373489	8	M	P		2								2								1			
200			199	43.7430166	-88.98374556	10	M	P		1																1			
201			200	43.7423864	-88.98375622	11	M	P		1																1			
202			201	43.7417562	-88.98376688	12	M	P																					
203			202	43.741126	-88.98377754	13	M	P		1																1			
204			203	43.7404959	-88.9837882	15	M	P																					
205			204	43.7398657	-88.98379886				DEEP																				
206			205	43.7392355	-88.98380952				DEEP																				
207			206	43.7386053	-88.98382018				DEEP																				
208			207	43.7379752	-88.98383083				DEEP																				
209			208	43.737345	-88.98384149				DEEP																				
210			209	43.7367148	-88.98385215				DEEP																				
211			210	43.7360846	-88.98386281				DEEP																				
212			211	43.7354545	-88.98387346				DEEP																				
213			212	43.7348243	-88.98388412				DEEP																				
214			213	43.7341941	-88.98389478				DEEP																				
215			214	43.7335639	-88.98390543				DEEP																				
216			215	43.7329338	-88.98391609				DEEP																				
217			216	43.7323036	-88.98392674	15.5	M	P																					
218			217	43.7316734	-88.9839374	11	M	P																					
219			218	43.7310432	-88.98394805	8.5	M	P		1	1	B	U					1											
220			219	43.7304131	-88.98395871	4	S	P		2							1	2											
221			220	43.7442692	-88.982855	6	M	P		3								3								1			
222			221	43.743639	-88.98286567	8.5	M	P																					
223			222	43.7430088	-88.98287634	9.5	M	P																					
224			223	43.7423787	-88.98288701	10.5	M	P		1								1											
225			224	43.7417485	-88.98289768	11	M	P																					
226			225	43.7411183	-88.98290835	9.5	R	P																					
227			226	43.7404881	-88.98291901	15	M	P																					
228			227	43.739858	-88.98292968				DEEP																				
229			228	43.7392278	-88.98294035				DEEP																				
230			229	43.7385976	-88.98295102				DEEP																				
231			230	43.7379674	-88.98296169				DEEP																				
232			231	43.7373373	-88.98297235				DEEP																				
233			232	43.7367071	-88.98298302				DEEP																				
234			233	43.7360769	-88.98299369				DEEP																				
235			234	43.7354467	-88.98300435				DEEP																				
236			235	43.7348166	-88.98301502				DEEP																				
237			236	43.7341864	-88.98302569				DEEP																				
238			237	43.7335562	-88.98303635				DEEP																				
239			238	43.732926	-88.98304702	17			DEEP																				
240			239	43.7322958	-88.98305768	13	M	P																					
241			240	43.7316657	-88.98306834	7.5	M	P		2	2	B	U													1			
242			241	43.7442614	-88.98198576	4.5	M	P		3								2								3			
243			242	43.7436313	-88.98199644	8	M	P		1				1	B	U													
244			243	43.7430011	-88.98200712	9	M	P		1																1			
245			244	43.7423709	-88.9820178	10	M	P																					
246			245	43.7417407	-88.98202848	10.5	M	P																					

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum*, Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus*, Curly-leaf pondweed	*POTCR: At/Near/Below Surface*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum*, Coontail	*Chara*, Muskgrasses	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp2	sp3	sp4
247			246	43.7411106	-88.98203915	8.5	R	P																					
248			247	43.7404804	-88.98204983	15	M	P																					
249			248	43.7398502	-88.98206051				DEEP																				
250			249	43.73922	-88.98207119				DEEP																				
251			250	43.7385899	-88.98208186				DEEP																				
252			251	43.7379597	-88.98209254				DEEP																				
253			252	43.7373295	-88.98210322				DEEP																				
254			253	43.7366993	-88.98211389				DEEP																				
255			254	43.7360692	-88.98212457				DEEP																				
256			255	43.735439	-88.98213524				DEEP																				
257			256	43.7348088	-88.98214592				DEEP																				
258			257	43.7341786	-88.98215659				DEEP																				
259			258	43.7335485	-88.98216727	16	M	P																					
260			259	43.7329183	-88.98217794	12	R	P																					
261			260	43.7436235	-88.98112721	6	M	P		3								2								3			
262			261	43.7429933	-88.9811379	8	M	P		2																2			
263			262	43.7423632	-88.98114859	9	M	P																					
264			263	43.741733	-88.98115928	10.5	M	P																					
265			264	43.7411028	-88.98116996	14	M	P																					
266			265	43.7404726	-88.98118065	15	M	P																					
267			266	43.7398425	-88.98119134				DEEP																				
268			267	43.7392123	-88.98120202				DEEP																				
269			268	43.7385821	-88.98121271				DEEP																				
270			269	43.7379519	-88.9812234				DEEP																				
271			270	43.7373218	-88.98123408				DEEP																				
272			271	43.7366916	-88.98124477				DEEP																				
273			272	43.7360614	-88.98125545				DEEP																				
274			273	43.7354312	-88.98126614				DEEP																				
275			274	43.7348011	-88.98127682	16	M	P																					
276			275	43.7341709	-88.9812875	16	M	P																					
277			276	43.7335407	-88.98129819	12.5	M	P																					
278			277	43.7436158	-88.98025798	4	S	P		2	1	N	D					2								2			
279			278	43.7429856	-88.98026868	7	M	P		2				2	B	U										1			
280			279	43.7423554	-88.98027938	9	M	P																					
281			280	43.7417252	-88.98029008	11	M	P																					
282			281	43.7410951	-88.98030077	13.5	M	P																					
283			282	43.7404649	-88.98031147	14	M	P																					
284			283	43.7398347	-88.98032217				DEEP																				
285			284	43.7392045	-88.98033286				DEEP																				
286			285	43.7385744	-88.98034356				DEEP																				
287			286	43.7379442	-88.98035425				DEEP																				
288			287	43.737314	-88.98036495				DEEP																				
289			288	43.7366838	-88.98037564				DEEP																				
290			289	43.7360537	-88.98038633				DEEP																				
291			290	43.7354235	-88.98039703				DEEP																				
292			291	43.7347933	-88.98040772				DEEP																				
293			292	43.7341631	-88.98041841	15	M	P																					
294			293	43.733533	-88.98042911	7	S	P																					
295			294	43.743608	-88.97938876	4	S	P		2							2	1								2			

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* , Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1 - *Elodea* sp. , Waterweed	sp2	sp3	sp4
296			295	43.7429778	-88.97939946	7	M	P		2				1	B	U										2			
297			296	43.7423477	-88.97941017	8.5	M	P		1				1	B	U													
298			297	43.7417175	-88.97942088	10	M	P																					
299			298	43.7410873	-88.97943158	11.5	M	P																					
300			299	43.7404571	-88.97944229	12.5	M	P		1																1			
301			300	43.739827	-88.97945299	13	M	P																					
302			301	43.7391968	-88.9794637	15	M	P																					
303			302	43.7385666	-88.9794744				DEEP																				
304			303	43.7379364	-88.97948511				DEEP																				
305			304	43.7373063	-88.97949581				DEEP																				
306			305	43.7366761	-88.97950651				DEEP																				
307			306	43.7360459	-88.97951722				DEEP																				
308			307	43.7354157	-88.97952792	14	M	P																					
309			308	43.7347856	-88.97953862	12.5	M	P																					
310			309	43.7341554	-88.97954932	2	R	P																					
311			310	43.7429701	-88.97853025	6	M	P		3	V	N	S					1								3			
312			311	43.7423399	-88.97854096	8	M	P		1																1			
313			312	43.7417097	-88.97855168	9.5	M	P		1				1	B	U										1			
314			313	43.7410795	-88.97856239	10.5	M	P																					
315			314	43.7404494	-88.97857311	11	M	P																					
316			315	43.7398192	-88.97858382	12	M	P																					
317			316	43.739189	-88.97859454	13	M	P																					
318			317	43.7385588	-88.97860525	13.5	M	P																					
319			318	43.7379287	-88.97861596				DEEP																				
320			319	43.7372985	-88.97862667				DEEP																				
321			320	43.7366683	-88.97863739				DEEP																				
322			321	43.7360382	-88.9786481				DEEP																				
323			322	43.735408	-88.97865881	13	M	P																					
324			323	43.7347778	-88.97866952	9.5	M	P																					
325			324	43.7429623	-88.97766103	3.5	S	P		1	1	N	S				1												
326			325	43.7423321	-88.97767175	6.5	M	P		3	1	B	U					1								3			
327			326	43.7417019	-88.97768248	8.5	M	P																					
328			327	43.7410718	-88.9776932	9.5	M	P																					
329			328	43.7404416	-88.97770393	10	M	P																					
330			329	43.7398114	-88.97771465	10.5	M	P																					
331			330	43.7391813	-88.97772537	11	M	P																					
332			331	43.7385511	-88.9777361	12	M	P																					
333			332	43.7379209	-88.97774682	12.5	M	P																					
334			333	43.7372907	-88.97775754	12.5	M	P																					
335			334	43.7366606	-88.97776826	12.5	M	P																					
336			335	43.7360304	-88.97777898	12	M	P																					
337			336	43.7354002	-88.9777897	11	M	P																					
338			337	43.73477	-88.97780042	8.5	M	P		1																1			
339			338	43.7423243	-88.97680255	4	M	P		2							2	1								2			
340			339	43.7416942	-88.97681328	7	M	P		2	1	B	U	1	B	U		1								2			
341			340	43.741064	-88.97682401	8.5	M	P		1				1	B	U													
342			341	43.7404338	-88.97683475	9	M	P																					
343			342	43.7398036	-88.97684548	9	M	P		1				1	B	U										1			
344			343	43.7391735	-88.97685621	10	M	P		1				1	B	U													

Survey Date: June 30, 2009

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	Entry		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Chara* , Muskgrasses	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1 - *Elodea* sp., Waterweed	sp2	sp3	sp4
345			344	43.7385433	-88.97686694	11	M	P		1																1			
346			345	43.7379131	-88.97687767	11	M	P																					
347			346	43.737283	-88.9768884	11	M	P																					
348			347	43.7366528	-88.97689914	11	M	P																					
349			348	43.7360226	-88.97690987	11	M	P		1																1			
350			349	43.7353924	-88.9769206	10	M	P		1	1	B	U				1												
351			350	43.7347623	-88.97693133	8	M	P		2													1			2			
352			351	43.7410562	-88.97595482	5	M	P		3	1	N	S					2	1							3			
353			352	43.740426	-88.97596557	6.5	M	P		3																3			
354			353	43.7397959	-88.97597631	7	M	P		1	1	B	U													1			
355			354	43.7391657	-88.97598705	8	M	P		2																2			
356			355	43.7385355	-88.97599779	9	M	P		2																2			
357			356	43.7379053	-88.97600853	9	M	P		2	2	B	U													1			
358			357	43.7372752	-88.97601927	9	M	P		1																1			
359			358	43.736645	-88.97603001	8.5	R	P									2												
360			359	43.7360148	-88.97604075	9	M	P																					
361			360	43.7353846	-88.97605149	8.5	M	P		1																1			
362			361	43.7347545	-88.97606223	7.5	M	P		1				1	B	U										1			
363			362	43.7341243	-88.97607297	5	M	P		3								2								3			
364			363	43.7397881	-88.97510714	3	M	P		2																2			
365			364	43.7391579	-88.97511789	6	M	P		2	1	N	S													2			
366			365	43.7385277	-88.97512864	5.5	M	P		3	1	N	S					2								3			
367			366	43.736007	-88.97517163	7	M	P		2	2	B	U					1								2			
368			367	43.7353769	-88.97518238	8	M	P		2																2			
369			368	43.7347467	-88.97519313	6.5	M	P		3				1	B	U		3								1			
370			369	43.7341165	-88.97520388	5.5	M	P		2	1	B	U					2								2			
371			370	43.7334863	-88.97521462	3.5	M	P		3	1	B	U					1								3			
372			371	43.7353691	-88.97431328	7	M	P		2				1	B	U		2								1			
373			372	43.7347389	-88.97432403	5.5	M	P		3								3								2			
374			373	43.7341087	-88.97433479	5	M	P		3	2	N	D	V	N	S		2								3			
375			374	43.7334785	-88.97434555	4	M	P		2	1	N	S					1							1	1			
376			375	43.7353613	-88.97344417	4.5	R	P		2								1	2										
377			376	43.7347311	-88.97345494	4.5	R	P		2																2			
378			377	43.7341009	-88.9734657	4.5	M	P		2							1	2								1			

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* , Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis* , Bushy pondweed	*Stuckenia pectinata* , Sago pondwe	sp1 Elodea sp.	sp2	sp3
2	**Name**	Little Green	1	43.73556962	-88.99691015	3.50	M	P		1							1	1										1		
3	**County**	Green Lake	2	43.73493944	-88.99692067	3.50	M	P		1	1	B	U				1											1		
4	**WBIC**	162500	3	43.73430926	-88.99693119	1.50	M	P		2	1	B	S				2	2					2	1				1		
5	**Date**	06/30/10	4	43.73619216	-88.99603051	3.00	M	P		2							1	1						1				1		
6	**Field Crew**	MN MB	5	43.73556199	-88.99604104	4.50	M	P		2	1	B	U					2						1				2		
7			6	43.73493181	-88.99605157	4.50	M	P		2	1	B	U					2						1				2		
8			7	43.73430163	-88.99606209	1.50	S	P		1	1	B	S				1					1						1		
9			8	43.73618453	-88.99516138	6.00	M	P		2								2				1						1		
10			9	43.73555435	-88.99517192	6.00	M	P		2								2										2		
11			10	43.73492417	-88.99518246	5.00	M	P		2								2						1				2		
12			11	43.73429399	-88.99519300	2.00	S	P		2	1	N	S				1			1		2		1				2		
13			12	43.73680706	-88.99428171	5.00	M	P		2	1	B	U					1										2		
14			13	43.73617688	-88.99429226	9.50	M	P																						
15			14	43.73554670	-88.99430281	7.00	M	P		2	1	B	U					1						1				2		
16			15	43.73491653	-88.99431335	5.50	M	P		1								1						1						
17			16	43.73428635	-88.99432390	2.50	S	P		2	1	A	S					2				1		1				1		
18			17	43.73302599	-88.99434499	4.00	M	P		2	1	N	S				1	2					1	2				1		
19			18	43.73239581	-88.99435554	3.50	M	P		2	1	A	D				2	2						1			1	1		
20			19	43.73679941	-88.99341258	8.50	M	P		2								1										2		
21			20	43.73616923	-88.99342314	14.00	M	P																						
22			21	43.73553905	-88.99343369	8.00	M	P		2				1	B	U		1						1				2		
23			22	43.73490887	-88.99344425	5.00	M	P		2	1	A	D					2									1	2		
24			23	43.73364852	-88.99346536	4.50	M	P		2								2		1				1			V	2		
25			24	43.73301834	-88.99347592	4.50	M	P		2	1	A	D				1	2						1				2		
26			25	43.73238816	-88.99348647	4.50	R	P		3	1	N	S				2	2						1				2		
27			26	43.73175799	-88.99349703	4.00	M	P		2							1	2						2				2		
28			27	43.73112781	-88.99350758	2.00	M	P		2								2					1	2				1		
29			28	43.73742193	-88.99253288	7.00	S	P		1																		1		
30			29	43.73679175	-88.99254345	11.00	M	P																						
31			30	43.73616157	-88.99255401	15.00	M	P																						
32			31	43.73553139	-88.99256458	8.00	M	P		1	1	B	U				1											1		
33			32	43.73490122	-88.99257515	6.00	M	P		3	2	N	S	1	B	U		2						1				2		
34			33	43.73427104	-88.99258571	2.50	R	P		1	1	A	D				1													
35			34	43.73364086	-88.99259628	6.00	M	P		2	2	N	S	1	B	U		1						1						
36			35	43.73301068	-88.99260684	5.50	M	P		2	2	A	D	1	B	S		1						1				1		
37			36	43.73238051	-88.99261740	5.00	M	P		2							1	2						1				1		
38			37	43.73175033	-88.99262797	4.50	M	P		2	1	N	S					2						2				1		
39			38	43.73112015	-88.99263853	4.00	M	P		2	V	A	D					2						1			V			
40			39	43.73048997	-88.99264910	2.50	M	P		2							1	2						2				1		
41			40	43.73741426	-88.99166374	12.00	M	P																						
42			41	43.73678408	-88.99167432				Deep																					
43			42	43.73615391	-88.99168489	12.00	M	P																						
44			43	43.73552373	-88.99169547	12.00	R	P																						
45			44	43.73489355	-88.99170604	10.00	M	P		1	1	B	U																	
46			45	43.73426338	-88.99171662	9.50	M	P		1																		1		
47			46	43.73363320	-88.99172719	8.00	M	P																						
48			47	43.73300302	-88.99173776	7.00	M	P		2	2	N	S				1	1						1				1		
49			48	43.73237284	-88.99174834	6.00	M	P		2	2	A	D				1	1												
50			49	43.73174267	-88.99175891	2.00	R	P																						

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum*, Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus*, Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum*, Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara*, Muskgrasses	*Elodea canadensis*, Common waterweed	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondwe	sp1 Elodea sp.	sp2	sp3
51			50	43.73111249	-88.99176948	5.00	M	P		2							1	2						1				1		
52			51	43.73803677	-88.99078402	12.00	S	P																						
53			52	43.73740659	-88.99079460	16.50	M	P																						
54			53	43.73677641	-88.99080519				Deep																					
55			54	43.73614624	-88.99081577	11.00	M	P		1				1	B	U														
56			55	43.73551606	-88.99082635	15.00	M	P		1														1						
57			56	43.73488588	-88.99083694	14.50	M	P																						
58			57	43.73425570	-88.99084752	12.00	M	P																						
59			58	43.73362553	-88.99085810	11.00	M	P																						
60			59	43.73299535	-88.99086869	10.00	M	P		1				1	B	U														
61			60	43.73236517	-88.99087927	8.00	M	P																						
62			61	43.73173500	-88.99088985	7.00	M	P		2								2		1				1				2		
63			62	43.73110482	-88.99090043	6.00	M	P		1				1	B	U		1										1		
64			63	43.73928944	-88.98989368	2.50	S	P		2	1	N	D				1	2										1		
65			64	43.73865926	-88.98990427	12.00	S	P																						
66			65	43.73802909	-88.98991487				Deep																					
67			66	43.73739891	-88.98992546				Deep																					
68			67	43.73676873	-88.98993605				Deep																					
69			68	43.73613856	-88.98994665	13.50	M	P																						
70			69	43.73550838	-88.98995724	17.00	M	P																						
71			70	43.73487820	-88.98996783				Deep																					
72			71	43.73424803	-88.98997843	15.00	M	P																						
73			72	43.73361785	-88.98998902	13.00	M	P																						
74			73	43.73298767	-88.98999961	11.50	M	P																						
75			74	43.73235750	-88.99001020	10.00	M	P																						
76			75	43.73172732	-88.99002079	9.00	M	P		2								2										2		
77			76	43.73109714	-88.99003138	6.00	M	P		2								1										2		
78			77	43.73991193	-88.98901391	5.00	S	P		2	1	B	U					1		2								2		
79			78	43.73928176	-88.98902451	13.00	S	P																						
80			79	43.73865158	-88.98903511				Deep																					
81			80	43.73802140	-88.98904572				Deep																					
82			81	43.73739123	-88.98905632				Deep																					
83			82	43.73676105	-88.98906692				Deep																					
84			83	43.73613087	-88.98907753				Deep																					
85			84	43.73550070	-88.98908813				Deep																					
86			85	43.73487052	-88.98909873				Deep																					
87			86	43.73424034	-88.98910933				Deep																					
88			87	43.73361017	-88.98911993	16.00	M	P																						
89			88	43.73297999	-88.98913054	13.00	M	P																						
90			89	43.73234981	-88.98914114	11.00	M	P		1				1	B	U														
91			90	43.73171964	-88.98915174	10.00	M	P		1																		1		
92			91	43.73108946	-88.98916234	8.00	M	P		2	V	N	S	1	B	U		1										2		
93			92	43.74116459	-88.98812350	1.50	S	P		1				1	N	S	1	1				1		1				1		
94			93	43.74053442	-88.98813412	5.00	S	P		2	1	B	U	1	B	U		1				1			1			2		
95			94	43.73990424	-88.98814473	15.50	M	P																						
96			95	43.73927406	-88.98815534				Deep																					
97			96	43.73864389	-88.98816596				Deep																					
98			97	43.73801371	-88.98817657				Deep																					
99			98	43.73738354	-88.98818718				Deep																					

