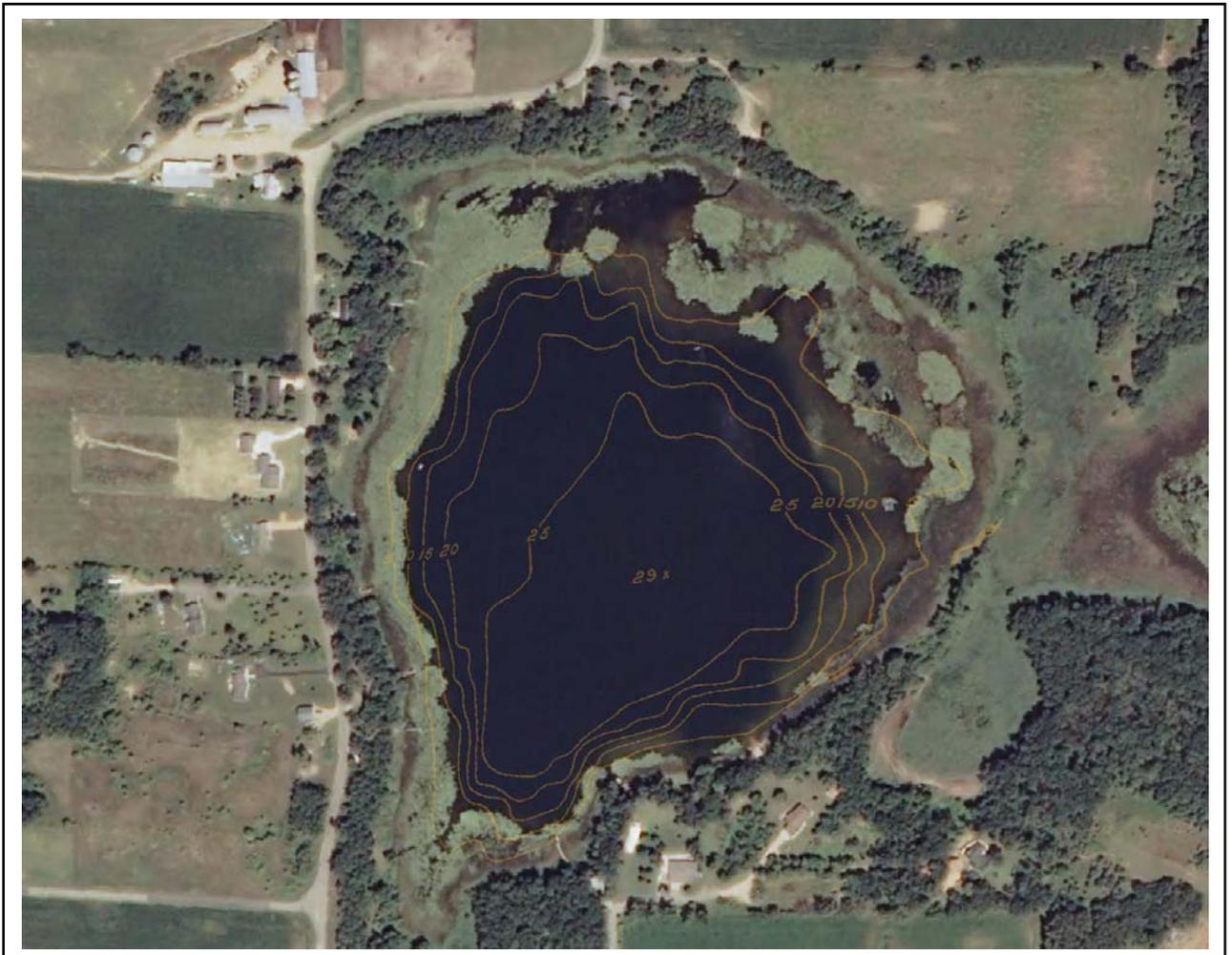


***CRITICAL HABITAT DESIGNATION
LIME LAKE
PORTAGE COUNTY, WI***

June, 2008



**Wisconsin Department of Natural Resources
Eau Claire, WI**

I. INTRODUCTION

Designations of Critical Habitat Areas within lakes provide a holistic approach to ecosystem assessment and the protection of those areas within a lake that are most important for preserving the very character and qualities of the lake that attract us to their shores. These sites are those sensitive and fragile areas that support the wildlife and fish habitat, provide the mechanisms that protect the water quality in the lake, harbor quality plant communities and preserve the places of serenity and aesthetic beauty for the enjoyment of lake residents and visitors.

