

# Green Lake AIS survey 2010-2011

Sawyer Township, Burnett County, Wisconsin, WBIC: 2467200

Sponsored by:

The Green Lake Association, as a part of a Wisconsin DNR aquatic invasive species (AIS) planning grant (Project #AEPP-225-10)

Prepared and submitted December 6, 2011 by:

Russ Schaffenberg

40 West 102nd. St.

Bloomington, Minn. 55420

Phone: 952-884-9814 email: russandcoco@comcast.net

## Summary

**Green Lake was searched one day in 2010 and five days in 2011 for the presence of non-native aquatic invasive macrophyte species and none were found.** The lake appeared to be in a healthy, natural state. However, several invasive terrestrial and wetland plant species such as Japanese knotweed, reed canary grass and Canada thistle were noted.

Invasive animal species were generally not included in the scope of this work, although dock posts and boat hulls were examined for zebra mussels and none were found.

The landscape surrounding the lake appeared to be largely in a natural state and no major areas of erosion were observed. However, some properties have been mostly converted to lawn, some of these on moderate slopes, so there are good opportunities for restoration projects around the lake, both large and small.

To help educate Green Lake residents about the need for continued AIS monitoring in the future, I attended the Green Lake Association meetings, answered questions and discussed plant identification. On several occasions, members participated in the on-water searches.

To provide a baseline for future plant studies, inform residents about native plant species present in Green Lake and encourage them to continue monitoring for AIS, a list of native aquatic plant species observed is provided. Four species listed as "Special Concern" were found: large purple bladderwort, small purple bladderwort, Robbins spikerush and Torreys 3-square bulrush. These and several other noteworthy specimens were collected and submitted to the State Herbarium in Madison.

## 1972 DNR Survey Data

According to a 1972 DNR survey of Green Lake (PDF map available at DNR website) it is 274 acres with 5.25 miles of shoreline, maximum depth 6 feet, the shoreline predominantly sand and gravel, a few places muck. Total alkalinity was measured at only 12 ppm, making the pH low enough for certain "acid loving" plant species to exist here. This is typical of shallow, seepage lakes in the "Northwest Sands Ecological Landscape" (see description at DNR website) which are fed by localized runoff. By comparison, Sand Lake is only a few meters across the road to the southeast but is much deeper, giving it access to more mineral rich ground water. There the alkalinity is 42 ppm, 3.5X higher than Green Lake.

## Overview of vegetation

Floating leaf vegetation:

Nearly the entire perimeter of the lake is covered by floating leaf vegetation, some places it is a fairly narrow zone, other places it extends out 100 meters or more and it covers nearly the entire southwest bay. This vegetation can be clearly seen on the Google Earth® image and appears to cover approximately one third of the total lake surface. Water shield is the most abundant and widespread, while white and yellow pond lilies account for the rest. Several pondweed (Potamogeton) species with floating leaves are also present but by comparison, their surface coverage of the lake is negligible (for convenience, these are listed in the table below along with the other pondweeds in the section on submersed vegetation).

Emergent vegetation:

Pickerelweed, bulrushes and spike-rushes are common and together they constitute >90% of the emergent vegetation, forming small to large clonal patches around the lake, almost always in association with the floating leaf species. Several rushes, twig-rush and other species account for the balance.

Submersed vegetation:

In the zone of open water at the deepest places, about half of the bottom appears to be free of large plants while the rest has scattered colonies, the most commonly observed are water bulrush, large-leaf pondweed, purple bladderwort and submersed forms of pond lilies. However, much of the submersed vegetation exists in association with the emergent and floating leaf species, growing densely among them and in the shallows near shore.

Wetlands:

The 1972 DNR map shows the wetlands near, and attached to the lake. At the northeast corner of the lake is the largest attached wetland, a sedge meadow consisting primarily of narrow leaved sedge and grasses (wiregrass sedge, bluejoint, etc.), other herbaceous plants, some ericaceous shrubs and a few tamarack. A small population of reed canary grass is established on either side of the dock at the public landing, mixed with bluejoint and other grasses, forbs and sedges. The population is small enough

that, under County supervision, one person could spray it all in just a few minutes, or in less than an hour treat it via wick method to avoid collateral damage to the native companion plants.

Shoreline vegetation (below the historical high water mark):

In 2010 the lake level was very low, exposing a large zone of beach that was colonized by many native species, as well as undesirable non-natives such as Canada thistle and many other weedy species typical of lawns and gardens. Due to significant precipitation in the fall, winter and spring, a dramatic and unprecedented rise in lake level was seen into 2011, which inundated most of this beach zone.