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum*, Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus*, Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum*, Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara*, Muskgrasses	*Elodea canadensis*, Common waterweed	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondwe	sp1 Elodea sp.	sp2	sp3
100			99	43.73675336	-88.98819779				Deep																					
101			100	43.73612318	-88.98820841				Deep																					
102			101	43.73549301	-88.98821902				Deep																					
103			102	43.73486283	-88.98822963				Deep																					
104			103	43.73423265	-88.98824024				Deep																					
105			104	43.73360248	-88.98825085				Deep																					
106			105	43.73297230	-88.98826146	14.00	M	P																						
107			106	43.73234212	-88.98827207	12.00	M	P																						
108			107	43.73171195	-88.98828268	10.50	M	P																						
109			108	43.73108177	-88.98829329	8.00	M	P		3							1	1										3		
110			109	43.73045159	-88.98830390	3.50	M	P		2	1	B	U				1	2						1				2		
111			110	43.74178707	-88.98724368	2.50	S	P		2	2	A	D				1	2										2		
112			111	43.74115689	-88.98725431	9.00	S	P																						
113			112	43.74052672	-88.98726493	15.50	M	P																						
114			113	43.73989654	-88.98727555				Deep																					
115			114	43.73926637	-88.98728618				Deep																					
116			115	43.73863619	-88.98729680				Deep																					
117			116	43.73800601	-88.98730742				Deep																					
118			117	43.73737584	-88.98731804				Deep																					
119			118	43.73674566	-88.98732866				Deep																					
120			119	43.73611549	-88.98733929				Deep																					
121			120	43.73548531	-88.98734991				Deep																					
122			121	43.73485513	-88.98736053				Deep																					
123			122	43.73422496	-88.98737115				Deep																					
124			123	43.73359478	-88.98738177				Deep																					
125			124	43.73296460	-88.98739239	14.00	M	P																						
126			125	43.73233443	-88.98740300	13.00	M	P																						
127			126	43.73170425	-88.98741362	11.50	M	P		1				1	N	S														
128			127	43.73107407	-88.98742424	9.00	M	P		2	2	B	U	1	B	U	1							1				2		
129			128	43.73044390	-88.98743486	4.00	R	P		2	1	B	S	1	B	U	1	1		2				1				1		
130			129	43.74177936	-88.98637448	9.00	M	P		1								1												
131			130	43.74114919	-88.98638512	14.00	M	P																						
132			131	43.74051901	-88.98639575	16.50	M	P																						
133			132	43.73988884	-88.98640638				Deep																					
134			133	43.73925866	-88.98641701				Deep																					
135			134	43.73862848	-88.98642764				Deep																					
136			135	43.73799831	-88.98643827				Deep																					
137			136	43.73736813	-88.98644890				Deep																					
138			137	43.73673796	-88.98645954				Deep																					
139			138	43.73610778	-88.98647017				Deep																					
140			139	43.73547760	-88.98648080				Deep																					
141			140	43.73484743	-88.98649142				Deep																					
142			141	43.73421725	-88.98650205				Deep																					
143			142	43.73358708	-88.98651268				Deep																					
144			143	43.73295690	-88.98652331	14.00	M	P																						
145			144	43.73232672	-88.98653394	14.50	M	P		1																		1		
146			145	43.73169655	-88.98654457	12.00	M	P																						
147			146	43.73106637	-88.98655519	9.00	M	P		2	1	B	U	2	B	U		2										1		
148			147	43.73043619	-88.98656582	6.00	S	P		2	2	N	S				1	2										2		

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* ,Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1 Elodea sp.	sp2	sp3
149			148	43.72980602	-88.98657645	3.00	R	P		2	1	B	S	1	B	U	1	1						1				2		
150			149	43.74429235	-88.98546271	2.00	M	P		2	1	N	S				1	2					1	1				1		
151			150	43.74366218	-88.98547335	2.00	M	P		1							1			1						1				
152			151	43.74303200	-88.98548400	2.50	S	P		2	2	A	D					1				1						1		
153			152	43.74240183	-88.98549464	7.00	M	P		1	1	B	S																	
154			153	43.74177165	-88.98550528	14.00	M	P																						
155			154	43.74114148	-88.98551592	15.50	M	P																						
156			155	43.74051130	-88.98552656	16.50	M	P																						
157			156	43.73988112	-88.98553721				Deep																					
158			157	43.73925095	-88.98554785				Deep																					
159			158	43.73862077	-88.98555849				Deep																					
160			159	43.73799060	-88.98556913				Deep																					
161			160	43.73736042	-88.98557977				Deep																					
162			161	43.73673025	-88.98559041				Deep																					
163			162	43.73610007	-88.98560105				Deep																					
164			163	43.73546989	-88.98561168				Deep																					
165			164	43.73483972	-88.98562232				Deep																					
166			165	43.73420954	-88.98563296				Deep																					
167			166	43.73357937	-88.98564360				Deep																					
168			167	43.73294919	-88.98565424				Deep																					
169			168	43.73231901	-88.98566487	15.50	M	P																						
170			169	43.73168884	-88.98567551	12.00	M	P																						
171			170	43.73105866	-88.98568615	9.00	M	P		2				2	B	U												2		
172			171	43.73042848	-88.98569678	7.00	M	P		2	2	N	S	1	B	U	1	2							1			1		
173			172	43.72979831	-88.98570742	6.00	M	P		2	2	N	S				1	2										2		
174			173	43.74428463	-88.98459347	6.00	M	P		2	2	N	S					2										1		
175			174	43.74365446	-88.98460412	7.00	M	P		2	2	B	S															2		
176			175	43.74302428	-88.98461478	10.00	M	P																						
177			176	43.74239411	-88.98462543	12.50	M	P																						
178			177	43.74176393	-88.98463608	14.00	M	P																						
179			178	43.74113376	-88.98464673	15.00	M	P																						
180			179	43.74050358	-88.98465738	15.00	M	P																						
181			180	43.73987341	-88.98466803				Deep																					
182			181	43.73924323	-88.98467868				Deep																					
183			182	43.73861306	-88.98468933				Deep																					
184			183	43.73798288	-88.98469998				Deep																					
185			184	43.73735270	-88.98471063				Deep																					
186			185	43.73672253	-88.98472128				Deep																					
187			186	43.73609235	-88.98473193				Deep																					
188			187	43.73546218	-88.98474257				Deep																					
189			188	43.73483200	-88.98475322				Deep																					
190			189	43.73420183	-88.98476387				Deep																					
191			190	43.73357165	-88.98477452				Deep																					
192			191	43.73294147	-88.98478516				Deep																					
193			192	43.73231130	-88.98479581	15.00	M	P																						
194			193	43.73168112	-88.98480645				Temporary Obstacle																					
195			194	43.73105094	-88.98481710	10.00	M	P		2	1	B	U	2	B	U												1		
196			195	43.73042077	-88.98482775	7.00	M	P		2	2	A	D	1	B	U	1											1		
197			196	43.72979059	-88.98483839	5.00	M	P		2	1	A	S				1	1										2		

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum*, Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus*, Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum*, Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara*, Muskgrasses	*Elodea canadensis*, Common waterweed	*Heteranthera dubia*, Water star-grass	*Lemna minor*, Small duckweed	*Lemna trisulca*, Forked duckweed	*Myriophyllum sibiricum*, Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata*, Sago pondweed	sp1 Elodea sp.	sp2	sp3
198			197	43.74427691	-88.98372423	7.00	M	P		2								2										2		
199			198	43.74364673	-88.98373489	9.00	M	P		1								1												
200			199	43.74301656	-88.98374556	10.00	M	P		1								1												
201			200	43.74238638	-88.98375622	11.00	M	P																						
202			201	43.74175621	-88.98376688	12.50	M	P																						
203			202	43.74112603	-88.98377754	13.00	M	P																						
204			203	43.74049586	-88.98378820	14.50	M	P																						
205			204	43.73986568	-88.98379886				Deep																					
206			205	43.73923551	-88.98380952				Deep																					
207			206	43.73860533	-88.98382018				Deep																					
208			207	43.73797516	-88.98383083				Deep																					
209			208	43.73734498	-88.98384149				Deep																					
210			209	43.73671480	-88.98385215				Deep																					
211			210	43.73608463	-88.98386281				Deep																					
212			211	43.73545445	-88.98387346				Deep																					
213			212	43.73482428	-88.98388412				Deep																					
214			213	43.73419410	-88.98389478				Deep																					
215			214	43.73356393	-88.98390543				Deep																					
216			215	43.73293375	-88.98391609	17.00			Deep																					
217			216	43.73230357	-88.98392674	15.00	M	P		1								1										1		
218			217	43.73167340	-88.98393740	11.00	M	P																						
219			218	43.73104322	-88.98394805	8.00	M	P		2	2	N	S	1	B	U		1										1		
220			219	43.73041305	-88.98395871	4.50	R	P		2	2	A	S				1	2										1		
221			220	43.74426917	-88.98285500	7.00	M	P		1								1										1		
222			221	43.74363900	-88.98286567	8.50	M	P																						
223			222	43.74300882	-88.98287634	9.50	M	P		1																		1		
224			223	43.74237865	-88.98288701	10.50	M	P																						
225			224	43.74174847	-88.98289768	11.50	M	P																						
226			225	43.74111830	-88.98290835	11.00	R	P																						
227			226	43.74048812	-88.98291901	15.50	M	P																						
228			227	43.73985795	-88.98292968				Deep																					
229			228	43.73922777	-88.98294035				Deep																					
230			229	43.73859760	-88.98295102				Deep																					
231			230	43.73796742	-88.98296169				Deep																					
232			231	43.73733725	-88.98297235				Deep																					
233			232	43.73670707	-88.98298302				Deep																					
234			233	43.73607690	-88.98299369				Deep																					
235			234	43.73544672	-88.98300435				Deep																					
236			235	43.73481655	-88.98301502				Deep																					
237			236	43.73418637	-88.98302569				Deep																					
238			237	43.73355620	-88.98303635	17.00			Deep																					
239			238	43.73292602	-88.98304702	15.50	M	P		1								1												
240			239	43.73229584	-88.98305768	13.00	M	P																						
241			240	43.73166567	-88.98306834	8.00	M	P		2	1	A	S					2										2		
242			241	43.74426143	-88.98198576	5.00	M	P		2								1										2		
243			242	43.74363126	-88.98199644	8.00	M	P		1								1												
244			243	43.74300108	-88.98200712	9.00	M	P																						
245			244	43.74237091	-88.98201780	10.00	M	P																						
246			245	43.74174074	-88.98202848	11.00	S	P																						

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* , Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata* , Sago pondwe	sp1 Elodea sp.	sp2	sp3
247			246	43.74111056	-88.98203915	9.50	R	P																						
248			247	43.74048039	-88.98204983	15.00	M	P																						
249			248	43.73985021	-88.98206051				Deep																					
250			249	43.73922004	-88.98207119				Deep																					
251			250	43.73858986	-88.98208186				Deep																					
252			251	43.73795969	-88.98209254				Deep																					
253			252	43.73732951	-88.98210322				Deep																					
254			253	43.73669934	-88.98211389				Deep																					
255			254	43.73606916	-88.98212457				Deep																					
256			255	43.73543899	-88.98213524				Deep																					
257			256	43.73480881	-88.98214592				Deep																					
258			257	43.73417863	-88.98215659	17.50			Deep																					
259			258	43.73354846	-88.98216727	15.50	M	P																						
260			259	43.73291828	-88.98217794	12.50	R	P																						
261			260	43.74362351	-88.98112721	6.00	M	P		2								2										2		
262			261	43.74299334	-88.98113790	7.50	M	P																						
263			262	43.74236316	-88.98114859	9.50	M	P																						
264			263	43.74173299	-88.98115928	9.00	R	P																						
265			264	43.74110282	-88.98116996	14.00	M	P																						
266			265	43.74047264	-88.98118065	15.00	M	P																						
267			266	43.73984247	-88.98119134				Deep																					
268			267	43.73921229	-88.98120202				Deep																					
269			268	43.73858212	-88.98121271				Deep																					
270			269	43.73795194	-88.98122340				Deep																					
271			270	43.73732177	-88.98123408				Deep																					
272			271	43.73669159	-88.98124477				Deep																					
273			272	43.73606142	-88.98125545				Deep																					
274			273	43.73543124	-88.98126614				Deep																					
275			274	43.73480107	-88.98127682	16.50	M	P																						
276			275	43.73417089	-88.98128750	17.50			Deep																					
277			276	43.73354072	-88.98129819	13.00	M	P																						
278			277	43.74361576	-88.98025798	4.00	S	P		2	1	A	S	1	B	S	1	2										2		
279			278	43.74298559	-88.98026868	6.50	M	P		2	1	A	D					2										1		
280			279	43.74235541	-88.98027938	9.50	M	P																						
281			280	43.74172524	-88.98029008	11.50	M	P																						
282			281	43.74109506	-88.98030077	13.50	M	P																						
283			282	43.74046489	-88.98031147	13.00	M	P		1																		1		
284			283	43.73983472	-88.98032217	14.00	M	P																						
285			284	43.73920454	-88.98033286	15.00	M	P																						
286			285	43.73857437	-88.98034356	17.00			Deep																					
287			286	43.73794419	-88.98035425				Deep																					
288			287	43.73731402	-88.98036495				Deep																					
289			288	43.73668384	-88.98037564				Deep																					
290			289	43.73605367	-88.98038633				Deep																					
291			290	43.73542349	-88.98039703				Deep																					
292			291	43.73479332	-88.98040772	15.00	M	P																						
293			292	43.73416314	-88.98041841	14.00	M	P																						
294			293	43.73353297	-88.98042911	7.00	R	P																						
295			294	43.74360800	-88.97938876	4.00	M	P		2							1	1										2		

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* , Eurasian water-milfoil	*MYRSP: At/Near/Below Surface*	*MYRSP: Sparse/Dense/Unknown*	*Potamogeton crispus* , Curly-leaf pondweed	*POTCR: At/Near/Below Surface*	*POTCR: Sparse/Dense/Unknown*	filamentous algae	*Ceratophyllum demersum* , Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata* , Sago pondweed	sp1 Elodea sp.	sp2	sp3
296			295	43.74297783	-88.97939946	6.00	M	P		2	2	A	D				1											2		
297			296	43.74234765	-88.97941017	8.50	M	P		1																		1		
298			297	43.74171748	-88.97942088	10.00	M	P		1	1	B	U																	
299			298	43.74108731	-88.97943158	11.00	M	P																						
300			299	43.74045713	-88.97944229	12.50	M	P																						
301			300	43.73982696	-88.97945299	13.00	M	P																						
302			301	43.73919678	-88.97946370	14.00	M	P																						
303			302	43.73856661	-88.97947440	15.00	M	P																						
304			303	43.73793643	-88.97948511				Deep																					
305			304	43.73730626	-88.97949581				Deep																					
306			305	43.73667608	-88.97950651				Deep																					
307			306	43.73604591	-88.97951722				Deep																					
308			307	43.73541573	-88.97952792	14.00	M	P																						
309			308	43.73478556	-88.97953862	13.00	S	P																						
310			309	43.73415539	-88.97954932				Terrestrial																					
311			310	43.74297006	-88.97853025	5.50	M	P		3								1										3		
312			311	43.74233989	-88.97854096	7.50	M	P		2				1	B	U	1											2		
313			312	43.74170971	-88.97855168	9.50	M	P																						
314			313	43.74107954	-88.97856239	10.00	M	P																						
315			314	43.74044937	-88.97857311	11.00	M	P																						
316			315	43.73981919	-88.97858382	12.00	M	P		1				1	B	U														
317			316	43.73918902	-88.97859454	13.00	M	P																						
318			317	43.73855884	-88.97860525	13.00	M	P																						
319			318	43.73792867	-88.97861596	13.50	M	P		1	1	B	U																	
320			319	43.73729850	-88.97862667	14.00	M	P																						
321			320	43.73666832	-88.97863739	14.00	M	P																						
322			321	43.73603815	-88.97864810	13.50	M	P																						
323			322	43.73540797	-88.97865881	13.00	M	P																						
324			323	43.73477780	-88.97866952	10.50	M	P																						
325			324	43.74296229	-88.97766103	3.50	M	P		2	1	N	D				1											2		
326			325	43.74233212	-88.97767175	6.00	M	P		2				1	B	U												2		
327			326	43.74170194	-88.97768248	8.50	M	P		2	1	N	U				1											2		
328			327	43.74107177	-88.97769320	9.50	M	P		1	1	B	U															1		
329			328	43.74044160	-88.97770393	10.00	M	P		1								1										1		
330			329	43.73981142	-88.97771465	10.50	M	P																						
331			330	43.73918125	-88.97772537	11.00	M	P																						
332			331	43.73855107	-88.97773610	12.00	M	P						V	N	S														
333			332	43.73792090	-88.97774682	12.00	M	P																						
334			333	43.73729072	-88.97775754	12.00	M	P																						
335			334	43.73666055	-88.97776826	12.00	M	P																						
336			335	43.73603038	-88.97777898	12.00	M	P		1				1	B	U														
337			336	43.73540020	-88.97778970	11.00	M	P																						
338			337	43.73477003	-88.97780042				Temporary Obstacle																					
339			338	43.74232434	-88.97680255	3.50	S	P		2				1	B	S	1	2										1		
340			339	43.74169416	-88.97681328	6.50	M	P		3								2										2		
341			340	43.74106399	-88.97682401	8.00	M	P		2	1	N	U	1	B	U		2										2		
342			341	43.74043382	-88.97683475	8.50	M	P																						
343			342	43.73980364	-88.97684548	9.00	M	P		2				1	B	U												2		
344			343	43.73917347	-88.97685621	10.00	M	P		2																		2		

