Pleasant Lake (Walworth County, Wisconsin)
Integrated Sensitive Area Report

Assessment Dates:	August 17, 2005 August 29, 2005 October 11, 2005 July 5, 2006
Number of Sensitive Areas Surveyed:	4 total
Site Evaluators:	Doug Welch, Fisheries Biologist Jenny Herrmann, Wildlife Technician Heidi Bunk, Lakes Biologist Pam Schense, Water Regulation and Zoning Ozzie Mohr, Commissioner Lars Higdon, Lake Resident Rick Callaway, Town Appointed Commissioner Doug Behrens, Commisioner
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General Lake Information

Pleasant Lake is located in north central Walworth County near the intersection of Highway 67 and Highway 20. The lake has an area of approximately 154 acres, a maximum depth of about 29 feet, and an average depth of approximately 12.4 feet. Pleasant Lake is an ice block kettle at the border of a terminal moraine and outwash terrace. The steep slopes on all but the southeast side of the lake represent moraine deposits while the gentler terrain southeast of the lake reflects outwash deposits.

The Pleasant Lake watershed (drainage basin) is approximately 216 acres. Land use within the watershed consists of 91 acres of agricultural land, 60 acres of low density residential area, 55 acres of woodlands, and 10 acres of wetlands. Data from observation wells indicates that the western half of the lake is a region of groundwater inflow and the eastern half of the lake is a region of groundwater outflow.

Pleasant Lake now has multiple recreational uses including the seasonal activities of: fishing, pleasure boating, swimming, small craft sailing, ice fishing, cross-country skiing, ice-skating, and hunting. The lake also provides natural scenic beauty throughout the year, and opportunities for walking, jogging, bird watching, and picnicking. The entire lake is “Slow, No Wake”.

Pleasant Lake supports a moderately diverse fish population. Northern pike, walleye, largemouth bass, forage fish and panfish are all present on the lake. Doug Welch, DNR Fisheries Biologist, conducted an electrofishing survey in May 2000. A fyke net survey and seine net survey was conducted in August 2000. Bluegill and largemouth bass were the most numerous fish found in the lake. The average length of bluegill caught was 5.7 inches, with a range of 1.4 inches to 7.8 inches. The average length of largemouth bass caught was 10.5 inches, with a range of 5.4 inches to 15.9 inches. The surveys also documented warmouth, pumpkinseed, yellow bullhead, grass pickerel, brown bullhead, rock bass, Iowa darter and johnny darter. The next fish survey is scheduled for 2008.

Exotic Species

Exotic species, most notably zebra mussels, 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 watermilfoil is present in Pleasant Lake. Eurasian watermilfoil 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 monocultures and out competed 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.

Curly-leaf pondweed is another submerged, exotic species found in Many Wisconsin lakes. 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 out compete native plants, resulting in the destruction of food, cover, and nesting sites for wildlife and fish.

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. calmariensis* are leaf-eating beetles; *Nanophyes brevis* and *N. marmoratus* are flower-eating beetles; and *Hylobius trasversovittatus* 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.

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.

Walworth County administers several ordinances that help protect the water quality, recreational use, scenic beauty and wildlife habitat of Pleasant Lake. Walworth County regulates the use, development and construction activities on land adjacent to Pleasant Lake. The Walworth County Shoreland Zoning Ordinance limits vegetation removal, earth movements, placement of structures, water view and water access within 1000 feet of the edge of Pleasant Lake.

The Walworth County Zoning Ordinance and Subdivision Ordinance includes Conservation Development Design Standards as a tool to protect the County's resource base, including County lakes and lakeshores. Walworth County also requires Construction Site Erosion Control Plans and Post-construction Storm Water Management Plans on most construction sites and developments.

The Town of LaGrange has developed local ordinances regarding pyramiding (Ordinance 2005-001), piers (Ordinance 2001-02), fertilizers (Ordinance 03-007) and conservation subdivisions (Ordinance 2004-04). Pyramiding is defined as "the use of a lot zoned for residential use in a manner that increases the number of persons who have access to a lake, to a greater degree than would occur if a single family property owner were using a single lot fronting on a lake." The conservation subdivision ordinance for the Town of LaGrange adopts the Walworth County ordinance.

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 on Pleasant 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 Pleasant Lake sensitive area designation surveys on August 17, 2005, August 29, 2005, October 11, 2005 and July 5th, 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, and wildlife. Four lake residents also participated in the survey.

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, with the exception of select portions of the developed shoreline. Three shoreline areas are excluded from the shore out to 60 feet** (see Map 1).

