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**Lulu Lake (Walworth County, Wisconsin)  
Integrated Sensitive Area Report**

Assessment Dates: June 19, 2006  
July 26, 2006

Number of Sensitive Areas Surveyed: 1- Entire Lake

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**General Lake Information**

Lulu Lake is located in northern Walworth County northeast of the intersection of county highways J and N in the Town of Troy (Township 4 North.-Range 17 East, Section 2). The lake has a surface area of approximately 84 acres with a shoreline length of 2.4 miles. Lulu Lake has a maximum depth of 40 feet and an average depth of approximately 24 feet. The lake itself is comprised of a hard water drainage kettle fed by the Mukwonago River and is situated at the base of glacial deposits. The Mukwonago River enters the lake from the southeast, flows out to the north and eventually connects to Eagle Spring Lake.

The Lulu Lake watershed (drainage basin) is roughly 9.98 square miles, which is approximately 6,387 acres. The residence time for water in Lulu Lake is 0.55 years. Lulu Lake has a watershed area-to-lake ratio of 76:1. (J. Thornton, personal communication). The land use according to data from 1990 states that approximately 62% of the land is agriculture, unused, or other open lands, 23% is woodlots and wetlands, and 3% is open water. 7% of the land use is single family residential and land under construction, while the remaining 5% is other urban uses.

Public access to Lulu Lake is comprised of walk-in access from the state owned land or by traveling up the Mukwonago River from Eagle Spring Lake. Lulu Lake offers low impact recreational opportunities including the seasonal activities of: fishing, swimming, slow no-wake boating, canoeing, kayaking, ice fishing, cross-country skiing,

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ice-skating, and hunting. The lake also provides excellent natural scenic beauty throughout the year, and opportunities for hiking, bird watching, and picnicking.

Overall Lulu Lake supports a moderately diverse fish population, including multiple forage, non-game, and game species. There were 18 species of fish observed during fish surveys conducted in 1993, 2000, and 2004. These included grass pickerel, largemouth bass, bluegill, pumpkinseed, bowfin, common shiner, warmouth, yellow bullhead, common carp, lake chubsucker, yellow perch, brook silverside, northern pike, fathead minnow, Johnny darter, blunt-nose minnow, rock bass, and white sucker (Beyler 1993, 2000, 2004).

Lulu Lake is classified as an Exceptional Water Resource in Wisconsin by the Department of Natural Resources. In Wisconsin, surface waters which provide valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental settings, and which are not significantly impacted by human activities may be classified as exceptional resource waters.

## **Exotic Species**

Exotic species, most notably curly-leaf pondweed, Eurasian watermilfoil, and purple loosestrife have invaded southeastern Wisconsin lakes. Boaters traveling from lake to lake often facilitate the propagation of exotic species. The introduction of exotic species into a lake ecosystem can lead to a decline in the native plant population and cause problems with nutrient loading. Also, the disturbance of lake bottoms from human activity (boating, plant harvesting, chemical treatments, etc.) enhances the colonization and/or expansion of exotic species. Two simple steps to prevent the spread of exotic species include 1) Removing aquatic plants, animals, and mud from trailers and boats before leaving the water access; and 2) Draining water from boats, motors, bilges, live wells, and bait containers before leaving the water access.

Eurasian water milfoil is present in Lulu Lake. Eurasian water milfoil is one of eight milfoil species currently found in Wisconsin. It is often misidentified as one of its seven native cousins, and vice versa. In many areas within the Lakes, this non-native milfoil has established large monotypic stands that out compete many native plants. These dense beds of milfoil not only impede the growth of native plant species but also inhibit fish movement and create navigational problems for boaters.

The regenerative ability of Eurasian watermilfoil is another obstacle when attempting to control this species. Fragments of Eurasian watermilfoil detached by harvesting, boating, and other recreational activities can float to non-colonized areas of the lake or downstream to additional lakes in the drainage system and create new colonies. Therefore, when controlling Eurasian watermilfoil, selective chemicals and harvesting, coupled with skimming, often produces the best results. In some lakes, biological agents such as the milfoil weevil have helped suppress milfoil populations. However, the most effective “treatment” of exotic milfoil is prevention through public education.

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Curly-leaf pondweed is another submerged, exotic species found in many Wisconsin lakes but has yet to be documented in Lulu Lake. Like Eurasian watermilfoil, curly-leaf often grows into large, homogenous stands. It can crowd out native vegetation, create navigational problems, and limit fish movement. Curly-leaf pondweed dies off in mid-summer, increasing nutrient availability in the water column. This often contributes to summer algal blooms and decreasing water quality.