Survey Date: June 30, 2010

	A	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1	**Entry**		sampling point	Latitude (need electronic copy of site locations)	Longitude (need electronic copy of site locations)	Depth (ft)	Dominant sediment type (M=muck, S=Sand, R=Rock)	Sampled holding rake pole (P) or rake rope (R)?	comments	Total Rake Fullness	*Myriophyllum spicatum* ,Eurasian water-milfoil	MYRSP: At/Near/Below Surface	MYRSP: Sparse/Dense/Unknown	*Potamogeton crispus* , Curly-leaf pondweed	POTCR: At/Near/Below Surface	POTCR: Sparse/Dense/Unknown	filamentous algae	*Ceratophyllum demersum* , Coontail	*Ceratophyllum echinatum*, Spiny hornwort	*Chara* , Muskgrasses	*Elodea canadensis* , Common waterweed	*Heteranthera dubia* , Water star-grass	*Lemna minor* , Small duckweed	*Lemna trisulca* , Forked duckweed	*Myriophyllum sibiricum* , Northern water milfoil	*Najas flexilis*, Bushy pondweed	*Stuckenia pectinata* , Sago pondwe	sp1 Elodea sp.	sp2	sp3
345			344	43.73854330	-88.97686694	10.00	M	P																						
346			345	43.73791312	-88.97687767	11.00	M	P		1								1												
347			346	43.73728295	-88.97688840	11.00	M	P		1	1	B	U																	
348			347	43.73665277	-88.97689914	11.00	M	P		1				1	B	U												1		
349			348	43.73602260	-88.97690987	10.00	M	P		2				1	B	U												2		
350			349	43.73539242	-88.97692060	9.50	M	P																						
351			350	43.73476225	-88.97693133	8.00	M	P		2	1	B	U	2	B	U												2		
352			351	43.74105621	-88.97595482	5.00	M	P		2	1	N	D				1	2										2		
353			352	43.74042603	-88.97596557	6.00	M	P		2	1	A	S					1										2		
354			353	43.73979586	-88.97597631	7.00	M	P		3	1	B	S															3		
355			354	43.73916569	-88.97598705	8.00	M	P		2				1	B	S												2		
356			355	43.73853551	-88.97599779	9.00	M	P		2																		2		
357			356	43.73790534	-88.97600853	9.00	M	P		2	2	B	U	2	B	U												2		
358			357	43.73727516	-88.97601927	9.00	M	P																						
359			358	43.73664499	-88.97603001	10.00	M	P		1																		1		
360			359	43.73601482	-88.97604075	9.00	M	P		1	1	B	U																	
361			360	43.73538464	-88.97605149	8.50	M	P		2	2	B	U	1	N	U												2		
362			361	43.73475447	-88.97606223	7.50	M	P		2	2	B	U					1										1		
363			362	43.73412429	-88.97607297	5.50	M	P		1																		1		
364			363	43.73978807	-88.97510714	4.00	M	P		1	1	B	S															1		
365			364	43.73915789	-88.97511789	6.00	M	P		2	1	B	S				1	2										2		
366			365	43.73852772	-88.97512864	6.00	M	P		2	1	A	S					2										2		
367			366	43.73600703	-88.97517163	6.00	R	P		2	2	B	S					1										2		
368			367	43.73537685	-88.97518238	8.00	M	P		2								2										2		
369			368	43.73474668	-88.97519313	7.00	M	P		2								2										2		
370			369	43.73411650	-88.97520388	6.00	M	P		2				1	B	U		2										2		
371			370	43.73348633	-88.97521462	4.00	M	P		2	2	B	U	1	B	U	1	2										2		
372			371	43.73536906	-88.97431328	7.00	M	P		2								2										2		
373			372	43.73473888	-88.97432403	7.00	M	P		2	1	B	U					2										2		
374			373	43.73410871	-88.97433479	5.00	M	P		2	2	N	D				1	2										2		
375			374	43.73347853	-88.97434555	4.00	M	P		2	1	B	U				1											2		
376			375	43.73536125	-88.97344417	5.00	M	P		2				1	B	U		2										2		
377			376	43.73473108	-88.97345494	5.00	M	P		2	2	A	D	1	B	U		2										2		
378			377	43.73410090	-88.97346570	4.00	M	P		2	2	N	S	1	B	U		2										2		

APPENDIX C

BLUE-GREEN ALGAE IN WISCONSIN WATERS
-FREQUENTLY ASKED QUESTIONS

Blue-Green Algae In Wisconsin Waters Frequently Asked Questions

GENERAL

What are blue-green algae?

Blue-green algae – also known as *Cyanobacteria* – are a form of algae many people call "pond scum." These algae often have a blue-green color which is how they got their name. Blue-green algae grow in lakes, ponds, and slow-moving streams when the water is warm and enriched with nutrients like phosphorus or nitrogen. Sometimes environmental conditions are just right and these algae grow very quickly and float to the surface where they form scum layers or floating mats. When this happens, you may be able to see an "algae bloom." In Wisconsin, algae blooms generally show up in June and may last until late September. It is not always the same species that blooms throughout the summer months. In fact, many lakes experience a bloom that lasts throughout the summer months, but it may actually be altogether different species growing in June than those that show up in August.

What purpose do blue-green algae serve in the environment?

Algae, including blue-green algae, are very important to the food chain. They are known as "primary producers " – a name that is given to living organisms that can convert sunlight and inorganic chemicals into usable energy for other living organisms. Most algae are microscopic and serve as the main supply of "high energy" food for larger organisms like zooplankton which in turn are eaten by small fish, larger fish, mammals, raptors, and even people.

What are algal toxins?

Algal toxins are naturally produced chemical compounds that are found at times inside the cells of certain species of blue-green algae. For most species, these chemicals are not produced all of the time and there is no easy way to tell when the algae are producing them and when they are not. These chemicals can be categorized as:

- **Endotoxins** – chemicals that affect the skin and other mucous membranes causing allergy like reactions (rash, eye/nose/throat irritation, asthma, etc.). They may also cause stomach cramps, fever, headaches, etc.
- **Hepatotoxins** – chemicals that damage the liver and other internal organs. They may cause gasteroenteritis, nausea, convulsions/seizures, vomiting, muscle weakness, vision problems, etc.
- **Neurotoxins** – chemicals that affect the central nervous system by acting as neuromuscular blocking agents leading to seizures, paralysis and respiratory or cardiac arrest.

When blue-green algae are growing in the water, they sometimes produce these toxins and store them within the algal cell itself. If a cell is broken open, the toxins may be released. Sometimes this occurs when the cells die off naturally and they break open as they sink and decay in a lake or pond. Other times, the cells may be broken open when the water is treated with chemicals meant to kill aglae or when the cells are swallowed and they are mixed with the digestive acids in the stomachs of people or animals.

Does the presence of blue-green algae always mean the water is contaminated?

The short answer is "No" and "Yes." Many blue-green algae do not produce toxins and while algae blooms may be unsightly, it does not always mean the water is contaminated with toxic substances. Simply seeing a bloom will not tell you whether or not algal toxins may be found in the water. The only way to be sure if the toxins are present is to have water samples analyzed in a laboratory using sophisticated equipment. These tests currently cost about $600 for each water sample.

On the other hand, these blooms often reach a nuisance state forming ugly, smelly scum layers that look like pea-soup or a green milk-shake if they have a sufficient supply of nutrients like phosphorus and nitrogen. While both phosphorus and nitrogen are natural and important elements for all life forms, human activity has clearly allowed more than necessary to enter our streams and lakes.

Are blue-green algae and their blooms a new problem?

No. Fossil evidence suggests that blue-green algae have been around for millions of years and they are believed to be the precursor to true plants. Scientists have recorded blue-green blooms dating back to the 12th century and they have documented the toxic effects to livestock for more than 100 years. It is probable that blooms seem to be more prominent now than in the past as a result of increased volumes of nutrients having reached our waters due to many human activities, including certain agricultural practices, discharge of untreated sewage, and use of phosphorus-based fertilizers and detergents.

Many lakes and streams in Wisconsin contain <u>native</u> species of blue-green algae capable of producing toxins. The most common species are *Anabaena* sp., *Aphanizomenon* sp., and *Microcystis* sp. – otherwise commonly referred to as "Annie," "Fannie," and "Mike." State researchers are testing a limited number of Wisconsin lakes and ponds in the summer of 2004 to try to learn more about algal blooms and the possible presence of algal toxins. If test results indicate the presence of large populations of algae or the presence of algal toxins, local health authorities will be notified immediately and public advisories or beach closures may be issued.

What is Cylindro and how is it different?

Cylindrospermopsis raciborskii – also referred to as "Cylindro" – is a blue-green algae that is not native to Wisconsin. Recent reviews of archived samples by DNR scientists have shown that Cylindro has been present in some Wisconsin lakes dating back to the early 1980's. It is likely that migratory waterfowl brought this algae to Wisconsin and other Midwestern states. This could have occurred by landing in lakes where the algae were growing and then carrying some of the algae on their feet and plumage to other lakes in a northerly direction.

Cylindro is different from many other blue-green algae because it does not always have the characteristic blue-green color and it is also believed to be less buoyant than other species of blue-green algae making it more difficult to see when it is blooming. Also, Cylindro may be capable of producing algal toxins more consistently than some of the native blue-green species. Current information on Cylindro indicates that it may be actively growing in some nutrient enriched Wisconsin waters from late July through the middle of September.

Why do blooms sometimes appear overnight?

Even if you can't see algae floating on the surface of the water, that doesn't mean that a bloom isn't present in the water - the bloom could be suspended at various depths in the water where you can't see it. The depth at which algae blooms float depends on a number of factors. The most important of these are light and food (phosphorus and nitrogen). Many species of blue-green algae have evolved to be able to control their buoyancy as the availability of these light and food change with the time of day and the local weather conditions. By being able to sink and rise at will, they are able to move to take advantage of the best light and nutrient levels. Light is a key factor that activates the mechanism for algae blooms to move. At night, when there is no light, cells are unable to adjust their buoyancy and often float to the surface, forming a surface scum. This scum literally appears overnight and lingers until the wind and waves scatter the cells throughout the water.

What can be done to reduce the frequency and intensity of blue-green algae blooms?

There are no quick and easy remedies for the control of blue-green algae once they appear in a lake or pond. Reducing the amount of nutrients that wash into our lakes and ponds may eventually reduce the intensity of algae blooms, but it will take a long time and a lot of community involvement to effectively change the nutrient concentrations in the water. Even if the nutrients washing into the water are reduced, there may still be large amounts of the nutrients in the sediment or muck at the bottom of many lakes and ponds that serve as food for the blue-green algae.

Regulatory agencies like the Wisconsin Department of Natural Resources and the Wisconsin Department of Agriculture, Trade, & Consumer Protection are working with communities around the state to reduce stormwater runoff and to encourage agricultural practices that reduce soil erosion while maintaining high crop yields. On a local basis, however, landowners and interested citizens can help minimize the problems associated with algal blooms by working together with all of the partners in their watershed to reduce the input of nutrients that reach our nearby lakes, streams, and ponds. There are many practices that can be promoted within your neighborhood or your community that will help, including:

- Use lawn fertilizers only where truly needed,
- Prevent yard debris (i.e., leaves, grass clippings, etc.) from washing into storm drains,
- Support local ordinances that require silt curtains for residential and commercial construction sites,
- Plant and maintain vegetative buffer strips along public and private land bordering lakes, streams, and ponds.
- Allow native plant species to grow along shorelines of lakes, streams, and ponds. Native plants are much more effective at filtering runoff than the typical grass species found on most residential lawns.

EFFECTS ON HUMANS & ANIMALS

Can blue-green algae make me sick?

Similar to allergies related to exposure to ragweed and goldenrod, some people may develop allergic reactions if they come in contact with water containing some species of blue-green algae when toxins are being produced. Symptoms may include skin rash, hives, itchy eyes and throat, etc.

If blue-green algae are swallowed through the mouth or nose, it is possible for more severe illness to occur. Because of the uncertainty about when the algae are actually producing toxins and just how much is being produced, there is no way to say how much is too much. A physician should be consulted if someone ingests these algae and one or more of the following symptoms occur: stomach cramps, vomiting, diarrhea, fever, headache, severe muscle or joint pain. Emergency room attention is warranted if someone is showing signs of seizure or convulsions after swimming or drinking water where blue-green algae are present.

Are children more vulnerable than adults?

Yes. Children may be at greater risk than adults for two primary reasons. First, children love to play in the water and they may not truly understand the health risks as well as adults. As a result, they may drink the water because they are thirsty or swallow it accidentally while swimming. Second, children have less relative body weight and a smaller quantity of the toxin may be trigger an adverse response in their liver or central nervous system.

Can blue-green algae make my pet sick?

Animals are not necessarily more sensitive to algal toxins than humans. However, many animals like dogs and cattle enjoy being in the water and they do not seem to be concerned with the fact that there is an unsightly green scum layer floating on the water. They will drink the water and are likely to consume large quantities of the algae as well. If the algae are producing toxins at the time the animals ingest them, they can become very ill and even die.

Signs of algal toxin poisoning may range from general lethargy and loss of appetite to more severe symptoms like seizures, vomiting, and convulsions. Dogs are particularly susceptible to blue-green algal poisoning because scums can attach to their coats and be swallowed during self-cleaning. If you suspect that your animals are showing any of these symptoms you should seek veterinary advice.

Should I let my pets or my livestock drink or swim in water containing algal blooms?
No. Animals can and do commonly become extremely ill and even die after swallowing water containing blue-green algae. As public awareness has increased, so has the number of reports of veterinarians suggesting that algal toxins have played a role in the deaths of dogs where other causes are not obvious. It is probable that the number of dogs that die from this phenomenon is an under-reported statistic.

DRINKING WATER CONCERNS

Other than recreation on the water, how likely am I to drink water contaminated with blue-green algae and/or its toxins?
Not very likely if your water supply is provided by a municipal drinking water agency. For most Wisconsin residents and tourists, drinking water is provided by underground water sources that are not going to have blue-green algae or its toxins present. Even though Lake Michigan and Lake Superior serve as the water supply for many residents of communities on or near those lakes, there is no reason to worry since the water is pumped from far offshore in deep water areas that are not affected by blue-green algae blooms. Rainbow Lake in Waupaca County and Lake Winnebago are the only two inland lakes that serve as the water supply for area communities (i.e., Appleton, Neenah, Menasha, & Oshkosh). While algal blooms may be seen on these lakes in summer months, the toxins that may be produced are removed by the routine water treatment process managed by the local utilities and they have not been found in the water after it has undergone routine treatment.

Keep in mind that water that is not treated may pose risks far beyond those associated with blue-green algae. All natural surface waters contain bacteria, algae, viruses, and other pathogens that if consumed may post health risks to humans, pets, and other domestic animals. No one should ingest raw lake or pond water at any time.

How do water treatment plants deal with blue-green algae?
As previously noted, Wisconsin has a limited number of communities that must be concerned about algal toxins in the water supply. Studies conducted by scientists from the the University of Wisconsin in the late 1990's did not detect any significant concentrations of algal toxins in the finished drinking water of several communities using Lake Winnebago as their water supply.

While most municipal water treatment plants with surface water supplies do not regularly monitor for algal toxins, they do use treatment techniques that would remove the toxins if they were present. Conventional water treatment facilities can remove the cells of algae and other growing organisms by adding chemicals that bind them together. As the cells clump together, they become heavier and fall to the bottom of settling basins. Additional removal is obtained by filtration and where necessary, algal toxins or other chemicals of concern are further reduced by using activated charcoal.

Can I treat my water at home to remove blue-green algae and their toxins?
There are a number of home water treatment options available to provide filtered water. Some of these systems include an activated charcoal step that will help remove certain chemicals like algal toxins if maintained and operated properly. However, variability in the design of the products on the market and the operation and maintenance by the homeowner prevent state health officials from declaring these products fail-safe.

Can I cook using water with blue-green algae in it?
No! Boiling water does not remove toxins from the water. Since it is impossible to detect the presence of toxins in the water by taste, odor or appearance, you are better off assuming that they may be present.

What about using water with blue-green algae for washing?
If blue-green algae are visible, try to find a better source of water for washing food (i.e., fruits & vegetables, etc.), dishes, and clothes. Bathing or showering in water with blue-green algae should also be avoided, as skin contact with the algae may lead to skin irritation and rashes.

RECREATIONAL WATER CONCERNS

Can water containing blue-green algae blooms be used for recreational activities?
Because local health officials cannot easily determine when algal toxins are being produced, anyone considering recreation on or in the water should use common sense. Simply put, if a scum-layer or floating mat is present, the chance for health effects is greater if you or your children participate in water-related activities like swimming, wading, water or jet-skiing, or wind surfing, especially if you ingest a large quantity of water containing the algae. It is advisable to try to find areas where the blooms are not present.

Is it safe to let your pets & kids swim in ponds? (e.g., farm ponds, stormwater detention ponds, golf course ponds?)
By design, many farm ponds, golf course ponds, and stormwater detention ponds are constructed to trap nutrients, eroded soil, and other debris. By doing this, they prevent those materials from reaching nearby lakes, ponds, and streams. Because more nutrients may be available and because these types of ponds are generally shallower and warmer, it is possible for them to have more frequent algae blooms bringing about the possibility of more frequent algal toxins. Without having specific information, the common sense approach is also recommended for these

types of waters. If a scum-layer or floating mat is present, it is advisable to try to find areas to recreate where the blooms are not present.

Is there a risk to SCUBA divers who swim in blue-green algae blooms?

It may not always be possible to avoid swimming in algae blooms. Rescue SCUBA divers may be required to swim in areas where a bloom is present. In those cases, divers should try to minimize the ingestion of water during the course of the dive. At a minimum, individuals should shower or rinse off thoroughly after exiting the water. All gear should also be rinsed thoroughly. Any diver who shows any signs of illness afterward should seek medical attention.

Do blue-green algae pose a risk to competitive swimmers such as triathletes?

When organizers establish the schedule and pick a course for a triathlon, they have no way of knowing whether or not an algae bloom will be present in the swim area, nor do they have any way of knowing whether or not algal toxins may be present. To the degree possible, race organizers are encouraged to establish a course that minimizes the exposure of participants to algae blooms. Race organizers may also want to consider having a rinse station established near the swimming finish area. Where this is not possible, all participants are encouraged to minimize the ingestion of water during the course of the event. At a minimum, individuals should shower or rinse off thoroughly after exiting the water. As is the case in any organized race, participants should seek medical attention if they show any signs of illness during or after the event.

FISH CONSUMPTION

Can I eat fish from water with blue-green algae?

Certain algal toxins have been shown to accumulate in the tissues of fish and shellfish, particularly in the viscera (liver, kidney, etc.). Whether or not the accumulation levels are sufficient to pose a risk to humans is uncertain although it would depend in part on the levels of consumption and the severity of the algal blooms where the fish or shellfish were caught or collected.

The Wisconsin Department of Natural Resources has not received any information that people eating fish have become ill due to algal toxins. The World Health Organization has advised that people choosing to eat fish from waters where blue-green algae blooms exist should eat them in moderation and avoid eating the guts of the fish where accumulation of toxins may be greatest.

Prepared by:
Wisconsin Department of Natural Resources
June 2004

IMPORTANT FACTS ABOUT HYGIENE & CONTACT INFORMATION

Important Note: All natural surface waters contain bacteria, algae, viruses, and other pathogens that if consumed may pose health risks to humans, pets, and other domestic animals (cattle, swine, etc...). No one should ingest raw lake or pond water at any time.

General Recreational Use Guidance:

- Common sense should be the guide to choosing whether or not to recreate on or in the water of any lake or pond that contains blue-green algae.
- No one should swim or dive where algae are visible (e.g., pea soup, floating matts, scum layers, etc.) or the water is discolored.
- Humans who enter the water where blue-green algae are present should not drink the water and should take precautions to prevent inhalation of water into the sinuses.
- Parents of children should keep them out of the water whenever algae are visible or the water is discolored, as it is possible that children are more susceptible to algal toxins than most adults.
- Pet owners should avoid allowing their pet to swim or drink the water whenever algae are visible or the water is discolored. Pet owners should also keep animals from eating algae that may have washed up along the shoreline.

If you experience illness that may be due to exposure or ingestion of blue-green algae, contact your doctor or the Poison Information Hotline at 1-800-222-1222.

If your pet shows symptoms such as seizures, vomiting, or diarrhea after contact with the water, contact your local veterinarian.