Upland vegetation (above the historical high water mark):

A colony of Japanese knotweed growing behind the residence at 4117 Greer Road had been treated with herbicide but some new growth was returning. The resident is aware of it and will follow up with additional treatment. They are aware that their neighbor to the south at 4101 Greer Road also has a well established colony of Japanese knotweed. They will inform them about it and recommend treatment to eliminate it. There was no indication that either colony was spreading by seed since a search of the immediate area turned up no new colonies.

### Search dates and details

May 15, 2010: I attended the Green Lake Association meeting in the morning, met with members and discussed plant identification and AIS. The rest of the day was spent on the lake searching for curly-leaf pondweed (CLP) by kayak. Conditions were ideal with high water clarity, full sun and calm winds which allowed excellent visibility at even the deepest parts of the lake, where small objects such as fresh water sponges and bits of litter could easily be identified. Seizing this rare opportunity, as much water as possible was searched as rapidly as possible. The zone nearest the public landing was thoroughly searched, then transects were made back and forth across the largest east and north bays, approximately 100-150 meters apart. The southwest bay was not searched.

May 21, 2011: I attended the Green Lake Association meeting, met with members and discussed plant identification and AIS. On this day the weather was cloudy and breezy with light rain, unsuitable for a search.

May 27, 2011: Several Association members participated in the search today via pontoon. Because loons were nesting near the public access, we did not search there, but made a loop through the southwest bay, then transects back and forth across the east bay and into the northern bay. Although conditions were less than ideal with moderate winds and high clouds, we could still easily see and identify patches of large-leaf pondweed, water bulrush and emerging pond lilies scattered across the bottom at the deepest part of the lake. However, wind and clouds increased during mid-afternoon which decreased visibility, so we quit before finishing the northern bay.

July 25, 2011: Decreased water clarity typical of mid-summer combined with moderate winds limited visibility to a few feet. The entire perimeter of the lake was searched via kayak, going among and at the

outer edge of the emergent and floating leaf vegetation, documenting what species were present, examining accumulations of mixed vegetation washed up along the edges, looking for signs of CLP, Eurasian water milfoil (EWM) or other non-native species.

August 18, 2011: The President of Green Lake Association joined me in the morning to search the perimeter of the north end of the lake via canoe, among and at the outer edge of the floating leaf vegetation. In the afternoon I searched the rest of the perimeter of the lake via kayak.

September 10, 2011: A clear, calm and hot day with improving water clarity and better visibility, the east and southwest bays were searched via kayak.

October 1, 2011: The water clarity had further improved, and with light winds the visibility was good. The entire perimeter of the lake was searched via kayak. An otter was observed on an abandoned beaver house in the southwest bay.

### Table of Green Lake native aquatic plants

Since the scope and purpose of this search was primarily the aquatic flora (with any eye to a few notorious wetland invaders), and since there is not a clear separation between aquatic and terrestrial plants (some are by nature both and there are changes in lake level from year to year), the list of “shoreline” plants is far from complete and many, many more could have been added. Almost any terrestrial plant native to Wisconsin might be found growing at the water’s edge. So, for convenience, the general classification method, and types of plants listed in ‘Through the Looking Glass....a Field Guide to Aquatic Plants’ (1997 Lakes Partnership), is followed in these tables with a few additions. Although many are typically terrestrial, all are from wet habitats and are listed below as “emergent”.

#### Floating leaf plants

Common name	Scientific name	Abundance and location
Watershield	<i>Brasenia schreberi</i>	Abundant, all around the lake
Spatterdock (yellow-flowered water lily)	<i>Nuphar variegata</i>	Abundant, all around the lake
White water lily	<i>Nymphaea odorata</i>	Abundant, all around the lake
Water smartweed	<i>Polygonum amphibium</i>	Occasional, shallows near shore

#### Emergent plants

Common name	Scientific name	Abundance and location
Pickernelweed	<i>Pontederia cordata</i>	Common, all around the lake
Robbins spikerush	<i>Eleocharis robbinsii</i>	Common, all around the lake
Creeping spikerush	<i>Eleocharis palustris</i>	Occasional, all around the lake
Needle spikerush	<i>Eleocharis acicularis</i>	Occasional, shallows
Hardstem bulrush	<i>Schoenoplectus acutus</i>	Common, all around the lake
Softstem bulrush	<i>Schoenoplectus tabernaemontani</i>	Common, all around the lake