The unusual life cycle of curly-leaf pondweed makes management difficult. The plant germinates as temperatures decrease in fall. Curly-leaf is highly tolerant of cold temperatures and reduced sunlight, continuing to grow under lake ice and snow cover. With ice-off and increasing water temperatures in the spring, the plant produces fruit, flowers, and buds (turions). Turions are the main reproductive mechanism of curly-leaf. To control the species in lakes, the plant must be combated before turions become viable. Most plant harvesters have not started cutting when curly-leaf is most susceptible and a small window of opportunity exists for chemical treatment. Therefore, prevention through public education is once again very important.

Purple loosestrife, a hardy perennial native to Europe, is another exotic species common to Wisconsin. Since its introduction to North America in the early 1800s, purple loosestrife has become common in gardens and wetlands, and around lakes, rivers, and roadways. The species is highly invasive and thrives in disturbed areas. Purple loosestrife plants often outcompete native plants, resulting in the destruction of food, cover, and nesting sites for wildlife and fish. Small stands of purple loosestrife have been documented on Lulu Lake.

Purple loosestrife most often spreads when seeds adhere to animals. Humans should be aware of picking up seeds on clothing and equipment when in the vicinity of the plant. Loosestrife can be controlled manually, biologically, or with a broad-leaf herbicide. Young plants can be pulled, but adult plants have large root structures and must be excavated with a garden fork. Biological control is most effective on large stands of purple loosestrife. Five different insects are known to feed on this plant. Four of those have been used as control agents in the United States. Of the five species, *Galerucella pusilla* and *G. californiensis* are leaf-eating beetles; *Nanophyes brevis* and *N. marmoratus* are flower-eating beetles; and *Hylobius transversovittatus* is a root-boring weevil. Only *N. brevis* has not been released in the United States (WDNR 2003). Lastly and most importantly, prevention through public education plays an important role in the management of this species.

Zebra mussels are native to the Baltic and Caspian Sea region or Eastern Europe, and were introduced to the great lakes via ballast water discharged from ocean-going vessels. These mussels attach to nearly every available surface – boats, docks, intake pipes, and are a great threat to native mussel populations. They are filter feeders, and thus eat plankton in the water column that many young fish and native mussels rely on for food. Zebra mussels begin their life cycle at a microscopic level. This stage of life stage is called a veliger. Water that is transferred from water body to water body can lead

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to new infestations by these veligers. Adults may also hitch a ride on aquatic plants that are transported from one body of water to another by means of boat trailers, river flow, or animal dispersion. Scott Thompson from the Wisconsin Nature Conservancy reports that zebra mussels have been observed in Lulu Lake but the population appears to be small.

## **Shoreland Management**

Wisconsin's Shoreland Management Program, a partnership between state and local governments, works to protect clean water, habitat for fish and wildlife, and natural scenic beauty. The program establishes minimum standards for lot sizes, structural setbacks, shoreland buffers, vegetation removal, and other activities within the shoreland zone. The shoreland zone includes land within 1000 feet of lakes, 300 feet of rivers, and floodplains. Current research shows that present standards are probably inadequate for the protection of water resources (Woodford and Meyer 2003, Garn 2002). Therefore, many communities have chosen to go beyond minimum standards to ensure protection of our natural resources. This report provides management guidelines for activities within the lake and in the immediate shoreland areas. Before any recommendations in this report are completed, please check with the Department of Natural Resources and local units of government for required approvals.

A vital step in protecting our water resources is to maintain effective vegetative buffers. A shoreland buffer should extend from the water onto the land at least 35 to 50 feet. Studies have shown that buffers less than 35 feet are not effective in reducing nutrient loading. (Wenger, 1999) Wider buffers of 50 feet or more can help provide important wildlife habitat for songbirds, turtles, frogs, and other animals, as well as filter pollutants from runoff. (Castelle 1994) In general, no mowing should occur in the buffer area, except perhaps in a viewing access corridor. The plant composition of a buffer should match the flora found in natural Wisconsin lakeshores. A buffer should include three layers - herbaceous, shrub, and tree.