Critical Habitat Areas include Sensitive Areas and Public Rights Features. Sensitive Areas ...”offer critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offering water quality or erosion control benefits to the area” (Administrative code 107.05(3)(1)(1)). This code provides the Wisconsin Department of Natural Resources the authority for the identification and protection of sensitive areas in a lake. Public Rights Features are areas that fulfill the right of the public for navigation, quality and quantity of water, fishing, swimming or natural scenic beauty. Protecting these Critical Habitat Areas requires the protection of shoreline and in-lake habitat.

Protecting the terrestrial plant community on shore provides a buffer that absorbs nutrient runoff, prevents erosion, protects water quality, maintains water temperatures and provides important habitat. The habitat is important for species that require habitat on shore and in the water as well as those species that require a corridor in order to move along the shore (Figure 1).

Protecting the littoral zone and littoral zone plant communities is critical for fish, wildlife and the invertebrates that both feed upon (Figure 1). The Critical Habitat Area designation will provide a framework for management decisions that impact the ecosystem of the lake.

II. METHODS, Plant Survey Field Methods

All Critical Habitat Designations include aquatic plant surveys. Following is an abbreviated review of the methods used to gather aquatic plant data on this lake for this report. Shoreline is also considered. These methods can vary from year to year and lake to lake.

The study design was based on the rake-sampling method developed by Jessen and Lound (1962), using stratified random placement of transect lines. The shoreline was divided into 13 equal segments and a transect, perpendicular to the shoreline, was randomly placed within each segment using a random numbers table.

One sampling site was randomly located in each depth zone (0-1.5ft, 1.5-5ft, 5-10ft and 10-20ft) along each transect. Using a long-handled, steel thatching rake, four rake samples were taken at each sampling site. The four samples were taken from each quarter of a 6-foot diameter quadrat. The aquatic plant species that were present on each rake sample were

recorded. Each species was given a density rating (0-5) for each rake sample on which it was present at each sampling site.

A rating of 1 indicates that a species was present on one rake sample

A rating of 2 indicates that a species was present on two rake samples

A rating of 3 indicates that it was present on three rake samples

A rating of 4 indicates that it was present on all four rake samples

A rating of 5 indicates that a species was abundantly present on all rake samples.

Visual inspection and periodic samples were taken between transect lines to record the presence of any species that did not occur at the sampling sites. Specimens of all plant species present were collected and saved in a cooler for later preparation of voucher specimens. Nomenclature was according to Gleason and Cronquist (1991).

The type of shoreline cover was recorded at each transect. A section of shoreline, 50 feet on either side of the transect intercept with the shore and 30 feet deep was evaluated. The percent cover of land use within this 100' x 30' rectangle was visually estimated.

III. LIME LAKE STATISTICS

Lake Area: 49 acres (48.97)*

Surface Watershed Details: 287 acres** (adapted from Portage County website, 2002 data)

Forest / Shrub : 28.5%

Nonirrigated Agriculture: 49%

Other Cover: 22.5 %

Lake Type: Seepage

Mean Depth: 13.08 feet

Maximum Depth: 29 feet

Miles of Shoreline: 1.13 miles / 5980 feet

Lake Volume: 640.5 acre-feet (Using 2008 DOP and projection fit of 1940 Bathymetry lines.)

Maximum Rooting Depth: 17 ft.

Number of Plant Species in 2007 Survey: 17

Littoral Area: 24.9 acres

*Wisconsin Statute **30.635 Motorboat prohibition**. On lakes 50 acres or less having public access, motorboats may not be operated in excess of slow-no-wake speed, except when such lakes serve as thoroughfares between 2 or more navigable lakes. The department by rule may modify or waive the requirements of this section as to particular lakes, if it finds that public safety is not impaired by such modification or waiver.

** The surface watershed area for a lake does not include the lake itself. However, wetlands, ponds and lakes within the watershed are included in the watershed area because all of these 'shed' water into the lake. Example, the Wisconsin portion of the Lake Michigan watershed does not include Lake Michigan but would include Lake Winnebago.