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 Designations

Sensitive areas often 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 designated sensitive area 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 may discourage certain permits from being approved within these sites.

Whole Lake Recommendations:

Several recommendations from Department staff pertain to Pleasant Lake as a whole rather than to individual sensitive areas:

1. Native aquatic plant beds should be protected and maintained whether located in the sensitive area or in the excluded shoreline.
2. Prevent the spread of exotic species through sign postings, education, etc. and control exotic species where established.
3. Create shoreland buffers and maintain existing buffers, especially in areas not currently developed.
4. Monitor water quality for early detection of changes and possible degradation.
5. Maintain the whole lake "Slow No Wake" ordinance. This ordinance minimizes boat motor disturbance of aquatic plants, fish and wildlife.
6. Recommendations regarding **local and county zoning**:
    - Strictly enforce shoreland and wetland ordinances by maintaining buffers, removing non conforming structures and limited impervious surfaces
    - New development 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.
    - Maintain Town of LaGrange Ordinance 2004-04, An Ordinance to Amend the Land Division Ordinance and Adopt Conservation Development Design for Subdivisions.
    - Maintain Town of LaGrange Ordinance 2005-001, An Ordinance to Regulate Access to Lakes Within the Town of LaGrange (Pyramiding).
    - Maintain Town of LaGrange Ordinance 2006-04, An Ordinance to Regulate Wharfs, Piers and Mooring Facilities and Establish a Pierhead Line for Lauderdale Lakes.
    - Maintain Town of LaGrange Ordinance 03-007, An Ordinance to Regulate Fertilizers Near Lakes.

Resource Value of Sensitive Area Site 1 – Pleasant Lake

Sensitive area 1 is a small bay on the northeast side of Pleasant Lake almost totally isolated from the main lake. This sensitive area is part of Camp Juniper Knoll, operated by the Girl Scouts of Chicago. This approximately three-acre plant community consists of open water, deep marsh, and shallow marsh.

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) conducted a plant survey on sensitive area #1 in 1999. The following 30 plants were observed: marsh fern, broad-leaf cat-tail, narrow-leaf cat-tail, long-leaf pondweed, flat-stemmed pondweed, reed canary grass, spike-rush, soft-stemmed bulrush, hard-stemmed bulrush, river bulrush, sedge, lake sedge, wooly sedge, bottlebrush sedge, lesser duckweed, sand-bar willow, stinging nettle, yellow water lily, silver maple, jewelweed, river-bank grape, purple loosestrife, red osier dogwood, tufted loosestrife, green ash, hoary vervain, cutleaf bugleweed, deadly nightshade, bladderwort, and boneset.

Sensitive area 1 provides northern pike with spawning habitat, nursery area, feeding area, and protective cover. This is unique to Pleasant Lake because of the abundance of water lilies. Largemouth bass, bluegills, pumpkinseed, and yellow perch use the area for feeding, nursery, and for cover from predators. This area is generally not navigable from the main lake.

Management Recommendations for Sensitive Area #1

1. Do not remove fallen trees along the shoreline.

2. A no motor zone is recommended for this area to protect emergent vegetation. No aquatic plant removal (either mechanical or manual) should be permitted.

3. A DNR permit should not be issued for any of the following:

Dredging	Pea gravel/sand blankets
Filling of wetlands	Rip Rap
Aquatic plant screens	New Piers
Boat Ramps	Sea Walls/Retaining Walls
Recreational floating devices	Boardwalks

4. No chemical treatment should be allowed except to target an infestation of an exotic species such as purple loosestrife, Eurasian watermilfoil or curly leaf pondweed. Biological controls such as the purple loosestrife beetle and the milfoil weevil should be considered where appropriate.

Resource Value of Sensitive Area Site 2 – The Bay

Sensitive area 2 is a bay located just east of sensitive area 1 and is known locally as “The Bay.” The area acts as a nutrient buffer to reduce algae blooms, a biological buffer that reduces the likelihood of exotic invasions, a physical buffer that protects against shoreline erosion, and a diverse aquatic plant community that allows for sediment stabilization. See Appendix 1 for a complete list of aquatic plants found in sensitive areas of Pleasant Lake.

Sensitive area habitat includes near-shore terrestrial, shoreline, and littoral zone locations. Bottom substrate is composed of silt and detritus and shoreland buffer consists of 50 percent wooded-wetland and 50 percent developed shoreline. Herbaceous plant growth is present, lawn is common, and trees are abundant on the shoreland buffer. The wetland consists of a deep marsh and large woody cover is present at a rate of 3-6 pieces / 30 meters of shoreline. The natural scenic beauty (NSB) rating is average overall but good on the undeveloped side.