For more information about contacting your local health department, check the Wisconsin Department of Health & Family Services website:

http://www.dhfs.state.wi.us/dph_ops/LocalHealth/

OTHER WEBSITES OF INTEREST:

www.pca.state.mn.us/water/lake-faq.html#blue-greenscum

www.pca.state.mn.us/water/clmp-toxicalgae.html

www.in.gov/dnr/fishwild/fish/cylind.htm

dnr.metrokc.gov/wlr/waterres/lakes/bloom.htm

www.btny.purdue.edu/Pubs/APM/blue-green_factsheet.pdf

APPENDIX D

SUMMARY OF AQUATIC PLANT MANAGEMENT ALTERNATIVES

Aquatic Plant Management

Aquatic plants are a critical component in an aquatic ecosystem. Any management of an ecosystem can have negative or even detrimental effects on the whole ecosystem. Therefore, the practice of managing aquatic plants should not be taken lightly. The concept of Aquatic Plant Management (APM) is highly variable since different aquatic resource users want different things. Ideal management to one individual may mean providing prime fish habitat, for another it may be to remove surface vegetation for boating. The practice of APM is also highly variable. There are numerous APM strategies designed to achieve different plant management goals. Some are effective on a small scale, but ineffective in larger situations. Others can only be used for specific plants or during certain times of the growing season. Of course, the types of plants that are to be managed will also help determine which APM alternatives are feasible. The following paragraphs discuss the APM methods used today. The discussion is largely adopted from *Managing Lakes and Rivers, North American Lake Management Society, 2001*, supplemented with other applicable current resources and references. The methods summarized here are largely for management of rooted aquatic plants, not algae. While some methods may also have effects on nuisance algae blooms, the focus is submergent rooted aquatic macrophytes. This information is provided to allow the user to gain a basic understanding of the APM method, it is not designed to an all-inclusive APM decision-making matrix. APM alternatives can be divided into the following categories: Physical Controls, Chemical Controls, and Biological Controls.

PHYSICAL CONTROLS

Physical APM controls include various methods to prevent growth or remove part or all of the aquatic plant. Both manual and mechanical techniques are employed. Physical APM methods include:

- ✓ Hand pulling
- ✓ Hand cutting
- ✓ Bottom barriers
- ✓ Light limitation (dyes, covers)
- ✓ Mechanical harvesting
- ✓ Hydroraking/rototilling
- ✓ Suction dredging
- ✓ Dredging
- ✓ Drawdown

Each of these methods are described below. The costs, benefits, and drawbacks of each APM strategy are provided.

Hand Pulling: This method involves digging out the entire unwanted plant including stems and roots with a hand tool such as a spade. This method is highly selective and suitable for shallow areas for removing invasive species that have not become well established. This technique is obviously not for use on large dense beds of nuisance aquatic plants. It is best used in areas less than 3 feet, but can be used in deeper areas with divers using scuba and snorkeling equipment. It can also be used in combination with the suction dredge method. In Wisconsin, hand pulling may be completed outside a designated sensitive area without a permit but is limited to 30 feet of shoreline frontage. Removal of exotic species is not limited to 30 feet.

Advantages: This technique results in immediate clearing of the water column of nuisance plants. When a selective technique is desired in a shallow, small area, hand pulling is a good choice. It is also useful in sensitive areas where disruption must be minimized.

Disadvantages: This method is labor intensive. Disturbing the substrate may affect fish habitat, increase turbidity, and may promote phosphorus re-suspension and subsequent algae blooms.

Costs: The costs are highly variable. There is practically no cost using volunteers or lakeshore landowners to remove unwanted plants, however using divers to remove plants can get relatively expensive. Hand pulling labor can range from $400 to $500 per acre.

Hand Cutting: This is another manual method where the plants are cut below the water surface. Generally the roots are not removed. Tools such as rakes, scythes or other specialized tools are pulled through the plant beds by boat or several people. This method is not as selective as hand pulling. This method is well suited for small areas near docks and piers. Plant material must be removed from the water. In Wisconsin, hand cutting may be completed outside a designated sensitive area without a permit but is limited to 30 feet of shoreline frontage. Removal of exotic species is not limited to 30 feet.

Advantages: This technique results in immediate clearing of the water column of nuisance plants. Costs are minimal.

Disadvantages: This is also a fairly time consuming and labor intensive option. Since the technique does not remove the entire plant (leaves root system and part of plant), it may not result in long-term reductions in growth.

Costs: The costs range from minimal for volunteers using hand equipment up to over $1,000 for a hand-held mechanized cutting implement. Hand pulling labor can range from $200 to $400 per acre.

Bottom Barriers: A barrier material is applied over the lake bottom to prevent rooted aquatics from growing. Natural barriers such as clay, silt, and gravel can be used although eventually plants may root in these areas again. Artificial materials can also be used for bottom barriers and anchored to the substrate. Barrier materials include burlap, nylon, rubber, polyethylene, polypropylene, and fiberglass. Barriers include both solid and porous forms. A permit is required to place any fill or barrier structure on the substrate of a waterbody. This method is well suited for areas near docks, piers, and beaches. Periodic maintenance may be required to remove accumulated silt or rooting fragments from the barrier.

Advantages: This technique does not result in production of plant fragments. Properly installed, it can provide immediate and multiple year relief.

Disadvantages: This is a non-selective option, all plants beneath the barrier will be affected. Some materials are costly and installation is labor intensive. Other disadvantages include limited material durability, gas accumulation beneath the cover, or possible re-growth of plants from above or below the cover. Fish and invertebrate habitat is disrupted with this technique. Anchored barriers can be difficult to remove.

Costs: A 20 foot x 60 foot panel cost $265, while a 30 foot x 50 foot panel cost $375 (this does not include installation costs). Costs for materials vary from $0.15 per square foot ($ft^2$) to over $0.35/ ft^2. The costs for installation range from $0.25 to $0.50/ ft^2. Barriers can cost $20,000 to $50,000 per acre.

Light Limitation: Limiting the available light in the water column can prevent photosynthesis and plant growth. Dark colored dyes and surface covers have been used to accomplish light limitation. Dyes are effective in shallow water bodies where their concentration can be kept at a desired concentration and loss through dilution is less. This method is well suited for small, shallow water bodies with no outlets such as private ponds.

Surface covers can be a useful tool in small areas such as docks and beaches. While they can interfere with aquatic recreation, they can be timed to produce results and not affect summer recreation uses.

Advantages: Dyes are non-toxic to humans and aquatic organisms. No special equipment is required for application. Light limitation with dyes or covers method may be selective to shade tolerant species. In addition to submerged macrophyte control, it can also control the algae growth.

Disadvantages: The application of water column dyes is limited to shallow water bodies with no outlets. Repeated dye treatments may be necessary. The dyes may not control peripheral or shallow-water rooted plants. This technique must be initiated before aquatic plants start to grow. Covers inhibit gas exchange with the atmosphere.

Costs: Costs for a commercial dye and application range from $100 to $500 per acre.

Mechanical Harvesting: Mechanical harvesters are essentially cutters mounted on barges that cut aquatic plants at a desired depth. Maximum cutting depths range from 5 to 8 feet with a cutting width of 6.5 to 12 feet. Cut plant materials require collection and removal from the water. Conventional harvesters combine cutting, collecting, storing, and transporting cut vegetation into one piece of equipment. Transport barges and shoreline conveyors are also available to remove the cut vegetation. The cut plants must be removed from the water body. The equipment needs are dictated by severity of the aquatic plant problem. Contract harvesting services are available in lieu of purchasing used or new equipment. Trained staff will be necessary to operate a mechanical harvester. To achieve maximum removal of plant material, harvesting is usually completed during the summer months while submergent vegetation is growing to the surface. The duration of control is variable and re-growth of aquatic plants is common. Factors such as timing of harvest, water depth, depth of cut, and timing can influence the effectiveness of a harvesting operation. Harvesting is suited for large open areas with dense stands of exotic or nuisance plant species. Permits are now required in Wisconsin to use a mechanical harvester.

Advantages: Harvesting provides immediate visible results. Harvesting allows plant removal on a larger scale than other options. Harvesting provides flexible area control. In other words, the harvester can be moved to where it is needed and used to target problem areas. This technique has the added benefit of removing the plant material from the water body and therefore also eliminates a possible source of nutrients often released during fall decay of aquatic plants. While removal of nutrients through plant harvesting has not been quantified, it can be important in aquatic ecosystem with low nutrient inputs.

Disadvantages: Drawbacks of harvesting include: limited depth of operation, not selective within the application area, and expensive equipment costs. Harvesting also creates plant fragments, which can be a concern since certain plants have the ability to reproduce whole plants from a plant fragment (e.g. Eurasian watermilfoil). Plant fragments may re-root and spread a problem plant to other areas. Harvesting can have negative effects on non-target plants, young of year fish, and invertebrates. The harvesting will require trained operators and maintenance of equipment. Also, a disposal site or landspreading program will be needed for harvested plants.

Costs: Costs for a harvesting operation are highly variable dependant on program scale. New harvesters range from $40,000 for small machines to over $100,000 for large, deluxe models. Costs vary considerably, depending on the model, size, and options chosen. Specially designed units are available, but may cost more. The equipment can last 10 to 15 years. A grant for ½ the equipment cost can be obtained from the Wisconsin Waterways Commission and a loan can be obtained for the remaining capital investment. Operation costs include insurance, fuel, spare parts, and payroll. Historical harvesting values have been reported at $200 up to $1,500 per acre. A survey of recent Wisconsin harvesting operations reported costs to be between $100/acre and $200/acre.

A used harvester can be purchased for $10,000 to $20,000. Maintenance costs are typically higher.

Contract harvesting costs approximately $125/per hour plus mobilization to the water body. Contractors can typically harvest ¼ to ½ acre per hour for an estimated cost of $250 to $500/per acre.

Hydroraking/rototilling: Hydroraking is the use of a boat or barge mounted machine with a rake that is lowered to the bottom and dragged. The tines of the rake rip out roots of aquatic plants. Rototilling, or rotovation, also rips out root masses but uses a mechanical rotating head with tines instead of a rake. Harvesting may need to be completed in conjunction with these methods to gather floating plant fragments. This application would best be used where nuisance populations are well established and prevention of stem fragments is not critical. A permit would be required for this type of aquatic plant management and would only be issued in limited cases of extreme infestations of nuisance vegetation. In Wisconsin, this method is not permitted at all by the WDNR.

Advantages: These methods have the potential for significant reductions in aquatic plant growth. These methods can remove the plant stems and roots, resulting in thorough plant disruption. Hydroraking/rototilling can be completed in "off season" months avoiding interference with summer recreation activities.

Disadvantages: Hydroraking/rototilling are not selective and may destroy substrate habitat important to fish and invertebrates. Suspension of sediments will increase turbidity and can possibly cause algae blooms. These methods can cause floating plant and root fragments, which may re-root and spread the problem. Hydroraking/rototilling are expensive and not likely to be permitted by regulatory agencies.

Costs: Bottom tillage costs vary according to equipment, treatment scale, and plant density. For soft vegetation costs can range from $2,000 to $4,000 per acre. For dense, rooted masses, costs can be up to $10,000 per acre. Contract bottom tillage reportedly ranges from $1,200 to $1,700 per acre (Washington Department of Ecology, 1994).

Suction Dredging: Suction dredging uses a small boat or barge with portable dredges and suction heads. Scuba divers operate the suction dredge and can target removal of whole plants, seeds, and roots. This method may be applied in conjunction with hand cutting where divers dislodge the plants. The plant/sediment slurry is hydraulically pumped to the barge through hoses carried by the diver. Its effectiveness is dependent on sediment composition, density of aquatic plants, and underwater visibility. Suction dredging may be best suited for localized infestations of low plant density where fragmentation must be controlled. A permit will be required for this activity.

Advantages: Diver suction dredging is species –selective. Disruption of sediments can be minimized. These methods can remove the plant stems and roots, resulting in thorough plant disruption and potential longer term control. Fragmentation of plants is minimized. This activity can be completed near and around obstacles such as piers or marinas where a harvester could not operate.

Disadvantages: Diver suction dredging is labor intensive and costly. Upland disposal of dredged slurry can require additional equipment and costs. Increased turbidity in the area of treatment can be a problem. Release of nutrients and other pollutants can also be a problem.

Costs: Suction dredging costs can be variable depending on equipment and transport requirements for slurry. Costs range from $5,000 per acre to $10,000 per acre.

Dredging

Sediment removal through dredging can work as a plant control technique by limiting light through increased water depth or removing soft sediments that are a preferred habitat to nuisance rooted plants. Soft sediment removal is accomplished with drag lines, bucket dredges, long reach backhoes, or other specialized dredging equipment. Dredging has had mixed results in controlling aquatic plant, however it can be highly effective in appropriate situations. Dredging is most often applied in a major restructuring of a severely degraded system. Generally, dredging is an activity associated with other restoration efforts. Comprehensive pre-planning will be necessary for these techniques and a dredging permit would be required.

Advantages: Dredging can remove nutrient reserves which result in nuisance rooted aquatic plant growth. Dredging, when completed, can also actually improve substrate and habitat for more desirable species of aquatic plants, fish, and invertebrates. It allows the complete renovation of an aquatic ecosytem. This method has the potential for significant reductions in aquatic plant growth. These methods can be completed in "off season" months avoiding interference with summer recreation activities.

Disadvantages: Dredging can temporarily destroy important fish and invertebrate habitat. Suspension of sediments usually increases turbidity significantly and can possibly releases nutrients causing algae blooms. Dredging is extremely expensive and requires significant planning. Dredged materials may contain toxic materials (metals, PCBs). Dredged material transportation and disposal of toxic materials are additional management considerations and are potentially expensive. It could be difficult and costly to secure regulatory permits and approvals.

Costs: Dredging costs depend upon the scale of the project and many other factors. It is generally an extremely expensive option.

Drawdown: Water level drawdown exposes the plants and root systems to prolonged freezing and drying to kill the plants. It can be completed any time of the year, however is generally more effective in winter, exposing the lake bed to freezing temperatures. If there is a water level control structure capable of drawdown, it can be an in-expensive way to control some aquatic plants. Aquatic plants vary in their susceptibility to drawdown, therefore, accurate identification of problem species is important. Drawdown is often used for other purposes of improving waterfowl habitat or fishery management, but sometimes has the added benefit of nuisance rooted aquatic plant control. This method can be used in conjunction with a dredging project to excavate nutrient-rich sediments. This method is best suited for use on reservoirs or shallow man-made lakes. A drawdown would require regulatory permits and approvals.

Advantages: A drawdown can result in compaction of certain types of sediments and can be used to facilitate other lake management activities such as dam repair, bottom barrier, or dredging projects. Drawdown can significantly impact populations of aquatic plants that propagate vegetatively. It is inexpensive.

Disadvantages: This method is limited to situations with a water level control structure. Pumps can be used to de-water further if ground water seepage is not significant. This technique may also result in the removal of beneficial plant species. Drawdowns can decrease bottom dwelling invertebrates and overwintering reptiles and amphibians. Drawdowns can affect adjacent wetlands, alter downstream flows, and potentially impair well production. Drawdowns and any water level manipulation are often highly controversial since shoreline landowners access and public recreation are limited during the drawdown. Fish populations are vulnerable during a drawdown due to over-harvesting by fisherman in decreased water volumes.

Costs: If a suitable outlet structure is available then costs should be minimal. If dewatering pumps would be required or additional management projects such as dredging are completed, additional costs would be incurred. Other costs would include recreational losses and perhaps loss in tourism revenue.

CHEMICAL CONTROLS

Using chemical herbicides to kill nuisance aquatic plants is the oldest APM method. However, past pesticides uses being linked to environmental or human health problems have led to public wariness of chemicals in the environment. Current pesticide registration procedures are more stringent than in the past. While no chemical pesticide can be considered 100 percent safe, federal pesticide regulations are based on the premise that if a chemical is used according to its label instructions it will not cause adverse environmental or human health effects.

Chemical herbicides for aquatic plants can be divided into two categories, systemic and contact herbicides. Systemic herbicides are absorbed by the plant, translocated throughout the plant, and are capable of killing the entire plant, including the roots and shoots. Contact herbicides kill the plant surface in which in comes in contact, leaving roots capable of re-growth. Aquatic herbicides exist under various trade names, causing some confusion. Aquatic herbicides include the following:

- ✓ Endothall Based Herbicide
- ✓ Diquat Based Herbicide
- ✓ Fluridone Based Herbicide
- ✓ 2-4-D Based Herbicide
- ✓ Glyphosate Based Herbicide
- ✓ Triclopyr Based Herbicide
- ✓ Phosphorus Precipitation

Each of these methods are described below. The costs, benefits, and drawbacks of each chemical APM alternative are provided.

Endothall Based Herbicide: Endothall is a contact herbicide, attacking a wide range of plants at the point of contact. The chemical is not readily transferred to other plant tissue, therefore regrowth can be expected and repeated treatments may be needed. It is sold in liquid and granular forms under the trade names of Aquathol K, Aquathol, or Hydrothol. Hydrothol is also an algaecide. Most endothall products break down easily and do not remain in the aquatic environment. Endothall products can result in plant reductions for a few weeks to several months. Multi-season effectiveness is not typical. A permit is required for use of this herbicide.

Advantages: Endothall products work quickly and exhibit moderate to highly effective control of floating and submersed species. This herbicide has limited toxicity to fish at recommended doses.

Disadvantages: The entire plant is not killed when using endothall. Endothall is non-selective in the treatment area. High concentrations can kill fish easily. Water use restrictions (time delays) are necessary for recreation, irrigation, and fish consumption after application.

Costs: Costs vary with treatment area and dosage. Average costs for chemical application range between $400 and $700 per acre.

Diquat Based Herbicide: Diquat is a fast-acting contact herbicide effective on a broad spectrum of aquatic plants. It is sold under the trade name of Reward. Diluted forms of this product are also sold as private label products. Since Diquat binds to sediments readily, its effectiveness is reduced by turbid water. Multi-season effectiveness is not typical. A permit is required for use of this herbicide.

Advantages: Diquat works quickly and exhibit moderate to highly effective control of floating and submersed species. This herbicide has limited toxicity to fish at recommended doses.

Disadvantages: The entire plant is not killed when using diquat. Diquat is non-selective in the treatment area. Diquat can be inactivated by suspended sediments. Diquat is sometimes toxic to zooplankton at the recommended dose. Limited water used restrictions (water supply, agriculture, and contact recreation) are required after application.

Costs: Costs vary with treatment area and dosage. A general cost estimate for treatment is between $200 and $500 per acre.

Fluoridone Based Herbicide: Fluoridone is a slow-acting systemic herbicide, which is effectively absorbed and translocated by both plant roots and stems. Sonar is the trade name and it is sold in liquid or granular form. Fluoridone requires a longer contact time and demonstrates delayed toxicity to target plants. Eurasian watermilfoil is more sensitive to fluoridone than other aquatic plants. This allows a semi-selective approach when low enough doses are used. Since the roots are also killed, multi-season effectiveness can be achieved. It is best applied during the early growth phase of the plants. A permit is required for use of this herbicide.

Advantages: Fluoridine is capable of killing roots, therefore producing a longer lasting effect than other herbicides. A variety of emergent and submersed aquatics are susceptible to this herbicide. Fluoridine can be used selectively, based on concentration. A gradual killing of target plants limits severe oxygen depletion from dead plant material. It has demonstrated low toxicity to aquatic fauna such as fish and invertebrates. 3 to 5 year control has been demonstrated. Extensive testing have shown that, when used according to label instructions, it does not pose negative health affects.

Disadvantages: Fluoridine is a very slow-acting herbicide sometimes taking up to several months for visible effects. It requires a long contact time. Fluoridine is extremely soluble and mixable, therefore, not effective in flowing water situations or for treating a select area in a large open lake. Impacts on non-target plants are possible at higher doses. Time delays are necessary on use of the water (water supply, irrigation, and contact recreation) after application.

Costs: Costs vary with treatment area and dosage. Treatment costs range from $500 to $2,000 per acre.

2,4-D Based Herbicide: 2,4-D-based herbicides are sold in liquid or granular forms under various trade names. It is a systemic herbicide that affects broad leaf plants. It has been demonstrated effective against Eurasian watermilfoil, but it may not work on many aquatic plants. Since the roots are also killed, multi-season effectiveness may be achieved. It is best applied during the early growth phase of the plants. Visible results are evident within 10 to 14 days. A permit is required for use of this herbicide.