In addition, citizens living around Lulu Lake and the community at large should investigate other innovative ways to reduce the impacts of runoff flowing into the lake while improving critical shoreline habitat (see A. Greene 2003). This may include the use of phosphorus-free fertilizers, installing rain gardens, setting the lawnmower at a higher mower height, decreasing the area of impervious surfaces, or restoring aquatic plant communities.

## **Introduction**

Department personnel conducted Lulu Lake sensitive area designation surveys on June 19, 2006 and July 26, 2006, following the Wisconsin Department of Natural Resources' sensitive area survey protocol. This study utilized an integrated team of DNR resource managers with input from multiple disciplines: water regulation and zoning, fisheries, lake biology, wildlife, and conservation biology. A representative from the Nature Conservancy of Wisconsin was also present.

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Sensitive areas are defined in Wisconsin Administrative Code NR 107.05 (3)(i)(1) as *areas of aquatic vegetation identified by the department as offering critical or unique fish and wildlife habitat, including seasonal or life stage requirements, or offering water quality or erosion control benefits to the body of water.* **Department resource managers determined that the entire lake met the criteria.**

The companion document, *Guidelines for Protecting, Maintaining, and Understanding Lake Sensitive Areas*, provides additional information to help interpret lake sensitive area reports. The document is designed to help people understand the important factors that determine the health of a lake's ecosystem. It discusses aquatic plant sensitive areas, shoreland use and lakeshore buffers, gravel and coarse rock rubble habitat, large woody cover, and various water regulation and zoning issues.

## Overview of Sensitive Area Designation

Sensitive areas have aquatic or wetland vegetation, terrestrial vegetation, gravel or rubble lake substrate, or areas that contain large woody cover (fallen trees or logs). These areas provide water quality benefits to the lake, reduce shoreline erosion, and provide habitat necessary for seasonal and/or life stage requirements of fish, invertebrates, and wildlife. A sensitive area designation alerts interested parties (i.e., DNR personnel, county zoning personnel, lake associations, etc.) that the area contains critical habitat vital to sustaining a healthy lake ecosystem, or may feature an endangered plant or animal. Information presented in a sensitive area report is often utilized in the process of making Chapter 30 (Wisconsin State Statutes) permit decisions.

## Resource Value of Lulu Lake as a Sensitive Area

The shoreline surrounding Lulu Lake is an assemblage of exceptionally high quality as well as diverse wetland and upland communities on glacial topography in the Kettle Moraine region. Many of the natural communities protected here have been virtually eliminated from the majority of southeastern Wisconsin. The clear waters harbor a diverse fish, amphibian, and reptile fauna including the threatened long-ear sunfish (*Lepomis megalotis*), pugnose shiner (*Notropis anogenus*), Blanding's turtle (*Emydoidea blandingii*), and pickerel frog (*Rana palustris*). A large wetland complex with patches of calcareous fen and shrub carr embedded within a sedge meadow matrix surrounds the lake on the north and west. An inlet stream contains many rare species such as beaked spike-rush (*Eleocharis rostellata*), slender bog arrow grass (*Triglochin maritimum*), Ohio goldenrod (*Solidago ohioensis*), lesser fringed gentian (*Gentianopsis procera*), Kalm's lobelia (*Lobelia kalmii*), and downy willow herb (*Epilobium strictum*). A small bog surrounded by tamarack forest is also present along with a good complement of other northern bog species including the uncommon dragon's mouth orchid (*Arethusa bulbosa*). Scattered patches of prairie grow within the oak opening and woodlands and harbor the state-threatened kitten tails (*Besseyia bullii*). Other rare species include the dion skipper

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butterfly (*Euphyes dion*). The majority of shoreline on Lulu Lake is owned by the DNR and The Nature Conservancy and was designated a State Natural Area in 1977.

The Lulu Lake Sensitive Area encompasses the near shore terrestrial, the shoreline, and the littoral zone. The shoreline is 70% wetland, 30 % wooded, and development is limited to two houses and one canoe shack. The eastern shore has a lake bottom substrate that is mainly made up of sand, gravel, and a rubble mixture. The western shore has different bottom sediment that consists of a silt, clay, and muck mixture with some areas having marl accumulation. This soft sediment along this shore can be as deep as three feet in some locations. Large woody cover along the western shore of the lake is estimated to be 1-2 pieces present per every 30 meters of shoreline. Along the eastern shore the estimate of large woody cover is common at 3-6 pieces per 30 meters of shoreline. The natural scenic beauty (NSB) rating is outstanding, noting that the lake features no adverse human influences and has unique natural aesthetics.

