2020

Critical Habitat Area Designation: Lake Ripley, Jefferson County, Wisconsin

Susan Graham and Jeanne Scherer
Wisconsin Department of Natural Resources, South Central Region
2/6/2020

Table of Contents

Acknowledgements

The following individuals assisted with field work, data assessment and editing of this report:
Susan Graham, WDNR SCR Lakes Management Coordinator
Jeanne Scherer, WDNR SCR Water Resources Management Specialist
Laura Stremick-Thompson, WDNR SCR Fisheries Biologist
Travis Schroeder, WDNR SCR Water Management Specialist
Mark Witecha, WDNR SCR Wildlife Biologist
Sumner Mattson, WDNR Conservation Biologist
Kim Grveles, WDNR Ecologist
Patricia Cicero, JCLWCD Water Resources Management Specialist
Lisa Griffin, Former LRMD Lake Manager
Lianna Spencer, former LRMD Intern and Volunteer; current Lake Researcher for LRMD
Lindsey Schreiner, Volunteer; UW-Whitewater
Beth Gehred, LRMD Lake Manager

WDNR=Wisconsin Department of Natural Resources. SCR=Southcentral Region. JCLWCD=Jefferson County Land and Water Conservation District. LRMD=Lake Ripley Management District.

Thanks also to Dave Winston, WDNR Data Services Specialist, for creating the Critical Habitat site maps.

Photo credits:
Carrie Bohn*
Danielle Lund*
Jenna Neumiller*
Jeanne Scherer
Nikki Smithback*
Dawn Weisto*
Linda Winn*
John Molinaro*

*Thank you to the Lake Ripley Management District for sharing many photos found in this report. Many were the result of a LRMD photo contest in 2011 and others are from their collection used on Facebook, newsletters and other media. All were taken at Lake Ripley itself.
Note: A detailed description of the Critical Habitat Designation program, associated methods, and the values of Critical Habitat can be found at http://dnr.wi.gov/lakes/criticalhabitat/. Detailed assessments of each Critical Habitat area including raw sampling data and GIS shape files are available by contacting the Fitchburg DNR office.

Introduction

What is a Critical Habitat Designation?

Critical Habitat Designation (CHD) methodology provides 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. The CHD will provide a framework for management decisions that impact the ecosystem and health of the lake.

Places in a lake are designated as Critical Habitat if they have Public Rights Features, or Sensitive Areas. Public Rights Features (defined in NR 1.06 (5)(a-d), Wis. Adm. Code) are areas that fulfill the right of the public for navigation, quality and quantity of water, fishing, swimming or natural scenic beauty (see Appendix A for details). Sensitive Areas (defined in NR 107.05(3)(i)(1), Wis. Adm. Code) "…offer critical or unique fish and wildlife habitat, including seasonal or lifestage requirements, or offering water quality or erosion control benefits to the area." This code provides the Wisconsin Department of Natural Resources (DNR) the authority for the identification and protection of sensitive areas in a lake.

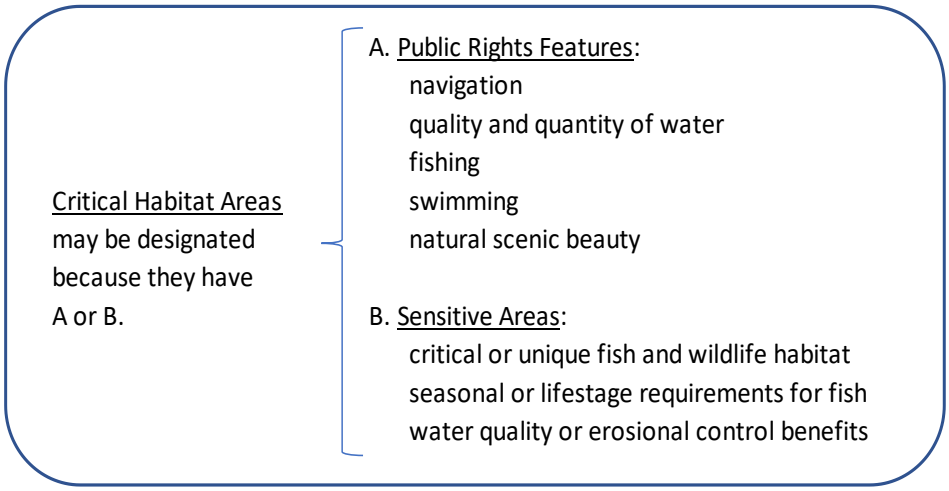


Figure 1. Critical Habitat Areas can include either Public Rights Features or Sensitive Areas

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 nearshore buffer zone 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. The littoral zone is found in shallow areas where sunlight reaches the lake bottom and provides enough light for plants to grow. Protecting the littoral zone and its plant communities is critical for fish, wildlife, and invertebrates that feed upon the emergent and submergent vegetation (Fig. 2).

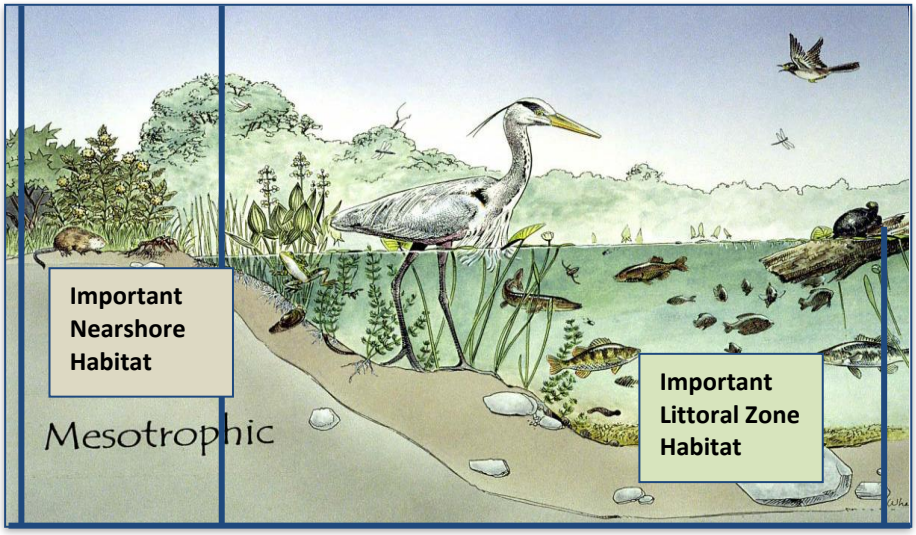


Figure 2. Location of important nearshore habitat and shallow water habitat about which Critical Habitat Designations are most concerned. Like the illustration, Lake Ripley is considered a mesotrophic lake (see "Lake Ripley Background" below).