This sensitive area provides excellent spawning habitat for northern pike. Yellow perch will drape their eggs over the submergent vegetation in this area. Excellent nursery, feeding and cover habitat is available for northern pike, largemouth bass, bluegill, pumpkinseed, crappie, yellow perch and minnows. Largemouth bass and bluegill will build spawning nests in areas of this bay where relatively thin layers of silt are underlain with sand and gravel.

Table 3. Plants observed in sensitive area 2.

	Emergent	**Submergent**	**Algae**	**Exotic**
PRESENT (0-25% Cover)	*Pontederia* (pickerelweed) *Scirpus* (bulrush) *Nuphar advena* (yellow water lily)	*Elodea* (waterweed)	Filamentous (algae)	*Myriophyllum spicatum* (Eurasian watermilfoil)
COMMON (26-50% Cover)				
ABUNDANT (51-75% Cover)	*Typha* (cattail)	*Vallisneria* (wild celery)		
DOMINANT (76-100% Cover)	*Nymphaea odorata* (white water lily)	*Utricularia* (bladderwort)	*Chara* (muskgrass)	

Management Recommendations for Sensitive Area # 2

Please note that this section of recommendations makes a distinction between the currently undeveloped shoreline and the currently developed shoreline. Any land that is subsequently developed will still be held to the standard of "currently undeveloped" for the purposes of interpreting this recommendation document. The currently developed shoreline includes portions of the southern shoreline of the bay as well as portions of the eastern shoreline of the bay. Map 2 denotes the "currently developed" shoreline.

1. 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.

2. The no wake zone should be maintained for this area to protect emergent, submergent and floating leafed aquatic vegetation.

3. No chemical treatment allowed except to target an infestation of an exotic species such as purple loosestrife, Eurasian watermilfoil or curly leaf pondweed. Biological controls such as the purple loosestrife beetle and the milfoil weevil should be considered where appropriate.

4. No **new** mechanical harvesting permits should be issued in this sensitive area. One mechanical harvesting permit is on file (originally issued in 2005). A total of 0.36 acres is permitted for harvesting. The depth of the harvest may not exceed two feet downward from the surface of the water. This permit will continue to be issued but with a time of year restriction (No harvesting before August 1st of any given year starting in 2008). The permit cannot be transferred to a new landowner.

5. Manual removal permits should be limited to a maximum of 20 feet along each landowner's shoreline and a maximum of 30 feet from the shoreline out into the lake. A NR 109 permit is needed for manual removal. Manual removal permits should only be issued in the area where the pier and boats are located for each property and should only be issued along the currently developed shoreline.

6. A DNR permit should not be issued for any of the following along the currently developed shoreline:

Filling of wetlands	Rip Rap
Aquatic plant screens	Recreational floating devices
Sea Walls/Retaining Walls	Pea Gravel/Sand Blankets

7. New piers along the currently developed shoreline will be permitted. The number of moorings allowed will be equal to that listed in State Statutes 30.12 (1g) (f). This would allow for two moorings for the first 50 feet of frontage owned and one additional mooring for each additional 50 feet of frontage owned.

8. Limited dredging to maintain the navigational channel may be considered if the water depth in the navigation channel becomes less than two feet deep. The navigational channel is located mainly along the currently developed shoreline.

9. A DNR permit should not be issued for any of the following along the undeveloped shoreline:

Dredging	Pea gravel/sand blankets
Filling of wetlands	Rip Rap
Aquatic plant screens	Recreational floating devices
Sea Walls/Retaining Walls	New Piers

10. A DNR permit should not be issued for boardwalk or ramp construction along the currently undeveloped shoreline. If condos or a subdivision are built, a rustic canoe access path can be marked.

In summary, the ecological community of Sensitive Area 2 has distinctly unique features when compared to the waterbody due to the abundant native aquatic plants and the undeveloped shoreline. This site provides a visual buffer from shoreline structures, roads, and boat traffic. Aquatic plants in the sensitive area include emergents, algae, potamogetons (pondweeds), exotics, free floating, floating leaf, and submergent vegetation. Wet edge plants include herbs, sedges, rushes, shrubs, and grasses. Game fish, panfish, fryfish and forage fish utilize the sensitive area. Wildlife utilizing the sensitive area include furbearers, waterfowl, shore birds (including wood ducks and brood), amphibians, and reptiles. This site provides an excellent educational area to explore by canoe.