There are multiple wetland types that add to the ecological importance of the sensitive area. A deep water and shallow water marsh are both present around the shoreline and littoral zone of the lake. The defining characteristics of the deep water marsh, with plant species such as Cattails, water lilies, and wild rice, can be observed on the western shore. Defining characteristics of the shallow water marsh, with such plants as soft-stem bulrush and arrowhead, are present on the south and eastern shore. The two types also converge at different locations around the lake. A sedge meadow, wet meadow, and wet prairie with species such as blue flag iris, and asters, are located along the western and southern terrestrial shore. A fen is situated in the northeast corner along the terrestrial shoreline. The northwest near shore terrestrial offers a conifer swamp consisting mainly of tamarack trees.

Lulu Lake acts as a nutrient buffer zone with adequate vegetation along the shoreline and within the lake which provides a sink for nutrients, thus reducing algae blooms. The lake also acts as a biological buffer with healthy native plant stands that reduces the likelihood of exotic species invasions. Dense plant beds create a micro-habitat that increases the likelihood of biodiversity. The existing diverse plant community in and around the lake also serve as a physical buffer that protects against shoreline erosion and helps to allow sediment stabilization. See Appendix 1 for a complete list and occurrence of aquatic plants found in the Lulu Lake Sensitive Area. Groundwater seepage, springs, and the stream inlet zone offer cold water to provide temperature fluctuations which increase biodiversity in the lake.

Lulu Lake provides a mixture of important fish habitat components such as sand, rubble/gravel, emergent vegetation, submerged vegetation, and floating-leaf vegetation. The native plant beds and clean bottom sediments offer fish species such as northern pike, largemouth bass, bluegills, sunfish, yellow perch, suckers, and numerous minnow species exceptional spawning habitat, nursery areas, feeding areas, and protective cover.

Lulu Lake is also very important for the fishery health of the downstream waters of Eagle Spring Lake. Fish are able to migrate between the two lake systems via the

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Mukwonago River and the sensitive area habitat of Lulu Lake help to sustain fish populations in Eagle Spring Lake by providing essential spawning areas and nursery areas.

Lulu Lake provides essential habitat for animals such as deer, turkey, beaver, otter, muskrat and mink. These animals use the area for reproduction, shelter and cover, and feeding areas. Frogs and turtles utilize Lulu Lake and the near shore areas for nesting locations, feeding areas, and shelter.

Emergent and floating leaf vegetation provide for an excellent waterfowl production area that supplies ducks and geese with cover for shelter and nesting areas. The vast abundance of native plant beds, especially wild rice, provides for many feeding locations throughout Lulu Lake. Many species of song birds also utilize the area for the same reasons. Lulu Lake also serves as a stop for the occasional migrating loon. The lake also has the potential to host up to two nesting pairs of osprey.

## **Recreational Use Conflicts**

Recreational use of Lulu Lake by boaters has caused deterioration of Lulu Lake in recent years. Turbidity in Lulu Lake has increased since 2001. Two to three dozen pontoon boats moor on the eastern shoreline of Lulu Lake on hot summer weekends, trampling the nearshore and aquatic vegetation. Boaters on jet skis come up to Lulu Lake via the Mukwonago River and illegally boat at speeds greater than slow no wake. Wakes created by high speed boating have the potential to cause shoreline erosion. High speed boaters navigate through native aquatic plant beds and rip apart native species.

Milfoil density in Lulu Lake has increased in recent years. Boaters coming from Eagle Spring Lake via the Mukwonago River often fail to reverse their motors when entering Lulu Lake and bring fragments of Eurasian water milfoil on their boat props. Each fragment of Eurasian water milfoil can root again.

## **Sensitive Area Recommendations:**

Recommendations from Department staff pertain to Lulu Lake as a whole:

1. Native aquatic plant beds should be protected and maintained throughout the entire lake.
2. Do not remove fallen trees along shoreline, except where navigation is impaired. If navigation is impaired by a fallen tree, cut into smaller pieces and place outside of boating lane.
3. Prevent the spread of exotic species through sign postings, education, and better boating practices. Boaters should be certain to reverse their motors before entering

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Lulu Lake via the Mukwonago River. The signs informing boaters to reverse their motors should be maintained and made more visible.