Advantages: 2,4-D is capable of killing roots, therefore producing a longer lasting effect than some other herbicides. It is fairly fast and somewhat selective, based on application timing and concentration. 2,4-D containing products are moderately to highly effective on a few emergent, floating, or submersed plants.

Disadvantages: 2,4-D can have variable toxicity effects to aquatic fauna, depending on formulation and water chemistry. 2,4-D lasts only a short time in water, but can be detected in sediments for months after application. Time delays are necessary on use of the water (agriculture and contact recreation) after application. The label does not permit use of this product in water used for drinking, irrigation, or livestock watering.

Costs: Costs vary with treatment area and dosage. Treatment costs range from $300 to $800 per acre.

Glyophosate Based Herbicide: Glyophosate has been categorized as both a contact and a systemic herbicide. It is applied as a liquid spray and is sold under the trade name Rodeo or Pondmaster. It is a non-selective, broad based herbicide effective against emergent or floating leaved plants, but not submergents. It's effectiveness can be reduced by rain. A permit is required for use of this herbicide.

Advantages: Glyophoshate is moderately to highly effective against emergent and floating-leaf plants resulting in rapid plant destruction. Since it is applied by spraying plants above the surface, the applicator can apply it selectively to target plants. Glyophosate dissipates quickly from natural waters, has a low toxicity to aquatic fauna, and carries no restrictions or time delays for swimming, fishing, or irrigation.

Disadvantages: Glyophoshate is non-selective in the treatment area. Wind can dissipate the product during the application reducing it's effectiveness and cause damage to non-target organisms. Therefore, spray application should only be completed when wind drift is not a problem. This compound is highly corrosive, therefore storage precautions are necessary.

Costs: Costs average $500 to $1,000 per acre depending on the scale of treatment.

Triclopyr Based Herbicide: Triclopyr is a systemic herbicide. It is registered for experimental aquatic use in selected areas only. It is applied as a liquid spray or injected into the subsurface as a liquid. Triclopyr has shown to be an effective control to many floating and submersed plants. It has been demonstrated to be highly effective against Eurasian watermilfoil, having little effect on valued native plants such as pondweeds. Triclopyr is most effective when applied during the active growth period of younger plants.

Advantages: This herbicide is fast acting. Triclopyr can be used selectively since it appears more effective against dicot plant species, including several difficult nuisance plants. Testing has demonstrated low toxicity to aquatic fauna.

Disadvantages: At higher doses, there are possible impacts to non-target species. There is a time delay of 30 days for fish consumption from treated areas. This herbicide is experimental for aquatic use and restrictions on use of the treated water are not yet certain.

BIOLOGICAL CONTROLS

There has been recent interest in using biological technologies to control aquatic plants. This concept stems from a desire to use a "natural" control and reduce expenses related to equipment and/or chemicals. While use of biological controls is in its infancy, potentially useful technologies have been identified and show promise for integration with physical and chemical APM strategies. Several biological controls that are in use or are under experimentation include the following:

- ✓ Herbivorous Fish
- ✓ Herbivorous Insects
- ✓ Plant Pathogens
- ✓ Native Plants

Each of these methods are described below. The costs, benefits, and drawbacks of each biologic APM method are provided.

Herbivorous Fish: A herbivorous fish such as the non-native grass carp can consume large quantities of aquatic plants. These fish have high growth rates and a wide range of plant food preferences. Stocking rates and effectiveness will depend on many factors including climate, water temperature, type and extent of aquatic plants, and other site-specific issues. Sterile (triploid) fish have been developed resulting in no reproduction of the grass carp and population control. This technology has demonstrated mixed results and is most appropriately used for lake-wide, low intensity control of submersed plants. Some states do not allow stocking of herbivorous fish. In Wisconsin, stocking of grass carp is prohibited.

Advantages: This technology can provide multiple years of aquatic plant control from a single stocking. Compared to other long-term aquatic plant control techniques such as bottom tillage or bottom barriers, costs may be relatively low.

Disadvantages: Sterile grass carp exhibit distinct food preferences, limiting their applicability. Grass carp may feed selectively on the preferred plants, while less preferred plants, including milfoil, may increase. The effects of using grass carp may not be immediate. Overstocking may result in an impact on non-target plants or eradication of beneficial plants, altering lake habitat. Using grass carp may result in algae blooms and increased turbidity. If precautions are not taken (i.e. inlet and outlet control structures to prevent fish migration) the fish may migrate and have adverse effects on non-target vegetation.

Costs: Costs can range from $50/acre to over $2,000/acre, at stocking rates of 5 fish/acre to 200 fish/acre.

Herbivorous Insects: Non-native and native insect species have been used to control rooted plants. Using herbivorous insects is intended to selectively control target species. These aquatic larvae of moths, beetles, and thrips use specific host aquatic plants. Several non-native species have been imported under USDA approval and used in integrated pest management programs, a combination of biological, chemical, and mechanical controls.
These non-native insects are being used in southern states to control nuisance plant species and appear climate-limited, their northern range being Georgia and North Carolina. While successes have been demonstrated, non-native species have not established themselves for solving biological problems, sometimes creating as many problems as they solve. Therefore, government agencies prefer alternative controls.

Native insects such as the larvae of midgeflies, caddisflies, beetles, and moths may be successful APM controls in northern states. Recently however, the native aquatic weevil *Euhrychiopsis lecontei* has received the most attention. This weevil has been associated with native northern water milfoil. The weevil can switch plant hosts and feed on Eurasian watermilfoil, destroying it's growth points. While the milfoil weevil is gaining popularity, it is still experimental.

Advantages: Herbivorous insects are expected to have no negative effects on non-target species. The insects have shown promise for long term control when used as part of integrated aquatic plant management programs. The milfoil weevils do not use non-milfoil plants as hosts.

Disadvantages: Natural predator prey cycles indicate that incomplete control is likely. An oscillating cycle of control and re-growth is more likely. Fish predation may complicate controls. Large numbers of milfoil weevils may be required for a dense stand and can be expensive. The weevil leaves the water during the winter, may not return to the water in the spring, and are subject to bird predation in their terrestrial habitat. Application is manual and extremely time consuming. Introducing any species, especially non-native ones, into an aquatic ecosystem may have undesirable effects. Therefore, it is extremely important to understand the life cycles of the insects and the host plants.

Costs: Reported costs of herbivorous insects rang from $300/acre to $3,000/acre.

Specifically, the native milfoil weevils cost approximately $1.00 per weevil. It is generally considered appropriate to use 5 to 7 weevils per stem. Dense stands of milfoil may contain 1 to 2 million stems per acre. Therefore, costs of this new technology are currently prohibitive.

Plant Pathogens: Using a plant pathogen to control nuisance aquatic plants has been studied for many years, however still remains largely experimental. Fungi are the most common pathogens, while bacteria and viruses have also been used. There is potential for highly specific plant applications.

Advantages: Plant pathogens may be highly species specific. They may provide substantial control of a nuisance species.

Disadvantages: Pathogens are experimental. The effectiveness and longevity of control is not well understood. Possible side effects are also unknown.

Costs: These techniques are experimental therefore a supply of specific products and costs are not established.

Native Plants: This method involves removing the nuisance plant species through chemical or physical means and re-introducing seeds, cuttings, or whole plants of desirable species. Success has been variable. When using seeds, they need to be planted early enough to encourage the full growth and subsequent seed production of those plants. Transplanting mature plants may be a better way to establish seed producing populations of desirable aquatics. Recognizing that a healthy, native, desirable plant community may be resistant to infestations of nuisance species, planting native plants should be encouraged as an APM alternative. Non-native plants can not be translocated.

Advantages: This alternative can restore native plant communities. It can be used to supplement other methods and potentially prevent future needs for costly repeat APM treatments.

Disadvantages: While this appears to be a desirable practice, it is experimental at this time and there are not many well documented successes. Nuisance species may eventually again invade the areas of native plantings. Careful planning is required to ensure that the introduced species do not themselves become nuisances. Hand planting aquatic plants is labor intensive.

Costs: Costs can be highly variable depending on the selected native species, numbers of plants ordered, and the nearest dealer location.

AQUATIC PLANT PREVENTION

The phrase "an ounce of prevention is worth a pound of cure" certainly holds true for APM. Prevention is the best way to avoid nuisance aquatic plant growth. Prevention of the spread of invasive aquatic plants must also be achieved. Inspecting boats, trailers, and live wells for live aquatic plant material is the best way to prevent nuisance aquatic plants from entering a new aquatic ecosystem. Protecting the desirable native plant communities is also often important to maintain a healthy aquatic ecosystem and preventing the spread of nuisance aquatics once they are present.

Prolific growth of nuisance aquatic plants can be prevented by limiting nutrient (i.e. phosphorus) inputs to the water body. Aeration or phosphorus precipitation can achieve controls of in-lake cycling of phosphorus, however if there are additional outside sources of nutrients, these methods will be largely ineffective in controlling algae blooms or intense aquatic macrophyte infestations. Watershed management activities to control nutrient laden storm water runoff are critical to controlling excessive nutrient loading to the water bodies. Nutrient loading can be prevented/minimized by the following:

- ✓ Shoreline Buffers
- ✓ Using non-phosphorus fertilizers on lawns
- ✓ Settling basins for storm water effluents

APPENDIX E

NR 107 WI ADM. CODE
AND
NR 109 WI ADM. CODE

Chapter NR 107

AQUATIC PLANT MANAGEMENT

Note: Chapter NR 107 as it existed on February 28, 1989 was repealed and a new Chapter NR 107 was created effective March 1, 1989.

NR 107.01 Purpose. The purpose of this chapter is to establish procedures for the management of aquatic plants and control of other aquatic organisms pursuant to s. 227.11 (2) (a), Stats., and interpreting s. 281.17 (2), Stats. A balanced aquatic plant community is recognized to be a vital and necessary component of a healthy aquatic ecosystem. The department may allow the management of nuisance–causing aquatic plants with chemicals registered and labeled by the U.S. environmental protection agency and labeled and registered by firms licensed as pesticide manufacturers and labelers with the Wisconsin department of agriculture, trade and consumer protection. Chemical management shall be allowed in a manner consistent with sound ecosystem management and shall minimize the loss of ecological values in the water body.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89; **correction made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

NR 107.02 Applicability. Any person sponsoring or conducting chemical treatment for the management of aquatic plants or control of other aquatic organisms in waters of the state shall obtain a permit from the department. Waters of the state include those portions of Lake Michigan and Lake Superior, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems and other ground or surface water, natural or artificial, public or private, within the state or its jurisdiction as specified in s. 281.01 (18), Stats.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89; **correction made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

NR 107.03 Definitions. (1) "Applicator" means the person physically applying the chemicals to the treatment site.

(2) "Chemical fact sheet" means a summary of information on a specific chemical written by the department including general aquatic community and human safety considerations applicable to Wisconsin sites.

(3) "Department" means the department of natural resources.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89.

NR 107.04 Application for permit. (1) Permit applications shall be made on forms provided by the department and shall be submitted to the district director for the district in which the project is located. Any amendment or revision to an application shall be treated by the department as a new application, except as provided in s. NR 107.04 (3) (g).

Note: The DNR district headquarters are located at:

1. Southern — 3911 Fish Hatchery Road, Fitchburg 53711
2. Southeast — 2300 N. Dr. Martin Luther King Jr. Dr., Box 12436, Milwaukee 53212
3. Lake Michigan — 1125 N. Military Ave., Box 10448, Green Bay 54307
4. North Central — 107 Sutliff Ave., Box 818, Rhinelander 54501
5. Western — 1300 W. Clairemont Ave., Call Box 4001, Eau Claire 54702
6. Northwest — Hwy 70 West, Box 309, Spooner 54801

(2) The application shall be accompanied by:

(a) A nonrefundable permit application fee of $20, and, for proposed treatments larger than 0.25 acres, an additional refundable acreage fee of $25.00 per acre, rounded up to the nearest whole acre, applied to a maximum of 50.0 acres.

1. The acreage fee shall be refunded in whole if the entire permit is denied or if no treatment occurs on any part of the permitted treatment area. Refunds will not be prorated for partial treatments.

2. If the permit is issued with the proposed treatment area partially denied, a refund of acreage fees shall be given for the area denied.

(b) A legal description of the body of water proposed for treatment including township, range and section number;

(c) One copy of a detailed map or sketch of the body of water with the proposed treatment area dimensions clearly shown and with pertinent information necessary to locate those properties, by name of owner, riparian to the treatment area, which may include street address, local telephone number, block, lot and fire number where available. If a local address is not available, the home address and phone number of the property owner may be included;

(d) A description of the uses being impaired by plants or aquatic organisms and reason for treatment;

(e) A description of the plant community or other aquatic organisms causing the use impairment;

(f) The product names of chemicals proposed for use and the method of application;

(g) The name of the person or commercial applicator, and applicator certification number, when required by s. NR 107.08 (5), of the person conducting the treatment;

(h) A comparison of alternative control methods and their feasibility for use on the proposed treatment site.

(3) In addition to the information required under sub. (2), when the proposed treatment is a large–scale treatment exceeding 10.0 acres in size or 10% of the area of the water body that is 10 feet or less in depth, the application shall be accompanied by:

(a) A map showing the size and boundaries of the water body and its watershed.

(b) A map and list identifying known or suspected land use practices contributing to plant–related water quality problems in the watershed.

(c) A summary of conditions contributing to undesirable plant growth on the water body.

(d) A general description of the fish and wildlife uses occurring within the proposed treatment site.

(e) A summary of recreational uses of the proposed treatment site.

(f) Evidence that a public notice of the proposed application has been made, and that a public informational meeting, if required, has been conducted.

1. Notice shall be given in 2 inch x 4 inch advertising format in the newspaper which has the largest circulation in the area affected by the application.

2. The notice shall state the size of the proposed treatment, the approximate treatment dates, and that the public may request within 5 days of the notice that the applicant hold a public informational meeting on the proposed application.

a. The applicant will conduct a public informational meeting in a location near the water body when a combination of 5 or more individuals, organizations, special units of government, or local units of government request the meeting in writing to the applicant with a copy to the department within 5 days after the notice is made. The person or entity requesting the meeting shall state a specific agenda of topics including problems and alternatives to be discussed.

b. The meeting shall be given a minimum of one week advance notice, both in writing to the requestors, and advertised in the format of subd. 1.

(g) The provisions of pars. (a) to (e) shall be repeated once every 5 years and shall include new information. Annual modifications of the proposed treatment within the 5–year period which do not expand the treatment area more than 10% and cover a similar location and target organisms may be accepted as an amendment to the original application. The acreage fee submitted under sub. (2) (a) shall be adjusted in accordance with any proposed amendments.

(4) The applicant shall certify to the department that a copy of the application has been provided to any affected property owners' association, inland lake district, and, in the case of chemical applications for rooted aquatic plants, to any riparian property owners adjacent to and within the treatment area.

(5) A notice of the proposed treatment shall be provided by the department to any person or organization indicating annually in writing a desire to receive such notification.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89.

NR 107.05 Issuance of permit. (1) The department shall issue or deny issuance of the requested permit between 10 and 15 working days after receipt of an acceptable application, unless:

(a) An environmental impact report or statement is required under s. 1.11, Stats. Notification to the applicant shall be in writing within 10 working days of receipt of the application and no action may be taken until the report or statement has been completed; or

(b) A public hearing has been granted under s. 227.42, Stats.

(2) If a request for a public hearing is received after the permit is issued but prior to the actual treatment allowed by the permit, the department is not required to, but may, suspend the permit because of the request for public hearing.

(3) The department may deny issuance of the requested permit if:

(a) The proposed chemical is not labeled and registered for the intended use by the United States environmental protection agency and both labeled and registered by a firm licensed as a pesticide manufacturer and labeler with the Wisconsin department of agriculture, trade and consumer protection;

(b) The proposed chemical does not have a current department aquatic chemical fact sheet;

(c) The department determines the proposed treatment will not provide nuisance relief, or will place unreasonable restrictions on existing water uses;

(d) The department determines the proposed treatment will result in a hazard to humans, animals or other nontarget organisms;

(e) The department determines the proposed treatment will result in a significant adverse effect on the body of water;

(f) The proposed chemical application is for waters beyond 150 feet from shore except where approval is given by the department to maintain navigation channels, piers or other facilities used by organizations or the public including commercial facilities;

(g) The proposed chemical applications, other than those conducted by the department pursuant to ss. 29.421 and 29.424, Stats., will significantly injure fish, fish eggs, fish larvae, essential fish food organisms or wildlife, either directly or through habitat destruction;

(h) The proposed chemical application is in a location known to have endangered or threatened species as specified pursuant to s. 29.604, Stats., and as determined by the department;

(i) The proposed chemical application is in locations identified by the department as sensitive areas, except when the applicant demonstrates to the satisfaction of the department that treatments can be conducted in a manner that will not alter the ecological character or reduce the ecological value of the area.

1. Sensitive areas are areas of aquatic vegetation identified by the department as offering critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offering water quality or erosion control benefits to the body of water.

2. The department shall notify any affected property owners' association, inland lake district, and riparian property owner of locations identified as sensitive areas.

(4) New applications will be reviewed with consideration given to the cumulative effect of applications already approved for the body of water.

(5) The department may approve the application in whole or in part consistent with the provisions of subs. (3) (a) through (i) and (4). Denials shall be in writing stating reasons for the denial.

(6) Permits may be issued for one treatment season only.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89; **corrections in (3) (g) and (h) made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

NR 107.06 Chemical fact sheets. (1) The department shall develop a chemical fact sheet for each of the chemicals in present use for aquatic nuisance control in Wisconsin.

(1m) Chemical fact sheets for chemicals not previously used in Wisconsin shall be developed within 180 days after the department has received notice of intended use of the chemical.

(2) The applicant or permit holder shall provide copies of the applicable chemical fact sheets to any affected property owners' association and inland lake district.

(3) The department shall make chemical fact sheets available upon request.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89.

NR 107.07 Supervision. (1) The permit holder shall notify the district office 4 working days in advance of each anticipated treatment with the date, time, location, and proposed size of treatment. At the discretion of the department, the advance notification requirement may be waived.

(2) Supervision by a department representative may be required for any aquatic nuisance control project involving chemicals. Supervision may include inspection of the proposed treatment area, chemicals, and application equipment before, during or after treatment. The inspection may result in the determination that treatment is unnecessary or unwarranted in all or part of the proposed area, or that the equipment will not control the proper dosage.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89.

NR 107.08 Conditions of the permit. (1) The department may stop or limit the application of chemicals to a body of water if at any time it determines that chemical treatment will be ineffective, or will result in unreasonable restrictions on current water uses, or will produce unnecessary adverse side effects on nontarget organisms. Upon request, the department shall state the reason for such action in writing to the applicant.

(2) Chemical treatments shall be performed in accordance with label directions, existing pesticide use laws, and permit conditions.

(3) Chemical applications on lakes and impoundments are limited to waters along developed shoreline including public parks except where approval is given by the department for projects of public benefit.

(4) Treatment of areas containing high value species of aquatic plants shall be done in a manner which will not result in adverse long–term or permanent changes to a plant community in a specific aquatic ecosystem. High value species are individual species of aquatic plants known to offer important values in specific aquatic ecosystems, including *Potamogeton amplifolius, Potamogeton Richardsonii, Potamogeton praelongus, Potamogeton pectinatus, Potamogeton illinoensis, Potamogeton robbinsii, Eleocharis spp., Scirpus spp., Valisneria spp., Zizania aquatica, Zannichellia palustris* and *Brasenia schreberi.*

(5) Treatment shall be performed by an applicator currently certified by the Wisconsin department of agriculture, trade and consumer protection in the aquatic nuisance control category whenever:

(a) Treatment is to be performed for compensation by an applicator acting as an independent contractor for hire;

(b) The area to be treated is greater than 0.25 acres;

(c) The product to be used is classified as a "restricted use pesticide"; or

(d) Liquid chemicals are to be used.