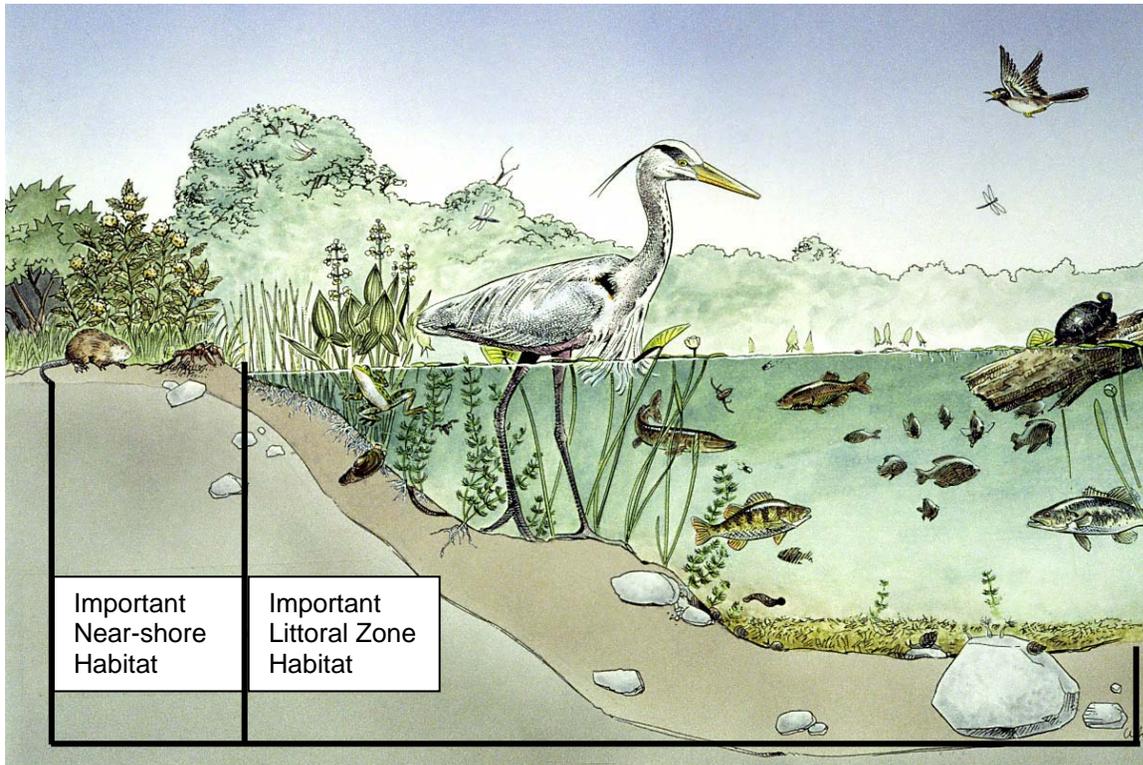


Figure 1. Location of important near-shore and littoral zone habitat.

A Critical Habitat Area Study was conducted June 16, 2008 on Lime Lake, Portage County. The designations were based on aquatic plant data collected during August 2007.

The study team included:

- Tom Meronek, DNR Fish Biologist
- Deborah Konkel, DNR, Aquatic Plant Specialist (Co-Author)
- Greg Dahl, DNR Wildlife Biologist
- Keith Patrick, DNR Water Regulation Specialist
- Neil Trombly, DNR Water Resources Specialist (Co-Author)

IV. AQUATIC SUMMARY:

Lime Lake is a mesotrophic lake with very good water clarity and good water quality. Filamentous algae occurred in Lime Lake in 2007, but was common only in the 0-1.5ft depth zone.

The aquatic plant community in Lime Lake is characterized by above average quality, good species diversity, a tolerance to disturbance and a condition closer to an undisturbed condition than the average lake in the state or region.

The aquatic plant community colonized the entire littoral zone, to a maximum depth of 17 feet. The 0-1.5 ft. depth zone supported the most abundant aquatic plant growth.

Seventeen (17) aquatic plant species were recorded in Lime Lake by the survey method used. *Cerataophyllum demersum* (coontail) was the dominant species within the plant community, especially in the 10-20ft depth zones, occurring at more than half of the sample sites and exhibiting a dense growth form. *Chara* spp. (musk-grass/skunk-weed/stonewort) and *Myriophyllum sibiricum* (northern watermilfoil) were the sub-dominant species, each occurring at more than half of the sites.