4. Funds should be sought for more enforcement of boating regulations, especially on weekends, to prevent high speed boating on Lulu Lake.
5. No chemical treatment should be allowed, except to target an infestation of an exotic species such as purple loosestrife, Eurasian water milfoil or curly leaf pondweed. Biological controls such as the purple loosestrife beetle and the milfoil weevil should be considered where appropriate.
6. Random tree drops should be conducted throughout the lake to enhance fish spawning and increase habitat.
7. New piers may be considered for a permit. However, additional piers are restricted to the existing developed shoreline (2 lots). The number of moorings allowed will be less than listed in State Statutes 30.12 (1g) (f). The number of moorings permitted will be limited and based on the carrying capacity of the resource.
8. A DNR permit should not be issued for any of the following:

Dredging	Pea gravel/sand blankets
Filling of wetlands	Fish Structures
Aquatic plant screens	Boat Ramps
Sea Walls/Retaining Walls/Riprap	Boardwalks
Recreational floating devices	
9. Recommendations regarding **local and county zoning**:
  - Strictly enforce shoreline and wetland ordinances by maintaining buffers, removing non conforming structures and limit impervious surfaces
  - New developments should comply with the Walworth County Land Use Plan
  - Require a buffer/"no touch" zone for grading projects along the currently undeveloped shoreline. This buffer/"no touch" zone should be at least 100 feet from the edge of the wetland back into the (landward) upland portion of parcels.
  - Require a buffer/"no touch" zone for grading projects located along steep slopes. The zone should extend at least 100 feet from the edge of a steep slope towards the landward side of the parcel.
  - Grading proposals should be strictly examined for superior erosion control and nutrient management plans.



## Conclusions

In summary, the ecological community that Lulu Lake offers as a sensitive area has distinctly unique features when compared to other water bodies in the area. This is due to the abundant native aquatic plants beds and the undeveloped natural shoreline. The plant community in Lulu Lake acts as a buffer to 1) trap dissolved nutrients and suspended solids; 2) deter the establishment of exotic species; 3) stabilize sediment, and 4) capture plant fragments. The lake also acts as a microhabitat which increases the likelihood of biodiversity.

The lake is located within a groundwater seepage zone as well as stream inlet zone. This causes temperature fluctuations that enhance biodiversity. Aquatic plants in Lulu Lake include emergents, algae, potamogetons (pondweeds), exotics, floating leaf, and submergent vegetation. Wet edge plants include herbs, sedges, rushes, shrubs, and grasses.

Game fish, panfish, fryfish and forage fish utilize Lulu Lake for all stages in their life. Wildlife utilizing the lake include upland animals, furbearers, waterfowl, shore birds, predatory birds, amphibians, and reptiles. This lake provides an excellent representation of the natural communities that once covered southeastern Wisconsin, which are virtually eliminated today.

Lulu Lake serves as a nutrient sink to the Mukwonago River. Water entering Lulu Lake via the Mukwonago River contains more phosphorus than water exiting Lulu Lake via the Mukwonago River. The Mukwonago River is classified in Wisconsin as an Exceptional Resource Water.

The Mukwonago River contains one of the most abundant and diverse fish populations of any stream in Wisconsin. In addition to a known population of at least 66 fish species, five of which are rare, threatened or endangered, the Mukwonago contains many unusual and rare clam species; and the only large bed of wild rice known to still exist in southeastern Wisconsin. The land adjacent to and draining towards the Mukwonago River is urbanizing quickly. This could result in the deterioration of the river. The classification of Lulu Lake as a Designated Sensitive Area will help to ensure protection and preservation of this ecosystem and promote responsible recreational opportunities and land use decision making for years to come.

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## APPENDIX 1 - Plant Occurrence within Lulu Lake Sensitive Area