The Critical Habitat Designation provides good information for lake and ecosystem management decisions for the DNR, other state agencies, and local agencies such as Jefferson County Planning and Zoning and the Lake Ripley Management District.

Ultimately, the goal of this study is to protect public rights on Lake Ripley, including water quality, healthy fish and wildlife, natural or screened shorelines and beneficial aquatic plants that help water quality, prevent erosion, reduce invasion by new exotic plants and animals, and support a healthy fishery.

Does This Program Affect Waterfront Owners?

Critical Habitat Designations provide advance information to waterfront owners to clarify the regulations that will apply when they want to do a construction project or activity along their shoreline. If a project is proposed in a CHD area, the permit jurisdiction or the permit process may change. This allows DNR to ensure that proposed projects will not harm these sensitive resources. This does not mean these activities will be prohibited, but that they will undergo more careful review to ensure that the activity does not adversely affect the critical habitat in the area.

Here are some examples:

- Grading – DNR permits are required for any project that involves more than 10,000 square feet of land disturbance on the bank of a waterway (typically within 75 feet of the bank). If the project is located in a CHD area, the permit jurisdiction changes to include all areas within 300 feet of the shoreline.
- Structures - Some projects to place structures in a waterway are exempt, and don't require a DNR permit. However, if the project is located in a designated CHD area, a general permit or individual permit may be required. For example, riprap repair or replacement can be exempt from permitting if specific design criteria are met. However, repair or replacement of existing riprap within or adjacent to a Sensitive Area is not exempt and requires a permit. Additionally, Sensitive Area designations are a consideration in the analysis of individual permit applications.
- Aquatic Plant Management - DNR may deny permits for chemical treatment for aquatic plant management if the proposed chemical application is in a Sensitive Area, unless DNR determines that it can occur without ecological impacts. Manual removal of plants is normally exempt from a permit if the removal is within a single area along a 30' length of shoreline provided the area includes any piers, swim rafts, boatlifts, and other recreational and water use devices (NR109.06 (2)). However, manual removal within a Sensitive Area is not exempt and is subject to permit requirements.
- Piers - If a lake front property owner wants to place a pier within a CHD, DNR staff work with the property owner to design the pier in a manner that does not adversely impact the area. This may mean that the pier extends to a greater depth out past a high quality fish spawning area or the pier is positioned to one side of the property where the impact would be minimized.

Lake Ripley Background

Lake Ripley is a 420 acre, glacial, compound kettle lake in the end moraine in the Town of Oakland in Jefferson County. The lake is situated within the Lower Koshkonong Creek watershed of the Lower Rock River Basin. The lake has one inlet and one uncontrolled outlet that drains to Koshkonong Creek over a low-head, rubble sill, referred to locally as a dam. The water body has a maximum depth of 44 feet, a mean depth of 18feet, a volume of 7,524 acre-feet, and has 4.85 miles of shoreline. Approximately 34% of the lake's surface area is less than five feet deep, while about 41% is greater than 20 feet deep. The lake has extensive shallow areas that support rooted aquatic plant growth, and contains a single deep basin near its center.

Lake Ripley is a heavily-used public resource for activities including fishing, boating and outdoor water recreation. Visitors have access to the lake from a public boat landing located on the south shoreline, a private marina, a public pier, and a public beach.

One measure of a lake's health is the trophic state, which relates to the amount of algae in the water. The average summer trophic state for the last five years was 49 (mesotrophic) and was determined using chlorophyll data. For a Deep Lowland lake, this is considered "Good." The Deep Lowland lake designation is based on the state's Natural Communities Determination. These lakes stratify, forming separate layers of water due to temperature variations during the summer months and have watersheds greater than four square miles in area. Lake Ripley's watershed is just over seven square miles. Most of the watershed is rural; however, the lake shore is primarily residential with 90% of the residences within a quarter mile of the lake.

Lake Ripley has areas that support fish and wildlife and harbor high-quality plant communities that protect water quality in the lake. The lake and watershed contain numerous endangered, threatened, and/or special concern species.

Lake Ripley Critical Habitat Designation Study

Determination

The Department of Natural Resources has determined that nine specific areas in Lake Ripley contain Critical Habitat that ensure a healthy aquatic system and maintain the public rights features of the lake (Fig. 2). Three of these areas are classified as Sensitive Areas for their aquatic vegetation and six areas are classified as Other Public Rights Features (Other PRF) for containing reaches of shore that are predominately natural in appearance or that screen man-made or artificial features, and/or have fish and wildlife habitat values. All nine areas are classified as Public Rights Features (PRF). While aquatic vegetation was present at all sites during surveys, only those areas with the most diverse native aquatic vegetation and high species diversity were classified as Sensitive Areas.

General Recommendations for Lake Ripley

Lake Ripley currently supports diverse biological communities important to the health of the lake. Steps should be taken to protect the habitat already present in the lake and to add habitat presently deficient in the lake. The Critical Habitat Study of Lake Ripley produced the following general recommendations for promoting and protecting the health of the lake:

1. Ensure aquatic plant management (for example, mechanical harvesting, herbicides, or manual removal) will not adversely affect native plant populations to protect fish and wildlife habitat, and only use methods that avoid suspension of sediment and reduce disturbance which promotes conditions ideal for new invasive species;
2. Encourage bioengineering alternatives to shoreline stabilization instead of riprap where feasible and ensure appropriate installation methods;

3. Prevent degradation of adjacent wetlands to maintain cover, feeding opportunities, and spawning habitat for fish and wildlife and to reduce the opportunity for new invasive plants to become established;
4. Maintain aquatic invasive species signs at all boat landings and maintain a WDNR Clean Boats, Clean Waters watercraft inspection program to educate lake users about protecting the lake from new invasive species introductions;
5. Limit the location and dimensions of grading on the banks, dredging, placement of pea gravel beds or sand blankets, boat ramps, new or replacement piers, recreational devices such as rafts, inflatables or trampolines, and shoreline erosion control (subject to site-specific wave energy calculations) to protect water quality, fish, and wildlife habitat and natural appearance;
6. When piers are constructed or replaced, they should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.
7. Increase structural habitat in the water, such as additional “fish sticks” (large trees intentionally placed in the water to benefit the fish communities) since woody habitat is scarce in this lake;
8. Maintain overhanging trees, shrubs and fallen trees along the shoreline and natural boulders in the water for fish and wildlife habitat;
9. Maintain standing dead or dying trees (snag and cavity trees) for cavity nesting birds and other wildlife, as well as canopy trees for roosting and perching of birds;
10. Encourage lakefront property owners to plant native vegetation (trees, shrubs, perennial forbs, and grasses) as a buffer zone to protect fish and wildlife habitat, screen development, reduce shoreline erosion and reduce the runoff of nutrients and other pollutants that affect water quality;
11. Update the Aquatic Plant Management Plan every 5 years to reflect current plant populations, lake conditions, and emerging management techniques, including those for invasive species.