Interpreting the Number and Prevalence of Aquatic Plant Species Cited

The number and prevalence of aquatic species cited in this report reflect only those species found within the Critical Habitat Designated area(s) at the specific time of the year and at the specific randomized sampling locations that actual sampling was done. Different years, seasons, methodology and sampling density can all affect the number and prevalence of species found in any one survey.

V. THE CRITICAL HABITAT DESIGNATED AREA

The selection process of a Critical Habitat Designated Area is driven by its importance to the whole of the lake community.

The Critical Habitat Area for Lime Lake was selected because of the diverse aquatic plant community and emergent and floating-leaf plant beds important for fish and wildlife habitat, the extensive wetland edge and shore and its natural scenic beauty (Figure 2). The plant beds provide a biological buffer, reducing the possibility that the introduced non-native (Eurasian watermilfoil) will establish readily.

The Critical Habitat Area was geo-referenced.

Interpreting the Boundaries of Critical Habitat Designated (CHD) Areas

- 1) The landward extent of a CHD area may be more or less than shown on the attached map. In simple situations the CHD area typically extends to the Ordinary High Water Mark, (OHWM). Where Public Rights Features and/or wetlands and/or public lands exist other determinants may be involved. Most CHD areas include shoreland held in public trust below the OHWM.
- 2) The lakeward extent of a CHD area in deeper lakes is set by the designation team with the expectation that it not extend much beyond maximum rooting depth. Shallow lakes often have boundaries set by the designation team without regard to rooting depth because most or all of the lake may be shallower than rooting depth.



Figure 2. Location of Critical Habitat Areas on Lime Lake.

Critical Habitat Designated Area – The Shallow Water Zone

This 24.9-acre area encompasses the entire littoral zone around the lake and includes one public boat landing. At the time of the designation, there were 7 piers and one swim raft in the critical habitat area. The bank was in good shape and all natural except for the small boat access. The shoreline is entirely natural shrub and wetland except for the unpaved boat path and one pea gravel blanket. The shoreline buffer was intact, a mixture of emergent wetland and mixed forest, except for one lawn extending to the lakeshore and one pasture edge extending into the shoreline buffer zone. There were homes, a stairway and shed visible from the lake in the setback zone.

The Plant Community:

This Critical Habitat site supports 17 species of aquatic plants found in our survey.

Emergent vegetation : bulrush and cattails are abundant, protecting the shoreline and providing important food, cover and fish spawning habitat.

Floating leaf-species : small duckweed, white water lily and yellow pond lily provide fish and wildlife cover and food resources.

A diverse submerged plant community provides many important habitat components for the fish and wildlife community (Table 1). Coontail is dominant; muskgrass is abundant; northern watermilfoil is common; common waterweed, small bladderworts and bushy pondweed are present. The pondweed family is likely the most important producer of habitat and is represented here by Illinois pondweed, flatstem pondweed and sago pondweed, which is common.

The non-native Eurasian watermilfoil is present at the boat landing.

Plant Community Effect on Water Quality

The aquatic and shoreline vegetation in the Critical Habitat Designated area(s) provide important water quality protections. The plants provide a nutrient buffer by absorbing nutrients thus reducing algae growth and also provide a physical buffer that protects the shoreline against wave erosion. The plant beds anchor the sediments and prevent sediment resuspension by boat motors and waves that would increase turbidity.

Table 1. Wildlife and Fish Uses of Aquatic Plants in Lime Lake CHA

Aquatic Plants	Fish	Water Fowl	Song and Shore Birds	Upland Game Birds	Muskrat	Beaver	Deer
<u>Submergent Plants</u>							
<i>Ceratophyllum demersum</i> (coontail)	F, I*, C, S	F(Seeds*), I, C			F		
<i>Chara</i> sp.(muskgrass)	F*, S	F*, I*					
<i>Elodea canadensis</i> (common waterweed)	C, F, I	F(Foliage) I					
<i>Myriophyllum sibiricum</i> (northern watermilfoil)	F*, I*, S	F(Seeds, Foliage)	F(Seeds)		F		
<i>Myriophyllum spicatum</i> (Eurasian watermilfoil)	F, C						
<i>Najas flexilis</i> (busy pondweed)	F, C	F*(Seeds, Foliage)	F(Seeds)				
<i>Potamogeton illinoensis</i> (Illinois pondweed) ¹	F, I, S*, C	F*(Seeds)	F		F*	F	F
<i>Potamogeton pectinatus</i> (sago pondweed) ¹	F, I, S*, C	F*			F*	F	F
<i>Potamogeton zosteriformis</i> (flatstem pondweed)	F, I, S*, C	F*(Seeds)			F*	F	F
<i>Utricularia gibba</i> (small bladderwort)	F, C, I*	I*			F		
<i>Zosterella dubia</i> (water stargrass)	F, C, S	F(Seeds)					