(6) Power equipment used to apply liquid chemicals shall include the following:

(a) Containers used to mix and hold chemicals shall be constructed of watertight materials and be of sufficient size and strength to safely contain the chemical. Measuring containers and scales for the purpose of measuring solids and liquids shall be provided by the applicator;

(b) Suction hose used to deliver the chemical to the pump venturi assembly shall be fitted with an on–off ball–type valve. The system shall also be designed to prevent clogging from chemicals and aquatic vegetation;

(c) Suction hose used to deliver surface water to the pump shall be fitted with a check valve to prevent back siphoning into the surface water should the pump stop;

(d) Suction hose used to deliver a premixed solution shall be fitted with an on–off ball–type valve to regulate the discharge rate;

(e) Pressure hose used to discharge chemicals to the surface water shall be provided with an on–off ball–type valve. This valve will be fitted at the base of the hose nozzle or as part of the nozzle assembly;

(f) All pressure and suction hoses and mechanical fittings shall be watertight;

(g) Equipment shall be calibrated by the applicator. Evidence of calibration shall be provided at the request of the department supervisor.

(h) Other equipment designs may be acceptable if capable of equivalent performance.

(7) The permit holder shall be responsible for posting those areas of use in accordance with water use restrictions stated on the chemical label, but in all cases for a minimum of one day, and with the following conditions:

(a) Posting signs shall be brilliant yellow and conspicuous to the nonriparian public intending to use the treated water from both the water and shore, and shall state applicable label water use restrictions of the chemical being used, the name of the chemical and date of treatment. For tank mixes, the label requirements of the most restrictive chemical will be posted;

(b) Minimum sign dimensions used for posting shall be 11 inches by 11 inches or consistent with s. ATCP 29.15. The department will provide up to 6 signs to meet posting requirements. Additional signs may be purchased from the department;

(c) Signs shall be posted at the beginning of each treatment by the permit holder or representing agent. Posting prior to treatment may be required as a permit condition when the department determines that such posting is in the best interest of the public;

(d) Posting signs shall be placed along contiguous treated shoreline and at strategic locations to adequately inform the public. Posting of untreated shoreline located adjacent to treated shoreline and noncontiguous shoreline shall be at the discretion of the department;

(e) Posting signs shall be made of durable material to remain up and legible for the time period stated on the pesticide label for water use restrictions, after which the permit holder or representing agent is responsible for sign removal.

(8) After conducting a treatment, the permit holder shall complete and submit within 30 days an aquatic nuisance control report on a form supplied by the department. Required information will include the quantity and type of chemical, and the specific size and location of each treatment area. In the event of any unusual circumstances associated with a treatment, or at the request of the department, the report shall be provided immediately. If treatment did not occur, the form shall be submitted with appropriate comment by October 1.

(9) Failure to comply with the conditions of the permit may result in cancellation of the permit and loss of permit privileges for the subsequent treatment season. A notice of cancellation or loss of permit privileges shall be provided by the department to the permit holder accompanied by a statement of appeal rights.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89**;** correction in (7) (b) made under s. 13.93 (2m) (b) 7., Stats., Register, September, 1995, No. 477.

NR 107.09 Special limitation. Due to the significant risk of environmental damage from copper accumulation in sediments, swimmer's itch treatments performed with copper sulfate products at a rate greater than 10 pounds of copper sulfate per acre are prohibited.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89.

NR 107.10 Field evaluation use permits. When a chemical product is considered for aquatic nuisance control and does not have a federal label for such use, the applicant shall apply to the administrator of the United States environmental protection agency for an experimental use permit under section 5 of the federal insecticide, fungicide and rodenticide act as amended (7 USC 136 et seq.). Upon receiving a permit, the permit holder shall obtain a field evaluation use permit from the department and be subject to the requirements of this chapter. Department field evaluation use permits shall be issued for the purpose of evaluating product effectiveness and safety under field conditions and will require in addition to the conditions of the permit specified in s. NR 107.08 (1) through (9), the following:

(1) Treatment shall be limited to an area specified by the department.

(2) The permit holder shall submit to the department a summary of treatment results at the end of the treatment season. The summary shall include:

(a) Total chemical used and distribution pattern, including chemical trade name, formulation, percent active ingredient, and dosage rate in the treated water in parts per million of active ingredient;

(b) Description of treatment areas including the character and the extent of the nuisance present;

(c) Effectiveness of the application and when applicable, a summary comparison of the results obtained from past experiments using the same chemical formulation;

(d) Other pertinent information required by the department; and

(e) Conclusions and recommendations for future use.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89.

NR 107.11 Exemptions. (1) Under any of the following conditions, the permit application fee in s. NR 107.04 (2) (a) will be limited to the basic application fee:

(a) The treatment is made for the control of bacteria on swimming beaches with chlorine or chlorinated lime;

(b) The treatment is intended to control algae or other aquatic nuisances that interfere with the use of the water for potable purposes;

(c) The treatment is necessary for the protection of public health, such as the control of disease carrying organisms in sanitary sewers, storm sewers, or marshes, and the treatment is sponsored by a governmental agency.

(2) The treatment of purple loosestrife is exempt from ss. NR 107.04 (2) (a) and (3), and 107.08 (5).

(3) The use of chemicals in private ponds is exempt from the provisions of this chapter except for ss. NR 107.04 (1), (2), (4) and (5), 107.05, 107.07, 107.08 (1), (2), (8) and (9), and 107.10.

(a) A private pond is a body of water located entirely on the land of an applicant, with no surface water discharge or a discharge that can be controlled to prevent chemical loss, and without access by the public.

(b) The permit application fee will be limited to the non–refundable $20 application fee.

(4) The use of chemicals in accordance with label instructions is exempt from the provisions of this chapter, when used in:

(a) Water tanks used for potable water supplies;

(b) Swimming pools;

(c) Treatment of public or private wells;

(d) Private fish hatcheries licensed under s. 95.60, Stats.;

(e) Treatment of emergent vegetation in drainage ditches or rights–of–way where the department determines that fish and wildlife resources are insignificant; or

(f) Waste treatment facilities which have received s. 281.41, Stats., plan approval or are utilized to meet effluent limitations set forth in permits issued under s. 283.31, Stats.

History: Cr. Register, February, 1989, No. 398, eff. 3–1–89; **corrections in (4) (d) and (f) made under s. 13.93 (2m) (b) 7., Stats., Register, December, 2000, No. 540.**

Chapter NR 109

AQUATIC PLANTS: INTRODUCTION, MANUAL REMOVAL and MECHANICAL CONTROL REGULATIONS

NR 109.01 Purpose. The purpose of this chapter is to establish procedures and requirements for the protection and regulation of aquatic plants pursuant to ss. 23.24 and 30.07, Stats. Diverse and stable communities of native aquatic plants are recognized to be a vital and necessary component of a healthy aquatic ecosystem. This chapter establishes procedures and requirements for issuing aquatic plant management permits for introduction of aquatic plants or control of aquatic plants by manual removal, burning, use of mechanical means or plant inhibitors. This chapter identifies other permits issued by the department for aquatic plant management that contain the appropriate conditions as required under this chapter for aquatic plant management, and for which no separate permit is required under this chapter. Introduction and control of aquatic plants shall be allowed in a manner consistent with sound ecosystem management, shall consider cumulative impacts, and shall minimize the loss of ecological values in the body of water. The purpose of this chapter is also to prevent the spread of invasive and non−native aquatic organisms by prohibiting the launching of watercraft or equipment that has any aquatic plants or zebra mussels attached.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03; **correction made under s. 13.92 (4) (b) 7., Stats.**

NR 109.02 Applicability. A person sponsoring or conducting manual removal, burning or using mechanical means or aquatic plant inhibitors to control aquatic plants in navigable waters, or introducing non−native aquatic plants to waters of this state shall obtain an aquatic plant management permit from the department under this chapter.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.03 Definitions. In this chapter:

(1) "Aquatic community" means lake or river biological resources.

(2) "Beneficial water use activities" mean angling, boating, swimming or other navigational or recreational water use activity.

(3) "Body of water" means any lake, river or wetland that is a water of this state.

(4) "Complete application" means a completed and signed application form, the information specified in s. NR 109.04 and any other information which may reasonably be required from an applicant and which the department needs to make a decision under applicable provisions of law.

(5) "Department" means the Wisconsin department of natural resources.

(6) "Manual removal" means the control of aquatic plants by hand or hand−held devices without the use or aid of external or auxiliary power.

(7) "Navigable waters" means those waters defined as navigable under s. 30.10, Stats.

(8) "Permit" means aquatic plant management permit.

(9) "Plan" means aquatic plant management plan.

(10) "Wetlands" means an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.04 Application requirements and fees. **(1)** Permit applications shall be made on forms provided by the department and shall be submitted to the regional director or designee for the region in which the project is located. Permit applications for licensed aquatic nursery growers may be submitted to the department of agriculture, trade and consumer protection.

Note: Applications may be obtained from the department's regional headquarters or service centers. DATCP has agreed to send application forms and instructions provided by the department to aquatic nursery growers along with license renewal forms. DATCP will forward all applications to the department for processing.

(2) The application shall be accompanied by all of the following unless the application is made by licensed aquatic nursery growers for selective harvesting of aquatic plants for nursery stock. Applications made by licensed aquatic nursery growers for harvest of nursery stock do not have to include the information required by par. (d), (e), (h), (i) or (j).

(a) A nonrefundable application fee. The application fee for an aquatic plant management permit is:

1. $30 for a proposed project to manage aquatic plants on less than one acre.

2. $30 per acre to a maximum of $300 for a proposed project to manage aquatic plants on one acre or larger. Partial acres shall be rounded up to the next full acre for fee determination. An annual renewal of this permit may be requested with an additional application fee of one−half the original application fee, but not less than $30.

(b) A legal description of the body of water including township, range and section number.

(c) One copy of a detailed map of the body of water with the proposed introduction or control area dimensions clearly shown. Private individuals doing plant introduction or control shall provide the name of the owner riparian to the management area, which includes the street address or block, lot and fire number where available and local telephone number or other pertinent information necessary to locate the property.

(d) One copy of any existing aquatic management plan for the body of water, or detailed reference to the plan, citing the plan references to the proposed introduction or control area, and a description of how the proposed introduction or control of aquatic plants is compatible with any existing plan.

(e) A description of the impairments to water use caused by the aquatic plants to be managed.

(f) A description of the aquatic plants to be controlled or removed.

(g) The type of equipment and methods to be used for introduction, control or removal.

(h) A description of other introduction or control methods considered and the justification for the method selected.

(i) A description of any other method being used or intended for use for plant management by the applicant or on the area abutting the proposed management area.

(j) The area used for removal, reuse or disposal of aquatic plants.

(k) The name of any person or commercial provider of control or removal services.

(3) (a) The department may require that an application for an aquatic plant management permit contain an aquatic plant management plan that describes how the aquatic plants will be introduced, controlled, removed or disposed. Requirements for an aquatic plant management plan shall be made in writing stating the reason for the plan requirement. In deciding whether to require a plan, the department shall consider the potential for effects on protection and development of diverse and stable communities of native aquatic plants, for conflict with goals of other written ecological or lake management plans, for cumulative impacts and effect on the ecological values in the body of water, and the long−term sustainability of beneficial water use activities.

(b) Within 30 days of receipt of the plan, the department shall notify the applicant of any additional information or modifications to the plan that are required. If the applicant does not submit the additional information or modify the plan as requested by the department, the department may dismiss the aquatic plant management permit application.

(c) The department shall approve the aquatic plant management plan before an application may be considered complete.

(4) The permit sponsor may request an annual renewal in writing from the department under s. NR 109.05 if there is no change proposed in the conditions of the original permit issued.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.05 Permit issuance. (1) The department shall issue or deny issuance of the requested permit within 15 working days after receipt of a completed application and approved plan as required under s. NR 109.04 (3).

(2) The department may specify any of the following as conditions of the permit:

(a) The quantity of aquatic plants that may be introduced or controlled.

(b) The species of aquatic plants that may be introduced or controlled.

(c) The areas in which aquatic plants may be introduced or controlled.

(d) The methods that may be used to introduce or control aquatic plants.

(e) The times during which aquatic plants may be introduced or controlled.

(f) The allowable methods used for disposing of or using aquatic plants that are removed or controlled.

(g) Annual or other reporting requirements to the department that may include information related to pars. (a) to (f).

(3) The department may deny issuance of the requested permit if the department determines any of the following:

(a) Aquatic plants are not causing significant impairment of beneficial water use activities.

(b) The proposed introduction or control will not remedy the water use impairments caused by aquatic plants as identified as a part of the application in s. NR 109.04 (2) (e).

(c) The proposed introduction or control will result in a hazard to humans.

(d) The proposed introduction or control will cause significant adverse impacts to threatened or endangered resources.

(e) The proposed introduction or control will result in a significant adverse effect on water quality, aquatic habitat or the aquatic community including the native aquatic plant community.

(f) The proposed introduction or control is in locations identified by the department as sensitive areas, under s. NR 107.05 (3) (i) 1., except when the applicant demonstrates to the satisfaction of the department that the project can be conducted in a manner that will not alter the ecological character or reduce the ecological value of the area.

(g) The proposed management will result in significant adverse long−term or permanent changes to a plant community or a high value species in a specific aquatic ecosystem. High value species are individual species of aquatic plants known to offer important values in specific aquatic ecosystems, including Potamogeton amplifolius, Potamogeton Richardsonii, Potamogeton praelongus, Stuckenia pectinata (Potamogeton pectinatus), Potamogeton illinoensis, Potamogeton robbinsii, Eleocharis spp., Scirpus spp., Valisneria spp., Zizania spp., Zannichellia palustris and Brasenia schreberi.

(h) If wild rice is involved, the stipulations incorporated by *Lac Courte Oreilles v. Wisconsin*, 775 F. Supp. 321 (W.D. Wis. 1991) shall be complied with.

(i) The proposed introduction or control will interfere with the rights of riparian owners.

(j) The proposed management is inconsistent with a department approved aquatic plant management plan for the body of water.

(4) The department may approve the application in whole or in part consistent with the provisions of sub. (3). A denial shall be in writing stating the reasons for the denial.

(5) (a) The department may issue an aquatic plant management permit on less than one acre in a single riparian area for a 3−year term.

(b) The department may issue an aquatic plant management permit for a one−year term for more than one acre or more than one riparian area. The permit may be renewed annually for up to a total of 3 years in succession at the written request of the permit holder, provided no modifications or changes are made from the original permit.

(c) The department may issue an aquatic plant management permit containing a department−approved plan for a 3 to 5 year term.

(d) The department may issue an aquatic plant management permit to a licensed nursery grower for a 3−year term for the harvesting of aquatic plants from a publicly owned lake bed or for a 5−year term for harvesting of aquatic plants from privately owned beds with the permission of the property owner.

(6) The approval of an aquatic plant management permit does not represent an endorsement of the permitted activity, but represents that the applicant has complied with all criteria of this chapter.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03**; reprinted to restore dropped language from rule order, Register October 2003 No. 574.**

NR 109.06 Waivers. The department waives the permit requirements under this chapter for any of the following:

(1) Manual removal or use of mechanical devices to control or remove aquatic plants from a body of water 10 acres or less that is entirely confined on the property of one person with the permission of that property owner.

Note: A person who introduces native aquatic plants or removes aquatic plants by manual or mechanical means in the course of operating an aquatic nursery as authorized under s. 94.10, Stats., on privately owned non−navigable waters of the state is not required to obtain a permit for the activities.

(2) A riparian owner who manually removes aquatic plants from a body of water or uses mechanical devices designed for cutting or mowing vegetation to control plants on an exposed lake bed that abuts the owner's property provided that the removal meets all of the following:

(a) 1. Removal of native plants is limited to a single area with a maximum width of no more than 30 feet measured along the shoreline provided that any piers, boatlifts, swimrafts and other recreational and water use devices are located within that 30−foot wide zone and may not be in a new area or additional to an area where plants are controlled by another method; or

2. Removal of nonnative or invasive aquatic plants as designated under s. NR 109.07 when performed in a manner that does not harm the native aquatic plant community; or

3. Removal of dislodged aquatic plants that drift on−shore and accumulate along the waterfront.

(b) Is not located in a sensitive area as defined by the department under s. NR 107.05 (3) (i) 1., or in an area known to contain threatened or endangered resources or floating bogs.

(c) Does not interfere with the rights of other riparian owners.

(d) If wild rice is involved, the procedures of s. NR 19.09 (1) shall be followed.

(4) Control of purple loosestrife by manual removal or use of mechanical devices when performed in a manner that does not harm the native aquatic plant community or result in or encourage re−growth of purple loosestrife or other nonnative vegetation.

(5) Any aquatic plant management activity that is conducted by the department and is consistent with the purposes of this chapter.

(6) Manual removal and collection of native aquatic plants for lake study or scientific research when performed in a manner that does not harm the native aquatic plant community.

Note: Scientific collectors permit requirements are still applicable.

(7) Incidental cutting, removal or destroying of aquatic plants when engaged in beneficial water use activities.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.07 Invasive and nonnative aquatic plants. (1) The department may designate any aquatic plant as an invasive aquatic plant for a water body or a group of water bodies if it has the ability to cause significant adverse change to desirable aquatic habitat, to significantly displace desirable aquatic vegetation, or to reduce the yield of products produced by aquaculture.

(2) The following aquatic plants are designated as invasive aquatic plants statewide: Eurasian water milfoil, curly leaf pondweed and purple loosestrife.

(3) Native and nonnative aquatic plants of Wisconsin shall be determined by using scientifically valid publications and findings by the department.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.08 Prohibitions. (1) No person may distribute an invasive aquatic plant, under s. NR 109.07.

(2) No person may intentionally introduce Eurasian water milfoil, curly leaf pondweed or purple loosestrife into waters of this state without the permission of the department.

(3) No person may intentionally cut aquatic plants in public/navigable waters without removing cut vegetation from the body of water.

(4) (a) No person may place equipment used in aquatic plant management in a navigable water if the person has reason to believe that the equipment has any aquatic plants or zebra mussels attached.

(b) This subsection does not apply to equipment used in aquatic plant management when re−launched on the same body of water without having visited different waters, provided the re−launching will not introduce or encourage the spread of existing aquatic species within that body of water.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.09 Plan specifications and approval. (1) Applicants required to submit an aquatic plant management plan, under s. NR 109.04 (3), shall develop and submit the plan in a format specified by the department.

(2) The plan shall present and discuss each of the following items:

(a) The goals and objectives of the aquatic plant management and protection activities.

(b) A physical, chemical and biological description of the waterbody.

(c) The intensity of water use.

(d) The location of aquatic plant management activities.

(e) An evaluation of chemical, mechanical, biological and physical aquatic plant control methods.

(f) Recommendations for an integrated aquatic plant management strategy utilizing some or all of the methods evaluated in par. (e).

(g) An education and information strategy.

(h) A strategy for evaluating the efficacy and environmental impacts of the aquatic plant management activities.

(i) The involvement of local units of government and any lake organizations in the development of the plan.

(3) The approval of an aquatic plant management plan does not represent an endorsement for plant management, but represents that adequate considerations in planning the actions have been made.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.10 Other permits. Permits issued under s. 30.12, 30.20, 31.02 or 281.36, Stats., or under ch. NR 107 may contain provisions which provide for aquatic plant management. If a permit issued under one of these authorities contains the appropriate conditions as required under this chapter for aquatic plant management, a separate permit is not required under this chapter. The permit shall explicitly state that it is intended to comply with the substantive requirements of this chapter.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

NR 109.11 Enforcement. (1) Violations of this chapter may be prosecuted by the department under chs. 23, 30 and 31, Stats.