Map of Lake Ripley Critical Habitat Areas

Figure 3. Lake Ripley Critical Habitat (Public Rights Features).
http://dnrintranetmaps.enterprise.wistate.us/sl/?Viewer=intSWDV&Project=c88fea46-e96f-4e18-a576-289aa838bee7

Value of Critical Habitat Area LR_1

Area LR_1 encompasses most of Milwaukee Bay in the southeast corner of the lake and includes the inlet channel entering the lake at the southeast corner of the bay. The northwestern start point is at 42.997312, -88.98664 and ends at northeastern point 42.9991, -88.9807. Area LR_1 is classified as a Sensitive Area due to its high diversity of aquatic vegetation, which provides fish, waterfowl, song bird and other wildlife habitat and water quality benefits (Fig. 3, Fig. 4). This area represents a substantial portion of Lake Ripley's remaining natural (i.e. undeveloped) shoreline. It is characterized by a relatively diverse native plant community and comparatively less shoreline development than other parts of the lake. With the exception of a residential area about 400 feet in length, wetlands border the shoreline of Area LR_1. The unnamed inlet to Lake Ripley flows through the wetland. The area is largely protected from motorboat disturbance through a slow-no-wake regulation. It is popular for kayaking, canoeing, and slow boating to enjoy the natural views and wildlife observation.

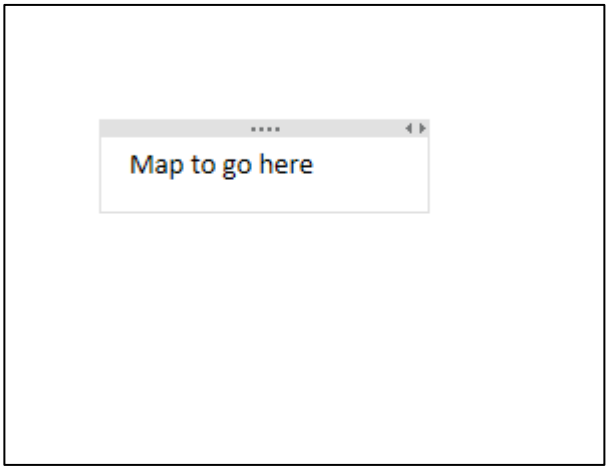


Figure 4. Lake Ripley Critical Habitat Area LR_1 west side.

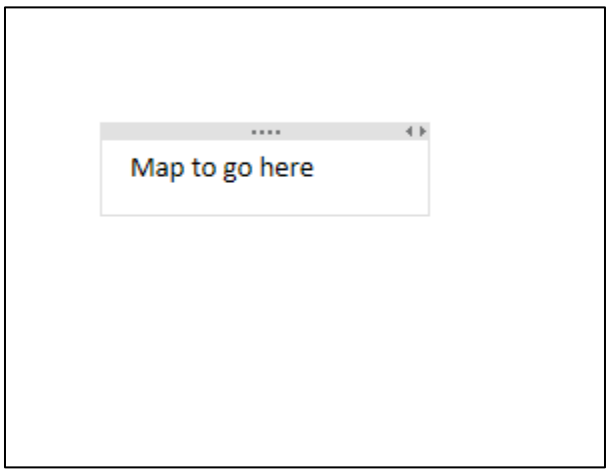


Figure 5. Lake Ripley Critical Habitat Area LR_1 east side.

Aquatic Plant Community:

During the 2006, 2011 and 2015 plant surveys, a total of 19 species of aquatic plants were observed in this area. *Chara* species, coontail, spiny naiad, and sago pondweed were most common in the bay with Fries' pondweed, elodea, and bladderwort also observed. Throughout the bay, these plants often occurred together with several species growing at each survey point. White water lilies, spatterdock, and emergent vegetation, such as water willow and cattails were also observed in the area. The only bulrush beds in the lake are located near the northwestern starting point of LR_1. The two beds are side by side, covering a combined 1,200 square foot area in 2015. During a 2008 survey they were measured as a single bed of 990 square feet. The plant beds provide a biological buffer, reducing the possibility that introduced exotic plant species could become established. It is important to keep this area's native plant community healthy by eliminating disturbance that could open new areas of the lake bottom where invasive plants can take root.

The invasive species Eurasian water milfoil and curly leaf pondweed are also present in this area, though the amount of both has decreased in recent years. Mechanical harvesting occurs in the bay for controlling invasive species and improving navigation, providing two channels through the thick plant beds. Phragmites was noted during the 2015 survey on the western side of the marsh, but it appeared to be the native species which is not considered invasive.

Wildlife Habitat:

This area is one of the most significant wildlife habitats for the lake. Dragonflies and damselflies lay eggs on the floating vegetation. These and other insects, along with their eggs and larvae, become food for birds and fish. A tamarack bog lines the lake along the western edge of the bay. Cattails and water willow edge the shoreline of the bay and inlet. Marsh milkweed, red and grey dogwood, and cedar are also present. The wetlands in this area provide habitat for amphibians, reptiles, fish, and other wildlife,

and includes nesting areas for turtles. Common musk, common snapping, spiny softshell, and painted turtles have been documented to occur in this area. The wetlands contain nesting areas for waterfowl, including Sora rail which have been heard calling in this area. Snags in the marsh provide roosting for birds. Green herons, killdeer, gulls, ducks, geese, grebes, and other birds have all been noted in the bay and wetlands. Bald eagles have been photographed at the lake and may use this area for hunting. There is potential habitat for the Endangered (state listed) black tern and Special Concern (state listed) Blanding's turtle which have historically been noted in the watershed and other nearby watersheds. The wetlands provide habitat for beaver, otter and mink.

Fish Habitat:

Fishery surveys have regularly found higher numbers of fish and higher diversity of fish species in Milwaukee Bay and the south bay relative to the rest of the lake. The presence of submersed, floating-leaved and emergent vegetation is a key element providing cover, spawning sites and structure for fish. Water lilies are particularly abundant and provide important spawning and rearing areas for largemouth bass. The emergent vegetation (bulrush beds) present in this area serve as important habitat for spawning largemouth bass. Panfish, such as pumpkinseeds also frequent the adjacent wetlands.