Emergent/Wet Edge	Present	Common	Abundant	Dominant
Rubus (red raspberry)				
Zizania (wild rice)				X
Typha (cattail)		X		
Juncus (rush)	X			
Scirpus (bulrush)				X
Eleocharis (spike-rush)	X			
Carex (sedges)				X
Decodon (water-willow)	X			
Pontederia (pickerelweed)				
Sparganium (bur-reed)	X			
Acorus (sweet flag)	X			
Aster (aster)	X			
Thelypteris (marsh fern)		X		
Sagittaria (arrowhead)	X			
Ambrosia artemisiifolia (ragweed)				
Bidens (beggar Tick)				
Vitis Hederacea (virginia creeper)				
Iris (blue flag)	X			
Eupatorium (joe pye weed)	X			
Eupatorium (boneset)	X			
Polygonum (smartweed)				
Arundo (giant reed)				
Phalaris (reed canarygrass)	X			
Lycopus americanus Muhl. (Bugleweed)				
Betula (bog birch)	X			
Larix (tamarack)	X			
Coreopsis (tick seed)				
Impatiens (jewelweed)	X			
Rumex (marsh dock)				
Cornus (dogwood)		X		
Salix (willow)	X			
Thalictrum (meadow rue)	X			
Dasiphora (shrubby cinquefoil)	X			
Umbelliferae (angelica)	X			
Ipomoea (morning glory)	X			
Decodon (swamp loosestrife)	X			
Lathyrus (marsh pea)	X			
Liparis (fen orchid)	X			
(sawtooth sunflower)	X			
Solidago (goldenrod)	X			

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## APPENDIX 1(cont...) - Plant Occurrence within Lulu Lake Sensitive Area

<b>Submergent</b>	<b>Present</b>	<b>Common</b>	<b>Abundant</b>	<b>Dominant</b>
<i>Myriophyllum sibiricum</i> (northern water milfoil)				
<i>Chara</i> (muskgrass)		X		
<i>Potamogeton amplifolius</i> (large-leaf pondweed)	X			
<i>Potamogeton nodosus</i> (longleaf pondweed)				
<i>Elodea</i> (waterweed)				
<i>Utricularia</i> (bladderwort)				
<i>Ceratophyllum</i> (coontail)		X		
<i>Stuckenia pectinata</i> (sago pondweed)	X			
<i>Ranunculus trichophyllus</i> (water crow foot)				
<i>Vallisneria</i> (wild celery)				
<i>P. zosteriformis</i> (flat-stemmed pondweed)		X		
<i>P. illinoensis</i> (Illinois pondweed)		X		
<i>Najas flexilis</i> (slender naiad)	X			
<i>Ruppia maritima</i> (Widgeon grass)			X	
<i>Najas marina</i> (spiney naiad)	X			

<b>Free-floating</b>	<b>Present</b>	<b>Common</b>	<b>Abundant</b>	<b>Dominant</b>
<i>Nuphar advena</i> (yellow water lily)				
<i>Nymphaea odorata</i> (white water lily)				X
<i>Nuphar variegata</i> (spatterdock)				X
<i>P. natans</i> (floating-leaf pondweed)	X			
<i>Lemna</i> (duckweed)				
<i>Spirodela</i> (large duckweed)				

<b>Exotic</b>	<b>Present</b>	<b>Common</b>	<b>Abundant</b>	<b>Dominant</b>
<i>Myriophyllum spicatum</i> (Eurasian water milfoil)	X			
<i>P. crispus</i> (curly-leaf pondweed)				
<i>Lythrum</i> (purple loosestrife)	X			
<i>Phragmites</i> (common reed grass)	X			
<i>Rhamnus frangula</i> (glossy buckthorn)	X			

<b>Algae</b>	<b>Present</b>	<b>Common</b>	<b>Abundant</b>	<b>Dominant</b>
<i>Chara</i> (muskgrass) filamentous		X		

**Works Cited**

Borman, S., R. Korth, and J. Temte, 1997. Through the Looking Glass: A Field Guide to Aquatic Plants, *Wisconsin Lakes Partnership*.

Castelle, A. J, Johnson, A.W. and Conolly, C. Wetland and Stream Buffer Size Requirements – A Review. *Journal of Environmental Quality* 23, (1994), pp. 878-882.

Chapter 30, Wisconsin State Statute.

Greene, A. 2003. A Homeowners Guide to Native Shoreline Buffers, *Walworth County Publication*.

Lyons, J., P.A. Cochran, and D. Fago, 2000. Wisconsin Fishes 2000: Status and Distribution, *University of Wisconsin Sea Grant Institute*.

NR 1, 102, 107, 109, Wisconsin Administrative Code.

Purple Loosestrife: What You Should Know, What You Can Do, *WDNR, PUB-WT-276* 2003.

Wenger, Seth. A Review of the Scientific Literature on Riparian Buffer Width, Extent and Vegetation. Institute of Ecology, University of Georgia, March 1999.

Woodford, J. E. and Meyer, M. W. Impact of Lakeshore Development on Green Frog Abundance. *Biological Conservation* 110 (2003), pp. 277-284

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