Resource Value of Sensitive Area Site 3 – The Pond

Sensitive area 3, locally known as "The Pond" in Pleasant Lake serves as a wildlife refuge. The area also supports many small fish, green heron, and great blue heron. The substrate in Sensitive Area 3 consists of 2" of silt on top of hard sand. A large amount of woody cover and snags (standing and fallen branches in the water) are present. This sensitive area acts as a nesting area for upland wildlife and a feeding area for ducks. Song birds such as the belted kingfisher use this area for nesting and feeding. Frogs and toads use the sensitive area for shelter/cover, nesting and feeding. Turtles use the area for shelter/cover and feeding. Floating leaf vegetation, shrubs/brush and snag trees are all important habitat components present at this site. Water depth in Sensitive Area #3 is an average of approximately 1.5 feet.

Table 5. Plants observed in sensitive area 3.

	Emergents	**Submergents**	**Exotics**	**Free Floating**
PRESENT (0-25% Cover)		*Potamogeton amplifolius* (large-leaf pondweed) *P. illinoensis* (Illinois pondweed)	*Myriophyllum spicatum* (Eurasian watermilfoil)	
COMMON (26-50% Cover)		*Najas flexilis* (slender naiad) *Vallisneria* (wild celery) *Najas marina* (Spiney naiad) *P. zosteriformis* (flat-stemmed pondweed)		
ABUNDANT (51-75% Cover)		*Stuckenia pectinata* (sago pondweed) *Chara* (muskgrass)		*Nymphaea odorata* (white water lily)
DOMINANT (76-100% Cover)				

Management Recommendations for Sensitive Area # 3

1. Do not remove fallen trees along the shoreline.

2. A no motor zone is recommended for this area to protect emergent and floating leafed vegetation. No mechanical aquatic plant removal should be permitted. Manual removal of exotic species such as Eurasian water milfoil, curly leaf pondweed or purple loosestrife will require a permit.

3. A DNR permit should not be issued for any of the following:

   Dredging
   Filling of wetlands
   Aquatic plant screens
   Boat Ramps
   Recreational floating devices
   Pea gravel/sand blankets
   Rip Rap
   New Piers
   Sea Walls/Retaining Walls

4. Boardwalks will be allowed on a case by case basis to provide open water access only for a riparian landowner. Watercraft moored at the boardwalk must be able to navigate the water without any additional dredging. The number of moorings allowed will be less than "reasonable use" as defined by state law.

5. No chemical treatment should be allowed except to target an infestation of an exotic species such as purple loosestrife, Eurasian watermilfoil or curly leaf pondweed. Biological controls such as the purple loosestrife beetle and the milfoil weevil should be considered where appropriate.

Resource Value of Sensitive Area # 4 – Pleasant Lake

Sensitive area # 4 includes most of the remaining shoreline of Pleasant Lake with the exception of the developed shoreline. Three shoreline areas are excluded from the shore out to 60 feet (see Map 1). Aquatic plants typically noted in this sensitive area included large leaf pondweed, long leaf pondweed, sago pondweed, wild celery, flat stemmed pondweed, Illinois pondweed, slender naiad, water stargrass, spiny naiad, white water lily, chara and Eurasian watermilfoil.

The excluded areas of shoreline lacked aquatic plant diversity, had a higher concentration of exotic species (mainly Eurasian watermilfoil and often lacked plant cover altogether. The three excluded areas are outlined in pink on Map 1 and extend from the shoreline out 60 feet into the water. Sensitive Area #4 includes plant communities along the excluded shoreline that are greater than 60 feet from shore.

The substrate along the majority of the shoreline was either rock, gravel, sand or a combination of the three. Mollusks, mainly snails and native mussels, were found along the majority of the shoreline in Sensitive Area # 4. Shorebirds, especially herons, were documented feeding along many of the sandbars containing mollusks.

Management Recommendations for Sensitive Area # 4

1. 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.

2. No chemical treatment should be allowed except to target an infestation of an exotic species such as purple loosestrife, eurasian watermilfoil or curly leaf pondweed. Biological controls such as the purple loosestrife beetle and the milfoil weevil should be considered where appropriate.

3. New piers will be permitted. 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. Boats will likely be required to be grouped on a shared pier to minimize impact.

4. A DNR permit should not be issued for any of the following:

   Dredging
   Filling of wetlands
   New sea walls
   Pea gravel/sand blankets
   Wetland removal

5. No new rip rap should be permitted if shoreline littoral zone has emergent vegetation such as bulrush, pickerelweed, sedges, etc. Existing rip rap should be maintained in compliance with Natural Resource Code 328.

6. Manual removal permits should be limited to a maximum of 20 feet along each landowner's shoreline and a maximum of 30 feet from the shoreline out into the lake. A NR 109 permit is needed for manual removal. Manual removal permits should only be issued in the area where the pier and boats are located for each property.