Three sampling points in Milwaukee Bay were included in an assessment of nearshore fish populations conducted by WDNR in 2012. Eight nearshore species of fish were noted by seining and electroshocking during the assessment, including an abundance of golden shiners. Native crayfish were also caught. The submergent and floating vegetation provides summer spawning, summer, fall and winter nursery areas, feeding areas and protective cover for largemouth bass, bluegill, pumpkinseed, yellow perch and rock bass. The aquatic plant species also provide food and cover for fish and wildlife, as well as shelter for invertebrates that provide food for fish.

Substrate:

The substrate was documented at several transects in this area. Aside from the start and end points of the area, the substrate within 50 feet of shore is primarily combinations of silt, clay, marl and detritus. Such combinations are also referred to as muck, which is not significant for spawning substrate. The start point on the northwestern edge of the bay has some small boulder, large and small gravel, and sandy substrates usable for fish spawning. The northeastern edge of the area's shoreline has large boulder riprap which quickly changes lakeward to gravels and sand until becoming primarily sand and marl about 30 feet from shore.

Water Quality:

The wetlands filter water entering the lake in this area and contribute to its natural scenic beauty. The plants in the bay also act as a filter for nutrients and sediment entering the lake through the inlet channel. The submergent and emergent vegetation slows incoming water, allowing suspended particles to settle out of the water, and absorbs nutrients from the inflow, helping to prevent algal blooms in the lake. Floating and emergent plants reduce the impacts of erosive wave action along the shoreline.

Recommendations for Area LR_1

1. Minimize disturbance to existing aquatic plants and substrates to support the growth of native plants, and reduce spread of invasives;
2. Allow only aquatic plant management control techniques that are selective for invasive species;
3. Survey the shoreline annually for new non-native species;
4. Permit no disturbance of the adjacent wetlands, for example by allowing piers, to reduce shoreline erosion, maintain spawning and cover habitat for fish, and to help maintain water quality;
5. Encourage homeowners to install native 3-story vegetative buffers of at least 35’ in width along their shorelines; maintain and widen native 3-story vegetative buffers; establish native shrubs throughout their landscapes;
6. Secure trees and shrubs that fall into the water; consider adding “fish sticks” projects specifically permitted and designed to add coarse wood to the lake for fish habitat;
7. When piers are constructed or replaced, they should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds;
8. No dredging to prevent disruption of fish and wildlife habitat;

Conduct a comprehensive study of plants and wildlife within the inlet channel and the wetland with property owner permission.

Value of Critical Habitat Area LR_2

Area LR_2 lies along the southeast shore of the lake, north of Milwaukee Bay (Fig. 5, Fig. 6). The eastern start point is 43.0000, -88.9812 and the western end point at 43.0005, -88.9840. Area LR_2 is classified as an Other Public Rights Feature (Other PRF) due the presence of fish habitat. The area encompasses approximately 800 feet of shoreline. Overhanging vegetation which provides a bit of shade and bird and insect habitat is present, but it is limited.

Aquatic Plant Community:

Fourteen species of submerged aquatic plants have been documented in this area in the 2006, 2011 and 2015 surveys. The plant community varied greatly in both diversity and abundance from survey to survey. *Chara* species, sago, and coontail were the most common species with Fries' pondweed, white and yellow water lilies, Illinois pondweed and eel grass (also known as water celery) observed, also. Flatstem pondweed was noted during the 2015 wood and substrate survey but hadn't been found during plant surveys. A small amount of Eurasian watermilfoil was found in 2011, however, no invasive plants were found in 2006 and 2015. It is important to keep this area's native plant community healthy by avoiding disturbance that could open new areas of the lake bottom for invasive plants to exploit.

Wildlife Habitat:

The shoreline in this area has been completely developed with residential housing. Much of the shoreline has been lined with riprap. Native gardens of flowers, small trees, shrubs, and grasses as well as other naturally growing plants, such as cattails, form a buffer strip approximately 20-feet deep in and above the riprap for approximately 500 feet including access corridors for pier access. Overhanging vegetation is limited. Mature oak, river birch and poplar trees near the shore provide habitat for birds and wildlife, but at the time of the surveys no shrub layer existed on the 300' of mowed lawns. Riprap is present along the entire shoreline, generally 3-5 feet landward from the Ordinary High Water Mark and extends into the water. Though it may be important protection against erosion, riprap is not ideal for wildlife habitat. Due to the high number of turtles noted in Milwaukee Bay, the uplands may attract nesting turtles. Emergent plants include cattails and pickerel weed which has flowers that attract pollinators.

Fish Habitat:

Fish habitat is the primary reason for an Other Public Rights Feature designation for this area. The aquatic plant species provide cover for fish and shelter invertebrates that provide food for fish. The sand, cobble and gravel substrate provide spawning areas for fish.
Moving from east to west, substrates quickly change from marl and sand to cobble and gravel with some sand or sand/marl. There are occasional shoreward bands of sand/marl between gravel/cobble areas.

Water Quality:

Although there is a 20-foot buffer strip along approximately 500 of the 800 feet of the shoreline which helps to reduce nutrient runoff from uplands to the lake, enlarging the buffer would provide even greater protection to water quality. Adding more shrubs along the lake shore and upland would also reduce the impact of surface water runoff and erosion impacts as rain is slowed by its movement through a tiered

system of large trees, shrubs, sedges and grasses. Slowing the movement of rain allows more time for the water to soak into the soil rather than run off into the lake.

Recommendations for Area LR_2:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;
3. No dredging or lake bed removal or modifications;
4. Encourage homeowners to maintain and widen native vegetation buffers to at least 35’ and to establish native shrubs throughout their landscapes;
5. Secure trees and shrubs that fall into the water;
6. Plant new trees and shrubs along shoreline;
7. When piers are constructed or replaced, they should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.;
8. Deny permits for swim rafts and inflatables to maintain in-lake habitat.

Value of Critical Habitat Area LR_3

Area LR_3 occupies approximately 150 feet of shoreline along the eastern shore of Lake Ripley (Fig. 7). This area is classified as an Other Public Rights Feature due to natural scenic beauty, and fish and wildlife habitat. The south start point is at the end of a seawall: 43.0013, -88.9854. The north end point is 43.0017, -88.9856 where there is currently old fieldstone and broken cinderblocks located before the next property's riprap. Area LR_3 is situated in front of a single home property with one simple pier. There is one small outfall pipe. The shoreline is a steeply sloped hill of approximately ten to fifteen feet, creating erosion concerns in this area. Large trees in the buffer zone and upland, including oak, maple, poplar, cedar and mulberry, reduce the impact of rain and provide habitat for terrestrial wildlife.