Aquatic Plants	Fish	Water Fowl	Song and Shore Birds	Upland Game Birds	Muskrat	Beaver	Deer
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<u>Floating-leaf Plants</u>							
<i>Lemna minor</i> (small duckweed)	F	F*, I	F	F	F	F	
<i>Nuphar variegata</i> (yellow pond lily)	F, C, I, S	F, I	F		F*	F	F*
<i>Nymphaea odorata</i> (white water lily)	F, I, S, C	F(Seeds)	F		F	F	F
<u>Emergent Plants</u>							
<i>Scirpus acutus</i> (hardstem blurush) ¹	F, S, C, I	F*(Seeds, tubers)	F(Seeds, Tubers), C	F	F*		
<i>Typha angustifolia</i> (narrow-leaf cattail)	S, C					F	
<i>Typha latifolia</i> (common cattail)	I, C, S	F(Entire), C	F(Seeds), C, Nest	Nest	F* (Entire), C*, Lodge	F	

F=Food, I= Shelters Invertebrates, a valuable food source C=Cover, S=Spawning

***=Valuable Resource in this category**

After Fassett, N. C. 1957. A Manual of Aquatic Plants. University of Wisconsin Press. Madison, WI

Nichols, S. A. 1991. Attributes of Wisconsin Lake Plants. Wisconsin Geological and Natural History Survey. Info. Circ. #73

¹ These are among the high value species specifically mentioned in Wisconsin Administrative Rules.

NR 107.08(4) ...“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*.”

Wildlife Habitat

The emergent vegetation, floating-leaf vegetation, shoreline shrubs and brush, snag trees and perch trees at this site provide habitat for a diversity of wildlife. This critical habitat area provides:

- 1) Shelter, cover, bedding/nesting areas and feeding areas for upland wildlife, muskrat, mink, ducks, song birds, herons, frogs, toads, salamanders, turtles, snakes and the Special Concern Species, the black tern.

Fish Habitat

The emergent vegetation (bulrush beds), floating-leaf vegetation and submerged plant beds are important for fish habitat at this site. This Critical Habitat Area provides:

- 1) Spring spawning, year-round nursery areas, feeding areas and protective cover for northern pike
- 2) Spring and summer spawning, summer-to-winter nursery areas, feeding areas and protective cover for large-mouth bass and bluegill
- 3) Spring spawning, summer-to-winter nursery areas, feeding areas and protective cover for crappie

Recommendations for Critical Habitat Designated Area

Recommendations for the terrestrial shoreline buffer:

- 1) Minimize removal of any shoreline vegetation. Allow removal of a maximum corridor width of 30 feet per landowner.
- 2) Maintain the current wildlife habitat
- 3) Maintain wildlife corridor around the shore
- 4) Leave snag trees and trees with cavities on shore for cavity nesting and perches
- 5) No bank grading allowed.

Recommendations for the aquatic habitat to the Ordinary High Water Mark

- 1) Maintain the aquatic vegetation (emergent, floating-leaf and submergent) in an undisturbed condition for wildlife habitat, fish cover and as a buffer for water quality protection. Permits required for any vegetation removal.
- 2) Protect emergent vegetation.
- 3) Maintain the current fish and wildlife habitat
- 4) Do not remove fallen trees along the shoreline, leave in water for habitat.
- 5) No shoreline erosion control needed, site is protected by aquatic vegetation and shoreline vegetation. No permits will be issued for rip-rap or retaining walls, etc.
- 6) No permit approval for pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects.
- 7) No dredging or lake bed removal or modifications.
- 8) Piers currently located in site, new pier placement by permit only.
- 9) One boat ramp is located at site, no additional boat ramps needed.
- 10) No recreational floating devices.