Torrey's 3-square bulrush	<i>Schoenoplectus Torreyi</i>	Occasional, on sand in shallows
Common 3-square bulrush	<i>Schoenoplectus pungens</i>	Occasional, on sand in shallows
Three-way sedge	<i>Dulichium arundinaceum</i>	Common, shallows
Grass-leaved arrowhead	<i>Sagittaria graminea</i>	Occasional, wet boggy soil
Cattail ssp.	<i>Typha</i> ssp.	Occasional, by public landing
<i>Sparganium angustifolium</i>	Narrow-leaf bur-reed	Occasional, wet boggy soil
Rice cut-grass	<i>Leersia oryzoides</i>	Occasional, wet boggy soil
Northern blue flag	<i>Iris versicolor</i>	Occasional, wet shores
Bristly sedge	<i>Carex comosa</i>	Occasional, wet shores
Wiregrass sedge	<i>Carex lasiocarpa</i>	Common, wet meadows, shores
Twig rush	<i>Cladium mariscoides</i>	Common, shallows or beach
Several Rush species	<i>Juncus</i> ssp.	Common, shallows or beach
<i>Xyris torta</i>	Slender yellow-eyed grass	Occasional, wet shores
Strap-leaved violet	<i>Viola lanceolata</i>	Occasional, wet shores
Bugleweed	<i>Lycopus</i> ssp.	Common, wet shores
Great blue lobelia	<i>Lobelia siphilitica</i>	Occasional, wet shores

### Submersed plants

Common name	Scientific name	Abundance, location
Large purple bladderwort	<i>Utricularia purpurea</i>	Abundant, throughout
Small purple bladderwort	<i>Utricularia resupinata</i>	Occasional, shallows
Common bladderwort	<i>Utricularia vulgaris</i>	Occasional, throughout
Flat-leaved bladderwort	<i>Utricularia intermedia</i>	Common, throughout
Creeping bladderwort	<i>Utricularia gibba</i>	Occasional, flowering on mud
Large-leaf pondweed	<i>Potamogeton amplifolius</i>	Common, throughout
Floating-leaf pondweed	<i>Potamogeton natans</i>	Occasional, throughout
Oakes pondweed	<i>Potamogeton oakesianus</i>	Occasional, quiet backwaters
Ribbon-leaf pondweed	<i>Potamogeton epihydrus</i>	Occasional, throughout
Variable pondweed	<i>Potamogeton gramineus</i>	Occasional, throughout
Small pondweed	<i>Potamogeton pusillus</i>	Occasional, throughout
Spiral-fruited pondweed	<i>Potamogeton spirillus</i>	Occasional, quiet shallows
Fern pondweed	<i>Potamogeton robbinsii</i>	Occasional, throughout
Water bulrush	<i>Schoenoplectus subterminalis</i>	Common, throughout
pipewort	<i>Eriocaulon aquaticum</i>	Occasional, quiet shallows
Dwarf water milfoil	<i>Myriophyllum tenellum</i>	Common, turf forming by shore
Creeping spearwort	<i>Ranunculus flammula</i>	Occasional, shallows and shore
Wild celery	<i>Vallisneria americana</i>	Occasional, throughout
Northern naiad	<i>Najas gracillima</i>	Occasional, quiet shallows
Common waterweed	<i>Elodea canadensis</i>	Occasional, throughout
Fresh water sponges		Occasional, throughout

## About the author:

Russ made his career as an Analytical Chemist, first with Midwest Research Institute where he performed trace analysis for pesticides and other toxic chemicals for nationwide EPA projects, and developed new EPA methods. Then he joined a new Twin Cities consulting laboratory where he played a leading role in establishing the first EPA-approved lab in the region. Finally, he joined a high-tech start-up company that grew rapidly and became the world's leader in water purification by reverse osmosis (RO) and nanofiltration (NF) membrane technology. For 17 years he supervised the corporate analytical laboratory, made significant contributions to the success of the company and co-authored a US patent.

Russ also holds a B.S. degree in Biology, cum laude, studied Botany in college and very nearly made his career in the natural resources field. So upon his early retirement he again began a full-time study of plant identification, especially the flora of Burnett County near his cabin on Deer Lake in Swiss Township. Since then he has contributed hundreds of noteworthy specimens to Wisconsin herbaria, discovered at least 100 populations of more than a dozen rare plant species, and documented many species new to Burnett County. Russ served on the Board of the Deer Lake Association for many years and for 19 years has been their Citizen's Lake Monitoring (CLM) volunteer. Russ also served on the Board of the Minnesota Native Plant Society and recently received the 'President's Volunteer Service Award' from the Minnesota DNR for his work on rare plant populations, including the dwarf trout lily and the western prairie fringed orchid.

## Invoice

December 6, 2011

Submitted To: Hud Gelein, President, Green Lake Association

From: Russ Schaffenberg, Consultant

Description of services rendered in support of Wisconsin DNR aquatic invasive species (AIS) planning grant (Project #AEPP-225-10):

May 15, 2010: Attended the Green Lake Association meeting and performed a lake survey.

May 21, 2011: Attended the Green Lake Association meeting.

May 27, 2011: Performed a lake survey

July 25, 2011: Performed a lake survey

August 18, 2011: Performed a lake survey

September 10, 2011: Performed a lake survey

October 1, 2011: Performed a lake survey

Total Charges: \$1400.72