Aquatic Plant Community:

Few aquatic plants were found in this area in 2015, although sago and Illinois pondweed were both found during the 2006 plant survey. *Chara* species, coontail, eel grass, Fries' pondweed, and Northern watermilfoil were found in 2011. It is important to keep this area's native plant community healthy by eliminating disturbance that could open new areas of the lake bottom where invasive plants can take root. Even if some plant species were not found in 2015, the area has potential for more species.

Wildlife Habitat:

A woodland with shrubs line the lake in this section, providing one of the few stretches of wooded shoreline in the eastern half of the lake. Basswood is present both as mature trees and shrubby saplings. Numerous shrubs and trees hang over and into the water, providing shade and structural habitat for fish and wildlife. This is one of the few areas of the lake where overhanging vegetation provides this type of habitat. The bank at this site is undercut and eroded in some areas, but root masses provide some stability.

Fish Habitat:

Rocky substrate is rare in Lake Ripley, making this a critical area for fish, such as walleye, that rely on rocky substrate for spawning habitat. Young largemouth bass were observedby DNR staff at this site in 2008. During fish surveys, sunfish have been often been found underneath the overhanging vegetation. The aquatic plant species provide food and cover for fish and wildlife, as well as shelter for invertebrates that provide food for fish.
Substrate: The substrate in this area consists of cobble-sized rock scattered throughout with small and large gravels embedded in sand for approximately 16 feet lakeward from shore. Beyond the 16 foot point, substrate is approximately 40% sand, 40% marl and 20% small gravel. Embeddedness is greatest at the start and end points of the shoreline length but moderate in between them.

Water Quality:

In addition to providing habitat for fish and wildlife, the wooded shoreline also acts as a buffer, helping to prevent nutrients and pollutants from entering the lake. The trees, shrubs and herbaceous plants along the shore slow and intercept rain and snowmelt, and root channels increase soil infiltration, reducing the amount of runoff that reaches the lake directly. This allows the vegetation and soil to remove nutrients from the runoff, reducing the nutrient load to the lake.

Recommendations for Area LR_3:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;
3. No dredging or lake bed removal or modifications;
4. Maintain and add trees, shrubs, and herbaceous plants along shoreline;
5. Secure trees and shrubs that fall into the water and consider adding “fish sticks” projects specifically permitted and designed to add coarse woody material to the lake for fish habitat;
6. Maintain dead and dying trees for cavity nesting animals/birds and perching where safe to do so;
7. Control non-native plants on shore, while removing and replacing them with native trees, shrubs and plants, using best management practices to reduce erosion as they grow and become well established;
8. Stabilize and restore the undercut shoreline using bioengineering bank stabilization techniques;
9. If the pier is replaced, it should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.

Value of Critical Habitat Area LR_4

Area LR_4 encompasses approximately 750 to 800 feet of shoreline in the northeast area of the lake (Fig. 8, Fig. 9). Area LR_4 is classified as an Other Public Rights Feature due to its natural scenic beauty and fish and wildlife habitat. The south most point is 43.0066, -88.9901 and the north most point is at 43.0079, -88.9920. There are five homes in the upland area. The shoreline is sloped. There is also a private boat ramp at the southernmost property's south property line.

Aquatic Plant Community:

Thirteen aquatic plant species were documented in this area during the 2006, 2011, and 2015 plant surveys. An additional species, floating-leaf pondweed, was noted during the wood and substrate surveys in 2008 and 2015. White and yellow water lilies are occasionally present. *Chara* species dominate the plant community. Eurasian watermilfoil has been observed at very low levels. It is important to keep this area's native plant community healthy by eliminating disturbance that could open new areas of the lake bottom where invasive plants can take root.

Habitat:

The shoreline has had several changes since the initial 2008 shoreline? survey. In 2008, all but 32 feet of shoreline had three-tiers of vegetation (trees, shrubs and non-woody plants). By 2015, more than 300 feet of natural vegetation have been removed, leaving some large trees, but little shrub and herbaceous cover in the removal areas. However, there are still wide expanses of three-tier vegetation. The numerous shrubs and trees that hang over and into the water provide shade and structural habitat for fish and wildlife. Large mature trees, shrubs and herbaceous plants make up at least 50% of the shoreline buffer zone. The shoreline and upland trees include burr oak, basswood, willow, green ash, pine and poplar. These trees benefit mammals in particular, by providing cover and/or forage for squirrels, deer, and mink. Large invasive buckthorn and black locust are also present. Riprap lined the shoreline except that at the north-most property at the time of the 2015 survey.

Fish Habitat:

Numerous sunfish have been found in this area during fish surveys. The 2012 nearshore fish assessment found Johnny darter, fantail darter, bluegill, yellow bullhead, largemouth bass, and bluntnose minnow. In 2008, no coarse woody habitat for fish habitat was found in the water. In 2015, four small trees (up to 15 feet) were documented in the water perpendicular to the shore. Numerous trees and shrubs hang over and into the water, providing shade and structural habitat for fish. The aquatic plant species provide food and cover for fish and wildlife, as well as shelter for invertebrates that provide food for fish.
Substrate: Primarily gravels with bands of cobble perpendicular to the shoreline that extend 16-20 feet lakeward.

Water Quality:

In addition to providing habitat for fish and wildlife, the wooded shoreline also acts as a buffer, helping to prevent nutrients and pollutants from entering the lake. The trees, shrubs and herbaceous plants

along the shore slow and intercept rain and snowmelt, and root channels increase soil infiltration, reducing the amount of runoff that reaches the lake.

Recommendations for Area LR_4:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;
3. No dredging or lake bed removal or modifications;
4. Encourage homeowners to maintain and widen native vegetation buffers to at least 35’ and to establish native shrubs throughout their landscapes;
5. Maintain dead and dying trees for cavity nesting animals/birds and perching where safe to do so;
6. Maintain and add trees and shrubs along shoreline;
7. Secure trees and shrubs that fall into the water and consider adding “fish sticks” projects specifically permitted and designed to add coarse woody material to the lake for fish habitat;
8. Control non-native plants on shore, while removing and replacing them with native trees, shrubs and plants, using best management practices to reduce erosion as they grow and become well established;
9. If the pier is replaced, it should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.

Value of Critical Habitat Area LR_5

Area LR_5 is on the western shore of Lake Ripley (Fig. 10, Fig. 11). The area occupies approximately 300 feet of shoreline, extends from shore to 100 feet lakeward, and includes the unnamed Lake Ripley outlet. The northeast most point is the west end of the nearest seawall: 43.00075, -89.0001. The southwest most point is at 43.0069, -89. 0008. Area LR_5 is classified as an Other Public Rights Feature due to its natural scenic beauty and fish and wildlife habitat.