(2) Failure to comply with the conditions of a permit issued under or in accordance with this chapter may result in cancellation of the permit and loss of permit privileges for the subsequent year. Notice of cancellation or loss of permit privileges shall be provided by the department to the permit holder.

History: CR 02−061: cr. Register May 2003 No. 569, eff. 6−1−03.

APPENDIX F

WDNR HARVESTING WORKSHEET
AND
RECORD KEEPING LOGS

AQUATIC PLANT MANAGEMENT HARVESTING PLAN WORKSHEET

Statement of Harvesting goals and objectives. Include a statement regarding the state wetland rule NR 103.

The objective of the harvesting program is to provide navigation channels for all lake users and to provide navigation access and nuisance relief for riparian landowners.

I – Baseline Information

a) List the lakes physical characteristics and include a hydrographic map of the lake if available.

Lake Type: Groundwater seepage, Surface Area: 466 acres Watershed area: 2,131 acres, Watershed-to-lake surface area ratio: 3.57:1, Shoreline Length: 4.2 miles, Mean Depth: 10', Maximum Depth: 26.5', Littoral Area: 0-14', Water Volume: 4,817 acre –feet, Hydraulic retention time: 12.7 acres, Inlets: 2 intermittent inlets, Outlets: 1 intermittent, dam regulated outlet

b) Outline on the map the areas of developed and undeveloped shoreline.

See Figure 9.

c) List all aquatic plant species and their distribution in areas you wish to manage.

Aquatic plants present in management areas are listed on Table 1.

d) Describe the fishery in the lake and its' importance to the surrounding community. Also describe wildlife and waterfowl use of the lake.

Little Green Lake offers fishing opportunities for panfish, smallmouth basss, largemouth bass, northern pike, musky and walleye. Wildlife and waterfowl use the lake and feed on aquatic plants. The lake is heavily fished by local residents throughout the year. Ice fishing is extremely popular.

e) Identify and discuss other recreational activities including swimming and pleasure boating. Indicate on the map where public access and other public recreational facilities are located.

Swimming is done in many areas especially in developed areas. Boats, pontoon boats, paddle boats, and canoes are all used on Little Green Lake. Figure 9 illustrates public access points on Little Green.

f) Describe, and locate on the map, any private recreational areas such as campgrounds, resorts, etc.

There are camping areas on the south shore of Little Green on Park Road.

g) List any local ordinances which effect public use of the lake.

None

<u>II – History of Aquatic Plant Problems</u>

a) Describe how aquatic vegetation presently restricts recreational uses and document specific instances.

Dense aquatic macrophyte growth restricts boat navigation during early spring (CLP) and during summer (EWM, Coontail, and Elodea) are problem species.

b) Describe past and present efforts to control aquatic vegetation. Include dates, types, and amounts of aquatic herbicides used. Describe previous harvesting efforts including areas and amounts of vegetation harvested, etc. Discuss the results of these efforts.

In the past, harvesting and chemical control have been used to control nuisance aquatic vegetation. The District harvesting operation have provided adequate navigation access for boat navigation, however, dense EWM, CLP, Coontail, and Elodea stands have required repeate harvesting efforts. Chemical treatment records can be researched at the WDNR office for exact time and amounts. .

Past chemical control has been successful. Harvesting has also been successful in managing nuisance levels of aquatic vegetation throughout the growing season.

c) Discuss any alternative methods for aquatic plant management.

The District promotes hand-pulling or raking for pier and boat access. Chemical treatment has been completed for a period of years. The advantages and disadvantages of a drawdown have also been discussed and researched.

III – Aquatic Plant Harvesting Proposal

a) Indicated on a map of the lake:

- **areas where aquatic plants restrict use:** Areas of high value aquatic plants, shoreline planting areas.

- **near shore areas**: Figure 9: (areas less than 3 ft. in depth).

- **areas to be harvested** – areas highlighted on Figure 9.

- **areas that will not be harvested** – areas not highlighted on Figure 9. Deep water areas greater than 12’ and near shore areas less than 3’. Undeveloped or areas of special concern will not be harvested.

b) To what depth will aquatic plants be cut and how will plant fragments and floating plants be harvested. How will plant fragments be harvested along the shore?

Aquatic plants will be harvested to half the water column depth. When possible, the harvester will operate into the wind to reduce the amount of fragments not collected. Floating mats of aquatic invasive species such as EWM, CLP, Coontail, and Elodea will be collected to the maximum extent practicable.

c) Describe where marker buoys will be used (if needed) to direct harvesting and/or boat traffic in lanes.

Buoys are used in some areas to help guide boat traffic. Kearley bay has buoys guiding boaters out to open water. Shallow areas are also marked using buoys.

d) List, and locate on the map, the off loading site(s) and describe how they will be managed.

Figure 9

e) Describe how the harvested plants will be disposed of.

Aquatic plants are disposed of on local agricultural fields.

f) Detail any extra precautions which will be taken to protect fish, turtles, and sensitive areas.

Harvesting is not allowed in undeveloped areas. Harvesting operations protect fish and wildlife by only harvesting half the water column depth and do not operate the harvester in less than 3 feet of water. Harvesters do not engage the sediments. If sediments are encountered, the cutter head is raised immediately.

g) Describe how the public will be informed of the harvesting, and any educational efforts.

The public will be educated on the APM Plan during the annual meeting held in mid summer. Current events are also communicated through a lake newsletter and webpage.

h) Outline a harvesting schedule by day and month, including the number of hours to be spent harvesting.

Please refer to District's harvesting report.

IV – Equipment Needs and Operation

a) Outline equipment needs and projected total cost.

The District currently owns one (1) Aquarius mechanical weed harvester, a conveyor, trailer and dump truck for current and future weed harvesting. Total annual cost for District weed harvesting operations is approximately $XX,000.

b) Describe the maintenance schedule, storage needs, and their cost.

A daily and weekly maintenance schedule is followed for the weed harvester and conveyor as recommended by the manufacturer. Appropriate maintenance of the dump truck also takes place. Equipment is stored inside building from November-April owned by the District. Maintenance cost of equipment runs about $X. per year, not including employee's time.

c) **Describe insurance coverage.**

Provided through X. Inland marine policy covers conveyor ($2,000), weed harvester ($10,000). Vehicle insurance for dump truck includes $1 million bodily injury insurance carried by subcontractor. In addition, $1 million general liabilty insurance and public liability is also carried on the equipment for bodily injury or property damage.

Workers comp insurance is also carried for harvesting crew by the District..

d) **Identify who will run operations (volunteers or paid employees) and describe operator training and supervision.**

5 contract operators operate the harvestor under the direct supervision and training of the crew chief (one of the 5 paid employees). The crew chief and the harvesting crew are under the general supervision of the District Commissioners, specifically the President.

V – Evaluation and Monitoring

a) **Describe method of daily record keeping. Records that should be kept include: work effort, estimated daily harvest in loads and tons, and an estimate of taxes harvested by percent.**

See attached Daily Record Log.

b) **Describe how daily maintenance and service records for equipment will be kept.**

See attached Daily Record Log

Harvesting Documentation Record

Date:________________________________
Operator:_____________________________
Harvester:____________________________

MANAGEMENT AREA			Time	# of Loads	Estimated tons	Aquatic Plants harvested? Types / % of loads	Noteworthy Observations
Description of area being harvested	Coordinates (if available lat/long or UTM)						

Service and Maintenance Needs

Routine Maintenance Required	Problems With Harvester?

APPENDIX G

SENSITIVE AREA INFORMATION

Sensitive Area Survey

a lake management tool for critical habitat protection

***What** are lake sensitive areas?* Sites within or around lakes that have been designated as "sensitive" typically fall under one or two categories: an area might provide unique and/or critical ecological habitat; and/or it might have historical, geological, and/or archaeological significance.

Who conducts the sensitive area survey?

These surveys are an integrated approach to resource management because they utilize the expertise of many natural resource managers. A team of professionals such as fishery biologists, water resource specialists, water regulations personnel, aquatic plant specialists, and wildlife biologists collaborate to identify the existing critical habitat areas within and around a lake.

What data is gathered during a sensitive area survey? Sensitive area surveys are comprehensive in nature. That means a lot of information is gathered in several categories: general information about the site and the primary reason/s for site designation; water quality attributes that the site offers; a detailed physical description of the site; information about the site's fishery and wildlife diversity; identification of the existing aquatic vegetation; a listing of the site specific management recommendations, as well as an evaluation of the site's status regarding water regulation laws.

Where may sensitive areas be found?

Sensitive area designations exist in a wide variety of locations within and around the shoreline of a lake. It's a good bet that areas around the shoreline rich in aquatic and wetland vegetation would be designated as a critical habitat area. This is because vegetation is so crucial to the healthy functioning of a lake ecosystem. There may be an area around the shoreline of a lake that offers a unique or endangered species. Again, chances are good that the area would be selected as sensitive. More and more, scientists are finding the benefits that large submersed wood (downed trees) offer to a lake's fishery and wildlife. This wood provides wonderful habitat for shade, protective cover for young fish, and a place for fish to feed on the invertebrates that flourish in this type of habitat. For these reasons alone, an area that contains downed woody structures would probably be cited as critical habitat. Shoreline areas that contain clean gravel as the dominant bottom type are likely to be important spawning sites for certain species of fish like walleye or bass. In the interest of protecting the natural reproduction requirements of these fish, a fishery biologist would select this type of area as sensitive. There may be certain locations on Wisconsin lakes that offer unique or beautiful historical, geological, and/or archaeological significance. Since we wouldn't want to jeopardize these types of sites in any way, they would likely be selected as a sensitive areas.

Who can use sensitive area surveys?

Lake organizations, existing and potential shoreland residents, historical preservation groups, town governments, aquatic plant managers, fishery managers, water regs personnel, county zoning personnel, and people involved in the preservation of endangered plants and animals can all utilize sensitive area survey data and reports.

How can sensitive area survey results be Used? The results of this type of survey can be used in many different capacities. Lake organizations have used results for planning and decision making for lake management or protection projects, WDNR personnel use the results for permit decisions regarding shoreline modifications and aquatic plant management. Comprehensive survey results can also be used to spur lake stewardship activities or to provide a wealth of educational information about a specific lake.

For more information contact:

Pamela Stubbe
WDNR Water Resources Management Specialist
(715) 395-6904
or
Frank Koshere
WDNR Statewide Aquatic Plant Manager
(715) 392-0807

WISCONSIN DEPT. OF NATURAL RESOURCES

APPENDIX H

PUBLIC EDUCATION MATERIALS

Aquatic Plant Management

the facts about the laws

Why *should I care about aquatic plant management (APM)?*

Aquatic plants are an important part of healthy ecosystems – both within lakes and rivers and on the shores around them. Aquatic plants provide habitat for fish, invertebrates, and wildlife; prevent shoreline erosion; and protect water quality by uptaking nutrients and producing oxygen. Furthermore, diverse native aquatic plant communities help prevent the establishment of nuisance exotic plants like Eurasian watermilfoil. In order to maintain healthy lakes and rivers, we must maintain healthy native aquatic plant communities.

What *are the APM laws?*

The Department regulates the removal of aquatic plants 1) any time that chemicals are used and 2) when plants are removed mechanically or manually from an area greater than thirty feet in width along the shore. Historically the Department required a permit only when chemicals were used to control aquatic plants as described in Administrative Rule NR 107 – Aquatic Plant Management. As of September 2001, however, the legislature passed a bill to further protect Wisconsin's invaluable aquatic plant communities. The result is NR 109 – Aquatic Plants: Introduction, Manual Removal & Mechanical Control Regulations.

Who *needs a permit to remove aquatic plants?*

Any person that controls aquatic plants with chemicals must apply for a Chemical Control of Aquatic Plants Permit from the Department. Any person or organization (e.g. a municipality, lake association, or lake district) that controls aquatic plants mechanically or manually must apply for a Mechanical/Manual Aquatic Plant Control Permit from the Department. The only time a permit is not required to control aquatic plants is when a riparian manually removes or gives permission to someone to manually remove plants, with the exception of wild rice, from his/her shoreline in an area that is thirty feet or less in width along the shore or when the exotic invasive plants Eurasian watermilfoil, curleyleaf pondweed, or purple loosestrife are manually removed.

How *do I apply for a permit to remove aquatic plants?*

Contact the aquatic plant management specialist in your area to discuss aquatic plant removal/control plans and request the appropriate application for your project.

When *do I apply for a permit?*

Upon receipt of a *complete* application, the Department has fifteen working days to issue or deny a permit to control or remove aquatic plants. Verification of a complete application and permit issuance, however, may depend on a site inspection of the aquatic plant community.

Where *do I go for more information about aquatic plants?*

The Department's webpage, dnr.wi.gov, contains informational resources such as literature, links, and contacts regarding aquatic plants.

WISCONSIN DEPT. OF NATURAL RESOURCES

For more information on managing aquatic plants, please contact your local APM coordinator. For more information about the new aquatic plant management rules and their development, please contact Frank J. Koshere, Statewide Aquatic Plant Management Coordinator, at (715) 392-0807 or frank.koshere@wisconsin.gov

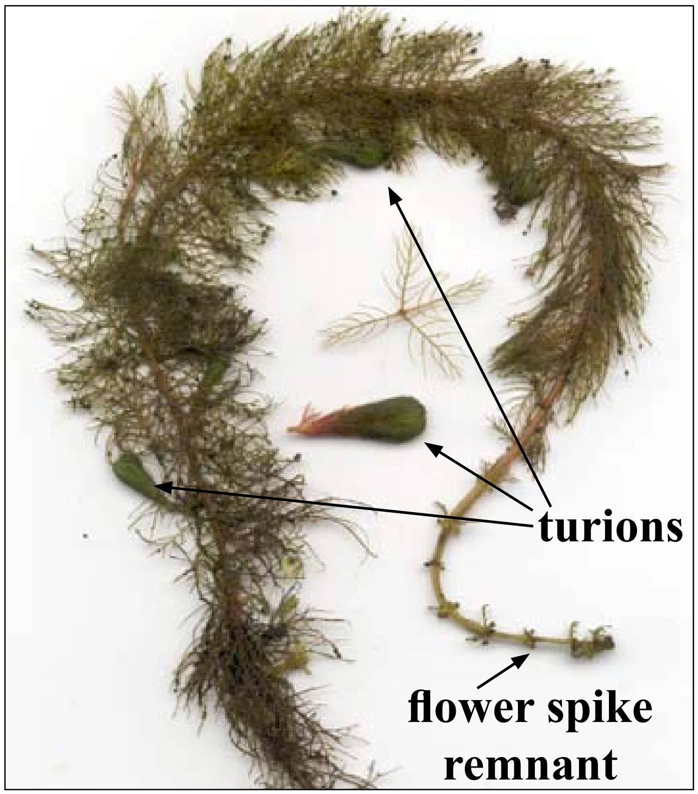
Native Water-milfoils

Late fall and early spring identification characteristics

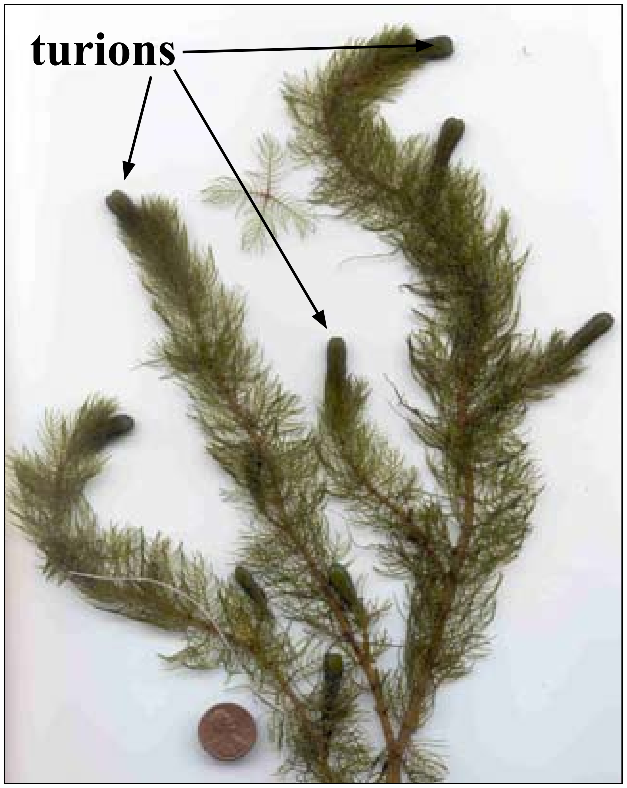
Several native water-milfoils form winter turions (buds). Turions are overwintering structures that are comprised of densely packed leaves. These turions form on the upper portion of the plant and/or on the plant's side branches during the fall of the year. The turions are often still attached to plants that are found washing up along shorelines in late fall (October-November). These turions break away from the plant and free-float to new areas. In the spring, the turions break dormancy and the small, thick, dark green turion leaves expand and grow. As the plant develops roots and continues to grow, the larger green summer leaves are produced at the tip of the plant. You can sometimes find the turion leaves at the base of the plant even into July. You may also see a "turionic arch" or U-shape at the base of northern water-milfoil throughout the year (early development of the arch is shown in pictures C and D on next page).

Eurasian water-milfoil (EWM) and some native water-milfoils (NWM) do not form winter turions. **If you see turions or the turion leaves, you DO NOT have Eurasian water-milfoil.** If you do not see turions, use other identification features to determine if you have a native water-milfoil or Eurasian water-milfoil. In 2007 some EWM/NWM hybrids were found to have turions. More research is needed in this area.