7. No mechanical aquatic plant removal should be permitted. Manual removal of exotic species such as Eurasian water milfoil, curly leaf pondweed or purple loosestrife will require a permit.

CONCLUSION

The majority of Pleasant Lake has been designated as a sensitive area. There are four distinct plant communities and three excluded shorelines. The excluded shorelines contained rip rap or sea walls along the shoreline and the lake bed near the piers was often devoid of vegetation (likely due to boat traffic and hand raking).

Landowners living in the excluded shorelines must still follow all applicable state, county and local permitting requirements. New laws were passed by the State Legislature in 2004. Landowners with existing sea walls that need replacement should check the Department of Natural Resources website to see if replacement is possible. The website can be found at: http://dnr.wi.gov/org/water/fhp/waterway/erosioncontrol.shtml.

Sensitive area 2, locally known as "The Bay" is actively managed by both the Pleasant Lake Management District and individual landowners. Chemical treatment for Eurasian watermilfoil occurs in the spring (by the District), and landowners manually rake up plants. There is one historical harvesting permit issued each year to an individual landowner. The aquatic plant community is very diverse. Management activities conducted in future years need to continue to balance the management of Eurasian watermilfoil and the preservation of valuable native plant species.

A large area of Eurasian watermilfoil is present on the southeast corner of Pleasant Lake. The Pleasant Lake Management District should continue actively managing the area for control of Eurasian watermilfoil.

Pleasant Lake enjoys a largely sandy or rock/cobble substrate as well as a healthy aquatic plant community. Water clarity is generally good. The fish community is moderately diverse. Game fish size structure is slightly below average. Preservation of native plant communities (regardless of location in the lake) will help preserve the value of Pleasant Lake for fish and wildlife.

APPENDIX 1 - Aquatic plants within sensitive areas of Pleasant Lake

Emergent	Area 1	Area 2	Area 3	Area 4
Rubus (red raspberry)				X
Zizania (wild rice)				
Typha (cattail)	X	X		X
Jancus (rush)	X			
Scirpus (bulrush)	X	X		X
Eleocharis (spike-rush)				
Carex (sedges)	X			X
Decodon (water-willow)				X
Pontederia (pickerelweed)		X		
Vitis (riverbank grape)	X			
Acorus (sweet flag)				
Aster (aster)				X
Thelypteris (marsh fern)	X			
Glyceria (mannagrass)				
Ambrosia artemisiifolia (ragweed)				X
Bidens (beggar Tick)				
Vitis Hederacea (virginia creeper)				X
Iris (blue flag)				
Eupatorium (joe pye weed)				X
Eupatorium (boneset)	X			X
Polygonum (smartweed)				X
Arundo (giant reed)				
Phalaris (reed canarygrass)	X			
Lycopus americanus Muhl. (Bugleweed)				X
Asclepias (marsh milkweed)				
Verbena (horay vervain)	X			
Coreopsis (tick seed)				
Impatiens (jewelweed)	X			X
Rumex (marsh dock)				
Cornus (dogwood)	X			X
Salix (willow)	X			
Solidago (goldenrod)				X

Submergent	**Area 1**	**Area 2**	**Area 3**	**Area 4**
Myriophyllum sibiricum (northern watermilfoil)				
Chara (muskgrass)		X	X	X
Potamogeton amplifolius (large-leaf pondweed)			X	X
Potamogeton nodosus (longleaf pondweed)	X			
Elodea (waterweed)		X		
Utricularia (bladderwort)	X	X		
Ceratophyllum (coontail)				
Stuckenia pectinata (sago pondweed)			X	X
Ranunculus trichophyllus (water crow foot)				
Vallisneria (wild celery)		X	X	X
P. zosteriformis (flat-stemmed pondweed)	X		X	X
P. illinoensis (Illinois pondweed)			X	X
Najas flexilis (slender naiad)			X	X
Heteranthera dubia (water stargrass)				X
Najas marina (spiney naiad)			X	X

Free-floating	**Area 1**	**Area 2**	**Area 3**	**Area 4**
Nuphar advena (yellow water lily)	X	X		
Nymphaea odorata (white water lily)		X	X	X
Wolffia (watermeal)				
P. natans (floating-leaf pondweed)				
Lemna (duckweed)	X			
Spirodela (large duckweed)				

Exotic				
Myriophyllum spicatum (Eurasian watermilfoil)		X	X	X
P. crispus (curly-leaf pondweed)				
Lythrum (purple loosestrife)	X			

Algae				
Chara (muskgrass)		X	X	X
filamentous		X		

Works Cited

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