Aquatic Plant Community:

This area does not contain abundant native aquatic plants. Some *Chara* species and Illinois pondweed have been noted during surveys. Adjacent to this area, spiny naiad, coontail, *Chara* species, Northern watermilfoil, sago and eel grass have been noted and are available for sheltering fish and invertebrates. No invasive plant species have been found during surveys here or in the adjacent areas. Even though plants here are sparse, it is important to keep this area's native plant community healthy by eliminating disturbance that could open new areas of the lake bottom where invasive plants can take root.

Wildlife Habitat:

Three-tiers of vegetation and overhanging shrubs and trees provide structure and habitat for birds and other wildlife for nesting, shelter and feeding. Throughout much of the area, the vegetative buffer extends thirty or more feet back from the shoreline. Erosion is present on some of the higher banks of the shoreline, although root masses are providing some stability. A small, manmade stone dam exists between the lake and outlet stream, and may allow for the movement of crayfish, provide habitat for other invertebrates, and provide a valuable feeding area for mammals and birds. Eagles have been observed hunting over the outlet when the lake is covered with ice.

Fish Habitat:

Substrate consists of a sand/marl mix. A fish crib was once in place near the dam. There are intermittent patches of riprap, but most of the shoreline is vegetated with some trees hanging far over the water. No submersed coarse woody habitat was found.

Water Quality:

In addition to providing habitat for fish and wildlife, the wooded shoreline also acts as a buffer, helping to prevent nutrients and pollutants from entering the lake. The trees, shrubs and non-woody plants along the shore slow and intercept rain and snowmelt, and root channels increase soil infiltration, reducing the amount of runoff that reach the lake.

Recommendations for Area LR_5:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;

3. No dredging or lake bed removal or modifications;
4. Encourage homeowners to maintain and widen native vegetation buffers to at least 35’ and to establish native shrubs throughout their landscapes;
5. Maintain dead and dying trees for cavity nesting animals/birds and perching where safe to do so;
6. Maintain and add trees and shrubs along shoreline;
7. Secure trees and shrubs that fall into the water and consider adding “fish sticks” projects specifically permitted and designed to add coarse woody material to the lake for fish habitat;
8. Control non-native plants on shore, while removing and replacing them with native trees, shrubs and plants using best management practices to reduce erosion as they grow and become well established;
9. If the pier is replaced, it should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.
10. Stabilize and restore the undercut shoreline using bioengineering bank stabilization techniques.

Value of Critical Habitat Area LR_6

Area LR_6 is on the western shore of Lake Ripley (Fig. 12, Fig. 13). It encompasses the entire shoreline of the cemetery property, screening the cemetery itself. The area occupies approximately 250 feet of shoreline and extends approximately 325 feet into the lake. Area LR_6 is classified as an Other Public Rights Feature due to its natural scenic beauty and fish and wildlife habitat.

Aquatic Plant Community:

During the 2006, 2011 and 2015 plant surveys, nine species of submerged aquatic vegetation were documented in the area. Although not abundant, *Chara* species dominated the plant community, while northern watermilfoil, Fries' pondweed, and Illinois pondweed have also been present. White water lilies and spatterdock have also been present. These species act as food for waterfowl and provide shelter and food for fish. It is important to keep this area's native plant community healthy by eliminating disturbance that could expose new areas of the lake bottom where invasive plants can take root.

Wildlife Habitat:

This area provides a unique natural shoreline. A ridge from ice heave has formed along the shoreline, leaving a narrow band of sand on the lake side and a swale below a steep hillside on the shoreland side. The swale is a possible habitat for spring ephemeral plants and amphibians. Belted kingfishers have been noted here. This area has good habitat for cavity nesting birds, including song birds which may nest or feed at the site. In the riparian zone, a three-tier mature woodlot borders the lake with no shoreline alterations. No manmade structures are present. Cottonwood, silver maple, highbush cranberry, basswood, oak, and willow trees shade the shore, and numerous branches drape into the water, providing additional shade and structural habitat for fish and wildlife. These trees benefit mammals in particular, by providing cover and/or forage for squirrels, deer, rodents and mink. There is one small, natural tree fall providing some structure in the lake. With a small cattail bog that has settled at the south end of the shoreline, the tree helps form a natural division between the natural area and the beach.

Fish habitat:

The shoreline is quiet and shaded. The aquatic plant species provide food and cover for fish and wildlife, as well as shelter invertebrates that provide food for fish. Additionally, this area has vegetated shallow water habitat that provides one of the few areas of spawning habitat for northern pike outside of Milwaukee Bay.
Substrate is primarily sand and muck, with some small gravel.

Water quality:

In addition to providing habitat for fish and wildlife, the wooded shoreline also acts as a buffer, helping to prevent nutrients and pollutants from entering the lake. The forested landscape slows and intercepts runoff, and root channels increase soil infiltration, reducing the amount of runoff and nutrient pollution that reaches the lake.

Recommendations for Area LR_6:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;
3. No dredging or lake bed removal or modifications;
4. Maintain and add trees and shrubs along shoreline;
5. Secure trees and shrubs that fall into the water and consider adding “fish sticks” projects specifically permitted and designed to add coarse woody material to the lake for fish habitat;
6. Maintain dead and dying trees for cavity nesting animals/birds and perching where safe to do so;
7. Control non-native plants on shore, while removing and replacing them with native trees, shrubs and plants using best management practices to reduce erosion as they grow and become well established;
8. New piers and other manmade structures by permit only;
9. Assess the swale for spring ephemerals and amphibians.

Value of Critical Habitat Area LR_7

Area LR_7 is the only section of shoreline along the western shore that is primarily wetland (Fig. 14). The area extends approximately 550 feet. The north most point is 42.9988, -88.9988. The south most point is 42.99734, -88.99833. Area LR_7 is designated as a Sensitive Area due to its abundant native aquatic vegetation, fish and wildlife habitat, and natural scenic beauty. Approximately 90% of the shoreline is wetland, including two small cottage lots near the south end of the area. One cottage property has an actively managed native shoreline buffer. The other appears primarily natural and unmanaged. There are minimal corridors of mowed lawn at the ends and midsections of the shoreline.

Aquatic Plant Habitat:

During the 2006, 2011, and 2015 plant survey, eleven species of submerged and floating aquatic vegetation were documented in the area, including spiny naiad, bushy pondweed and eel grass. *Chara* species and Illinois pondweed dominate the community. White water lily is also present and has been observed outside of surveys. It is important to keep this area's native plant community healthy by eliminating disturbance that could open new areas of the lake bottom where invasive plants can take root.