Whorled Water-milfoil (native)

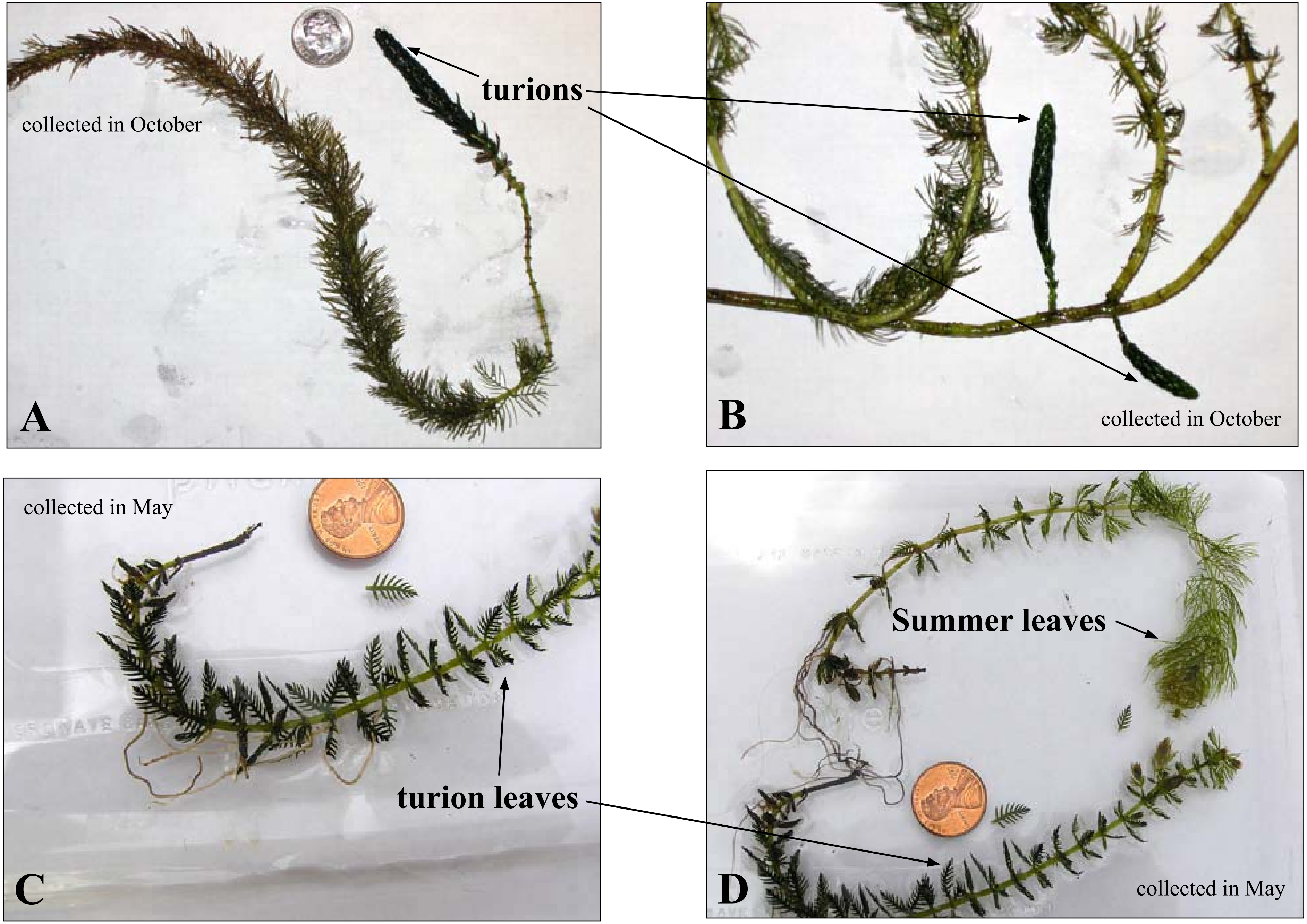


collected in October



Northern Water-milfoil (native)

Turions (pictures A & B). Turion leaf expansion and growth (picture C), followed by formation of summer leaves (picture D).



LOOKING BEYOND THE LAKESHORE: WATERSHED MANAGEMENT

(fact sheet #16 of the Shoreland Management and Lake Classification Series)

Watershed management is critical for lake protection for several reasons:

- **Surface water runoff draining from the land surrounding the lake and groundwater flows are likely to enter the lake and affect water quality.**
- **A lake's water quality will ultimately reflect poor watershed development.**

THE WATERSHED

A watershed is the entire land area or basin that contributes runoff to a body of water. Consideration of the watershed is important for lake protection because the geology, size and slope of the drainage basin, types of land use and amount of impervious surface area within a lake's watershed strongly influences the water quality and ecology of the receiving lake system. All water is essentially linked. Land-based activity occurring in one part of the watershed will inevitably affect water quality downstream. Given that all water is connected within the boundaries of a watershed, it follows that effective watershed management entails recognizing the various sources of pollution within the watershed and addressing them. This means that a community may need to adopt a "multi-tiered" approach consisting of several management actions such as construction site erosion controls, a program of information and education, initiatives to reduce stormwater discharge, and best management practices for lakefront property owners. An effective program will also entail working cooperatively across political jurisdictions; watersheds follow natural boundaries, not political ones.

STATE INITIATIVES

That urban and rural land uses such as agriculture can adversely affect surface waters and groundwater in the watershed was recognized through Wisconsin's Priority Watershed Program. Based on how a given watershed is ranked given certain criteria (administrative rule NR 120), communities can be eligible to receive funding to install best management practices (BMP's) and to put into effect other measures designed to prevent additional pollutants from entering the waterways. Some of the goals of the Priority Watershed Program include: establishment of water quality objectives, identification of nonpoint pollution sources and best management practices (BMP's) for landowners and municipalities, and monitoring of water quality. Specific management practices can include shoreline buffer restoration, streambank stabilization and wetland restoration.

Many federal, state and local agencies have become involved in some aspect of watershed management over the years. Some of these organizations include the Coastal Zone Management Agency, the Wisconsin Department of Agriculture, Trade and Consumer Protection and county land and water conservation departments.

INDIVIDUAL AND COMMUNITY EFFORTS

Watershed management requires one to think beyond the immediate backyard or lake shore to consider a larger water dynamic consisting of stream flow, groundwater flow and surface water runoff. Effective watershed management, then, should include not only measures to control polluted runoff, but also shoreland zoning, pier and surface use management and protection of ecologically critical areas.

Some communities have taken an active role in lake protection and watershed management. The case study below illustrates how individuals and lake groups can work cooperatively with local units of government, state agencies and other entities to address lake and watershed issues at several different levels.

Case Study: Community Initiatives in Green Lake County

Several lake groups around Big Green Lake in Green Lake County (Green Lake Preservation Society, Green Lake Association, Big Green Lake Volunteers) have worked closely with the WDNR (Wisconsin Department of Natural Resources), USGS (United States Geological Survey), the Green Lake Sanitary District and other local units of government over the years to implement various lake and watershed protection projects. Below is a listing of some of the more recent initiatives in this region:

- The lake groups surrounding Big Green Lake pride themselves on their involvement in local planning issues. Members are familiar with county and local government planning procedure, lake and watershed issues and the mechanics of effective citizen participation. Members have been instrumental in passing shoreland zoning amendments and surface use ordinances and have been involved in the review of proposed shoreland developments and pier expansion projects. A county-wide comprehensive planning effort was spear-headed by Big Green Lake groups.
- Property owner's identification of problem areas for nonpoint source pollution led to the construction of detention basins and the revegetation of certain critical areas. The Green Lake Conservancy, a local land trust, in association with the Green Lake Sanitary District and State of Wisconsin have recently purchased several ecologically valuable shoreland-wetland parcels. Plans to acquire additional properties are being developed.
- Lake planning grants have funded comprehensive monitoring of Big Green Lake with strategic placement of automatic samplers and gauging stations. Data obtained on nutrient loading from the surrounding uplands will be critical in the development of a management plan for Big Green Lake and the surrounding watershed. This initiative is being driven by the Green Lake Watershed Alliance, a cooperative effort between the cities of Ripon and Green Lake, Fox-Wolf Basin 2000, the Green Lake Sanitary District and Green Lake and Fond du lac Counties.
- Regular public educational forums have been organized by the Green Lake Preservation Society on topics of watershed-scale significance. The Partners with Education Program engages four area high schools and Ripon College in conducting lake and watershed based research. A core team of trained individuals from the Green Lake Association and the Green Lake Sanitary District visit individual homeowners and provide information on lakefront stewardship.

Additional Sources of Assistance:

Nonpoint Source Water Pollution Abatement Program Implementation Handbook, 1996. Wisconsin Department of Natural Resources .

Dresen, M., Korth, R. 1994. Life on the Edge, Wisconsin Lakes Parternship, University of Wisconsin-Extension, Stevens Point.

Drafted by Tamara Dudiak, UWEX-Lake Specialist (715-346-4744); tdudiak@uwsp.edu . Contributions from Marian Possin, Chair, Green Lake Preservation Society and Charlie Marks, Administrator of Green Lake Sanitary District.

Wisconsin Lakes Partnership

For more information, contact your regional Department of Natural Resources lake coordinator, the Wisconsin Association of Lakes [800/542-5253] or UWEX/UW-Stevens Point [715/346-4744].

HOW ARE AQUATIC INVASIVE SPECIES (AIS) SPREAD?

Many of the invasives that are present in Wisconsin are originally from Europe and Asia. They were introduced into the United States through a variety of activities, such as in the ballast water of ocean-going ships, sport fish stocking, and accidental releases in the horticulture, aquaculture, and aquarium trades.

Dave Brenner

Unfortunately, aquatic invasive species, or AIS, travel from lake to lake primarily with our help. Since Wisconsin's lakes are essentially islands of water on the landscape, our boats, trailers, fishing nets, personal watercraft, and other equipment are the transportation devices for aquatic invasives. As we travel to lakes across the state, they tag along and become established in new areas. Once introduced, some species can travel to other places without our help, via seeds, fragments, tributaries, and other methods.

Montello Lake District

For more information about *Clean Boats, Clean Waters* and how you can help protect Wisconsin's lakes from invasive species, please contact:

Erin Henegar
AIS Volunteer Coordinator
phone: 715-346-4978
e-mail: ehenegar@uwsp.edu
www.uwsp.edu/cnr/uwexlakes/CBCW

Science *Citizens* *Education*

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PUB-WT-782 2008

VOLUNTEER WATERCRAFT INSPECTION PROGRAM

HELP PREVENT THE INTRODUCTION AND SPREAD OF AQUATIC INVASIVE SPECIES!

Purple Loosestrife
Lythrum salicaria

Eurasian Water-milfoil
Myriophyllum spicatum

Zebra Mussel
Dreissena polymorpha

WHAT ARE INVASIVE SPECIES?

Invasive species are non-native plants, animals, or pathogens that may cause environmental or economic harm. In their native environments, invasive species like purple loosestrife or Eurasian water-milfoil have predators and competitors to keep their populations in check. However, when these species are introduced to a new location, those important limiting factors may not be present. The invasives can outcompete the native species by growing faster, maturing earlier, and reproducing more quickly and in larger numbers. This affects the diversity and abundance of native plants and animals, changes ecosystems, and impacts recreational activities.

What you can do!

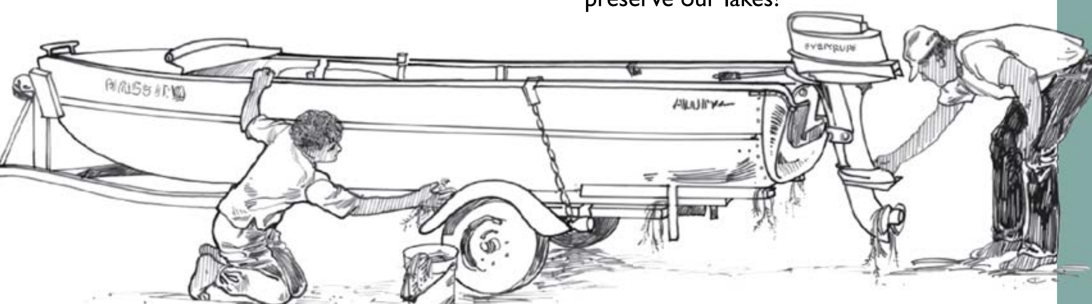
Share the message
CLEAN BOATS = CLEAN WATERS

Volunteers have been an integral part of protecting Wisconsin lakes for over two decades. With so many waterbodies and so few state resources, we rely heavily on volunteer efforts to educate boaters about AIS and how to prevent their spread.

Through the *Clean Boats, Clean Waters* program, volunteers are trained to organize and conduct a boater education campaign in their community. Adults and youth share information with boaters and the general public on AIS and how they travel from lake to lake. Volunteers also show boaters where invasives are most likely to hitch a ride, and encourage boaters to check their boats and equipment for invasive species before they enter the water.

Montello Lake District

Thanks to our volunteers, public awareness of AIS and how to prevent their spread continues to grow! The information and watercraft inspections that volunteers provide at the boat landings really do make a difference. Consider joining *Clean Boats, Clean Waters* volunteers in working to preserve our lakes!



Take these AIS PREVENTION STEPS every time you boat

In order to prevent the arrival of new invasive species and keep the invasives already in Wisconsin from spreading further, it is important for all of us to follow the appropriate preventative steps. This message is the core of AIS prevention!

- **Inspect** and **remove** aquatic plants, animals, and mud from boat, trailer, and equipment before leaving the landing.
- **Drain** all water from boat, motor, live wells, bilge, bait buckets and other containers before leaving the landing.

- **Ice** your catch; don't leave landing with any live fish, bait, or fish eggs.
- **Dispose** of unused bait in trash, not in the water or on land.
- **Rinse** boat and equipment with hot or high pressure water OR **Dry** boat for at least five days.

CLEAN BOATS CLEAN WATERS

www.uwsp.edu/cnr/uwexlakes/CBCW

CONTACTS

INSPECT

State Regulations
Many states have regulations that prohibit the transportation of some or all species of aquatic plants, as well as, the possession and transport of prohibited species such as the zebra mussel.

For More Information
If you would like more information about aquatic invasive species, the problems they cause, regulations to prevent their spread, or methods and permits for their control, contact your state natural resource or conservation agency. Additional information on invasive species issues and problems, and how to prevent their spread is available at the following:

MRBP
the MISSISSIPPI RIVER BASIN PANEL on AQUATIC NUISANCE SPECIES

wwwaux.cerc.cr.usgs.gov/MICRA
(A membership directory for the Mississippi River Basin Panel, which includes state contacts, is available on the above Web site.)

STOP AQUATIC HITCHHIKERS!

www.ProtectYourWaters.net

You may also contact:

Printed on recycled paper containing a minimum of 10% post-consumer waste and vegetable based ink.

HELP STOP Aquatic Hitchhikers

Cover photo: Deborah Rose, MNDNR

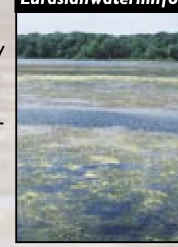
STOP AQUATIC HITCHHIKERS!
Prevent the transport of nuisance species. Clean all recreational equipment.

Enjoying the great outdoors is important to many of us. Boating, fishing, hunting, and wildlife watching are traditions that we want to preserve for our children and their children. Today, these traditions are at risk. Aquatic invaders such as round goby, zebra mussels, purple loosestrife, Eurasian watermilfoil, bighead and silver carp, and New Zealand mudsnail threaten our valuable waters and recreation. These and other non-native, or exotic, plants and animals do not naturally occur in our waters and are called *invasive species* because they cause ecological or economic harm.

Paul Stafford, Minnesota Office of Tourism

The main way invasive species get into lakes, rivers, and wetlands is by "hitching" rides with anglers, boaters, and other outdoor recreationists. If you leave a body of water without taking precautions recommended in this brochure, you may be transporting these harmful species from one lake, river, or wetland to another. These "aquatic hitchhikers," such as Eurasian watermilfoil (right), have invaded many waters, doing irreparable harm to lakes, streams, and wetlands and their native inhabitants.

Eurasian watermilfoil



MNDNR

The good news is that the majority of waters are not yet infested with invasive species and you can help protect our valuable waters.

Stop Aquatic Hitchhikers!

Aquatic hitchhikers can spread in many ways such as on aquatic plants, on recreational equipment, and in water. Fortunately, there are a few simple actions you can take to prevent them from spreading.

In many states and provinces it is illegal to transport aquatic invasive species, so taking the following actions may also help avoid a citation (see back page).

INSPECT your boat, trailer, and equipment and REMOVE visible aquatic plants, animals, and mud before leaving the water access.

It is important to carefully remove all plant fragments before you leave the access area to ensure you are not transporting an invasive plant species. This will also reduce the threat of moving zebra mussels that hitchhike by attaching to aquatic plants.

Deborah Rose, MNDNR

"Stop Aquatic Hitchhikers!" is a national campaign that helps recreational users to become part of the solution in stopping the transport and spread of aquatic invasive species.

REMOVE

DRAIN DISPOSE CONSULT

DRAIN water from your boat, motor, bilge, live wells, and bait containers before leaving the water access.

Deborah Rose, MNDNR

Many types of invasive species are very small and easily overlooked. For example, zebra mussel larvae are invisible to the naked eye. Seeds or small fragments of invasive plants, spiny waterfleas, eggs of fish and small aquatic animals, and fish diseases can be carried in water. Draining water before you leave the access area will effectively reduce the chance that any remaining plants and animals survive.

Spiny waterfleas

Jeff Gunderson, MN Sea Grant Program

Spiny waterfleas are tiny animals that can be a problem for anglers because they form gelatinous globs on fishing lines, lures, and downrigger cables. Their eggs can remain viable out of water for a long time, so it is important to inspect and remove them from equipment.

REPORT new sightings.

If you suspect a new infestation of an invasive plant or animal, save a specimen and report it to a local natural resource or Sea Grant office. Many agencies have "ID" cards, Web sites, and volunteer monitoring networks to help you identify and report invasive species.

DISPOSE of unwanted bait and other animals or aquatic plants in the trash.

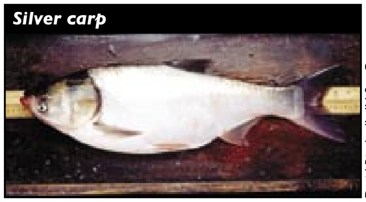
Releasing live animals and plants in a lake, river, or along the shore often causes invasive species to become established. Identifying fish when they are small is difficult and it is hard to be absolutely sure there are no invasive fish in your bait bucket. Even earthworms that you collect in northern states or buy for bait are not native and should not be dumped on the ground. Likewise, other aquatic plants or animals that you collect, or buy in a pet store, should never be released into the wild.

Round goby

Center for Great Lakes and Aquatic Sciences

Round gobies are bottom-dwelling fish from Europe. They're aggressive, attacking bait and eating the eggs of other fish, such as smallmouth bass. This aggressive behavior contributes to the decline of valuable sport fish populations.

Silver carp



David Riecks, IL–IN Sea Grant

Silver (pictured) and bighead carp from Asia are threats to aquatic ecosystems and water recreation. Silver carp can jump into boats and hit boaters and waterskiers. Because young silver carp look similar to native minnows they could accidentally be spread via live bait.

SPRAY, RINSE, or DRY boats and recreational equipment to remove or kill species that were not visible when leaving a waterbody. Before transporting to another water:

- Spray/rinse with high pressure, and/or hot tap water (above 104° F or 40° C), especially if moored for more than a day.

  – Or –
- Dry for at least five days.

Zebra mussel

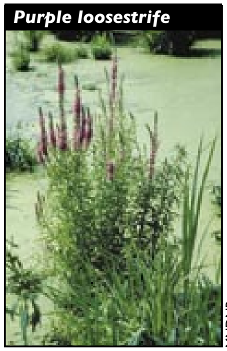
Deborah Rose, MNDNR

Zebra mussels attach to native mussels, plants, and boats. They foul beaches, cut swimmers' and dogs' feet, interfere with food webs, and clog water intakes.

CONSULT your natural resource agency.

Do-it-yourself control treatments could be illegal and can make matters worse by harming native fish, wildlife, and plants. It is best to contact your natural resource agency before you try to control an invasive species or add new plants along your shoreline. These agencies can provide recommendations and notify you what permits are required.

Purple loosestrife



MNDNR

Purple loosestrife invades wetlands, degrading wildlife habitat. Its seeds can be present in large amounts in mud that might be incidentally moved on waders, boots, and equipment.

ADDITIONAL STEPS are recommended for the following activities.

Shore and fly-fishing

Deborah Rose, MNDNR

Remove aquatic plants, animals, and mud from waders and hip boots.
Drain water from bait containers.

Personal watercraft

Avoid running engine through aquatic plants.
Run engine for 5-10 seconds on the trailer to blow out excess water and vegetation from internal drive, then turn off engine.
Remove aquatic plants and animals from water intake grate, steering nozzle, watercraft hull, and trailer.

Sailing

Remove aquatic plants and animals from hull, centerboard or bilgeboard wells, rudderpost area, and trailer.

Scuba diving

Remove aquatic plants, animals, and mud from equipment.
Drain water from buoyancy compensator (bc), regulator, tank boot, and other containers.
Rinse suit and inside of bc with hot water.

Waterfowl hunting

Deborah Rose, MNDNR

Remove aquatic plants, animals, and mud from boat, motor, trailer, waders or hip boots, decoy lines, and anchors (elliptical and bulb-shaped anchors can help reduce snagging aquatic plants).
Cut cattails or other plants *above the waterline* when they are used for camouflage or blinds.

REPORT SPRAY, RINSE, or DRY