Wildlife Habitat:

Emergent wetland vegetation, including cattails, highbush cranberry, and water willow grow along much of the shoreline. Song birds and dragonflies/damselflies are abundant here. Along shore and within the wetland there are some trees, including snags, and shrubs that provide nesting, perching and feeding sites for birds. The wetland provides habitat for beaver, mink and otter as well as nesting areas for turtles which have been seen basking on the wood in the area.

Fish Habitat:

The wetlands provide one of the few areas of spawning habitat for northern pike in the main section of the lake as well as habitat for many other fish and wildlife species. Two downed trees (one of which was brought to the site by the Lake Ripley Management District several years ago) and a root wad were observed in the water at the wetland shoreline. This woody habitat provides habitat for fish and wildlife. Between the cottages and wetland there are willows and shrubs providing overhanging vegetation. The aquatic plant species provide food and cover for fish and wildlife, as well as shelter for invertebrates that provide food for fish.

Due to the very thick *Chara* species beds, it was not possible to fully assess the substrate of this area. Three transects were surveyed. Near the north end of the area, marl was dominant (60%) over sand and silt. Gravel (40%) was present at the north side of the north most cottage. At the south end of the area, the substrate was a nearly equal balance of gravel, silt, sand and marl.

Bass are regularly seen in this area. Grass pickerel have also been found. During the 2012 nearshore fish assessment, nine species were found (178 + fish sampled): bluegill, green sunfish, yellow bullhead, yellow perch, Iowa darter, Johnny darter, largemouth bass, bluntnose minnow, and more than 100 golden shiners.

Water Quality:

The wetlands filter water entering the lake in this area and contribute to its natural scenic beauty. The wetland plants also act as a filter for nutrients and sediment entering the lake helping to prevent algal blooms. Floating and emergent plants reduce the impacts of erosive wave action along the shoreline.

Recommendations for Area LR_7:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;
3. Regularly survey for non-native wetland species;
4. Conduct a comprehensive study of plants and wildlife within the wetland;
5. No dredging or lake bed removal or modifications;
6. Protect the adjacent wetlands to maintain spawning and cover habitat for fish and to help maintain water quality;
7. Encourage homeowners to maintain and widen native vegetation buffers to at least 35’ and to establish native shrubs throughout their landscapes;
8. Maintain and add trees and shrubs along shoreline;
9. Secure trees and shrubs that fall into the water and consider adding additional “fish sticks” projects specifically permitted and designed to add coarse woody habitat to the lake for fish habitat;
10. Maintain and protect the emergent wetland vegetation;
11. When piers are constructed or replaced, they should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.
12. Restrict additional piers or other manmade structures.

Value of Critical Habitat LR_8

Area LR_8 occupies most of South Bay (also referred to as Marina Bay) and includes Vasby's Channel (Fig. 15, Fig. 16). The northwest most point at the shoreline is 42.99463, -88.99580, north of the marina. The northeast most point is 42.9956, -88.9916. Area LR_8 is classified as a Sensitive Area because of its diverse submerged aquatic vegetation, fish and wildlife habitat, natural shoreline, and natural scenic beauty. The area occupies approximately 1,900 feet of shoreline, of lake shoreline, not counting the length of Vasby's Channel, and is largely undeveloped. A conservation easement protects much of the area, and is shown on the map in Appendix X along with a legal description

Aquatic Plant Community:

During the 2006, 2011 and 2015 plant surveys, seventeen species of submerged and floating aquatic vegetation were documented in this area, including Northern watermilfoil, Fries' pondweed, and sago pondweed. Additionally, spatterdock and white water-lilies grow in large patches along much of the shore. *Chara* species, sago, and spiny naiad were dominant in 2015. Eurasian watermilfoil (3 sampling points) and curlyleaf pondweed (1 sampling point) were observed only during the 2011 survey. The Lake Ripley Management District limits harvesting in this area to one navigation channel for the marina as well as one from the Lake Pointe pier when requested. It is important to keep this area's native plant community healthy by eliminating disturbance that could open new areas of the lake bottom where invasive plants can take root.

Wildlife Habitat:

Like Milwaukee Bay, this area is one of the lake's most significant wildlife habitats for the lake. Dragonflies and damselflies lay eggs on the floating vegetation. These and other insects, along with their eggs and larvae, become food for birds and fish. Bulrush was noted along the shoreline along with water willows, Arum arrowhead, swamp milkweed, cattail, willow trees, and boneset. The island formed by Vasby's Channel and the lake includes three-tiers of vegetation on a third of the island. The wetlands in this area provide habitat for amphibians, reptiles, fish, and other wildlife. There are nesting areas for song birds, waterfowl and turtles. Common musk, common snapping and painted turtles have been documented to occur in this area. Snags in the marsh and on the island provide roosting for birds. Bald eagles that have been photographed at the lake may use this area for hunting. There is potential habitat for the Endangered (state listed) black tern and Special Concerns (state listed) Blanding's turtle which have been noted in the watershed and other nearby watersheds historically. The wetlands also provide habitat for beaver, otter and mink.

Fish Habitat:

According to past fishery inventories, the most diverse species assemblage in the lake is consistently found in Lake Ripley's South Bay area. This particular area is also believed to provide the best largemouth bass habitat in the lake. It is characterized by a relatively diverse native plant community and comparatively less shoreline development than other parts of the lake. It is also largely protected from motorboat disturbance through slow-no-wake and no-motor allowed (in Vasby's channel) regulations. The presence of submersed, floating-leaved and emergent vegetation is a key element providing cover, spawning sites

and structure for fish. Water lilies are particularly abundant within the bay, with rhizomes providing the firm substrate needed for bass nesting.

Protecting the plant community of South Bay and its attending fishery by limiting development and imposing slow-no-wake and no motor ordinances are justified. This justification is based on the professional judgment that a disruption of the fishery community of this bay may harm the bass population and ultimately change the fishery resource of the entire lake.

The bay contains large numbers of fish at times, including adult walleye and largemouth bass. Northern pike have been found in Vasby's Channel. Longnose gar, grass pickerel, yellow perch, smallmouth bass, bigmouth buffalo and one special concern species have been documented in this area.

The aquatic plant species provide food and cover for fish and wildlife, as well as shelter for invertebrates that provide food for fish. Overhanging vegetation found along the wooded shoreline in the western part of the area provides shade and structural habitat as well. Three instances of large coarse woody habitat were found in the water in 2015 along with many smaller pieces that may offer some additional structure for fish and wildlife.

Substrate: Eight transects were surveyed. Each transect consisted primarily of muck made up of marl, clay, silt and detritus.

Water Quality:

Except for the marina near the western boundary, the entire shoreline in this area remains in a natural wetland state. These wetlands protect water quality in the lake by reducing and filtering nutrients from runoff, as well as providing habitat for wildlife and fish. They also contribute to the area's natural scenic beauty.

Recommendations for Area LR_8:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;
3. Regularly survey for non-native wetland species;
4. Protect the adjacent wetlands to maintain spawning and cover habitat for fish and to help maintain water quality;
5. Encourage homeowners to maintain and widen native vegetation buffers to at least 35' wide along the shoreline and to establish native shrubs throughout their landscapes;
6. Maintain and add trees and shrubs along shoreline;
7. Secure trees and shrubs that fall into the water and consider adding "fish sticks" projects specifically permitted and designed to add coarse woody material to the lake for fish habitat;
8. Maintain and protect the emergent wetland vegetation;
9. When piers are constructed or replaced, they should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing

platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.

10. No dredging or lake bed removal or modifications;
11. Limit the area and location of dredging in Vasby's Channel to prevent disruption of fish and wildlife habitat;
12. Conduct a comprehensive survey of plants, wildlife and aquatic invasive species within the wetland about every 5 years.

Value of Critical Habitat Area LR_9

Area LR_9 occupies the shoreline along the southern end of the lake between the southwest bay and Milwaukee Bay (Fig. 17). Area LR-9 is classified as an Other Public Rights Feature for fish and wildlife habitat and natural scenic beauty. The area begins at the western property line of the Hoard and Curtis Scout Camp and ends at the eastern property line, at approximate GPS points 42.9966, -88.9910 and 42.99787, -88.9883. The area encompasses approximately 1,000 feet of shoreline. Aside from a single small pier and beach, development consists of simple campground structures on top of the hill, high above the shoreline. The shoreline has three tiers of vegetation beginning at the picnic area on the western side of the property and extending to the eastern property line. This area's abundant terrestrial and aquatic vegetation, rocky bottom, and lack of development provides fish, bird, invertebrate and other wildlife habitat for nesting, feeding and shelter.

Aquatic Plant Community:

During the 2006, 2011 and 2015 plant survey, plant species documented included: *Chara* species, sago pondweed, Fries' pondweed, Illinois pondweed, floating-leaf pondweed, spiny naiad, and eel grass. It is important to keep this area's native plant community healthy by eliminating disturbance that could open new areas of the lake bottom where invasive plants can take root.

Wildlife Habitat:

The entire shoreline, except for the beach which is x feet long, of this area remains in a natural, wooded state. Catalpa, mountain ash, willow, dogwood, and basswood grow along the bank, shading the water. In some places, this vegetation hangs into the water providing structural habitat for fish and wildlife. In 2010 and 2011, extensive restoration work took place along the shoreline and on the steep hillside. The work included removal of invasive trees, shrubs and plants; planting native shoreline vegetation to the top of the hill; and installing new rock riprap along the entire shoreline. Native crayfish were noted here during the 2015 wood survey. Great blue heron and many other birds frequent the shoreline and woods. The area has shelter, nesting and feeding areas for songbirds, and tall perching trees for hunting raptors. Large trees in the water also provide perching areas for birds and basking sites for turtles.

Fish Habitat:

This area has the most large, coarse woody habitat for fish in the lake and there are currently six tree falls (varying from 18-45 feet long and 6-11 inches in diameter) anchored to the shore that were installed in 2014 by the Lake Ripley Management District as part of a permitted "fish sticks" project aimed to increase in-lake fish habitat. Large and small boulder-sized riprap extends 5-6 feet lakeward along the shoreline aside from a small beach. Beyond the riprap, the substrate in the area consists of bands of cobbles, various sized gravel, sand and marl, providing spawning habitat for fish such as rock bass and walleye. The 2012 Assessment of Nearshore Fish Populations Survey rated this area as having high species richness and total habitat value.

Water Quality:

Although the shoreline lies below the very steep slope of a high hill with a few structures at the top, natural vegetation, both planted and existing naturally, greatly reduce the potential for erosion by slowing the impact of rain and increasing the opportunity of infiltration of rain and snowmelt. The shoreline stabilization work, completed by Lake Ripley Management District in 2010, incorporates rock, boulders and native vegetation and limits erosion to the lake by providing a physical buffer to runoff.

Recommendations for Area LR_9:

1. Keep presence of aquatic invasive species low by minimizing disturbance to existing aquatic plants and substrates;
2. Allow only aquatic plant management techniques selective for exotics and minimize treatment and removal of native aquatic plants to promote fish and wildlife habitat;
3. Continue to improve and maintain existing wildlife habitat (trees, shrubs, and non-woody plants), including terrestrial invasive removal in the shoreline buffer;
4. Maintain fallen trees and large woody habitat in the water for fish and wildlife habitat and consider additional “fish sticks” projects specifically permitted and designed to add coarse woody material to the lake for fish habitat;
5. Maintain dead and dying trees for cavity nesting animals/birds and perching where safe to do so;
6. No dredging or lake bed removal or modifications;
12. Restrict additional piers (currently there is one small pier for the camp and a launch site for the LRMD harvester), When the existing pier is replaced, it should be constructed to reduce detrimental impacts on aquatic plants. For instance, reduce shading of plants by placing piers high above the water, made of slats (instead of a totally solid surface) or minimal in size (especially any landing platforms); or when there are areas of varying plant diversity along a riparian property, the pier should be located away from the healthiest plant beds.
7. Recommend no permits for recreational floating devices, such as rafts and multi-person inflatables.

Appendix A. Summary of Public Rights Features including Sensitive Areas; and their Applicable Activity-Based Laws

Public rights features are:

(a) Fish and wildlife habitat, including specific sites necessary for breeding, nesting, nursery and feeding.

Note: Physical features constituting fish and wildlife habitat include stands of aquatic plants; riffles and pools in streams; undercut banks with overhanging vegetation or that are vegetated above; areas of lake or streambed where fish nests are visible; large woody cover.

(b) Physical features of lakes and streams that ensure protection of water quality.

Note: Physical features that protect water quality include stands of aquatic plants (that protect against erosion and so minimize sedimentation), natural streambed features such as riffles or boulders (that cause turbulent stream flow and so provide aeration).

(c) Reaches of bank, shore or bed that are predominantly natural in appearance (not man−made or artificial) or that screen man−made or artificial features.

Note: Reaches include those with stands of vegetation that include intermixed trees, shrubs and grasses; stands of mature pines or other conifer species; bog fringe; bluffs rising from the water's edge; beds of emergent plants such as wild rice, wild celery, reeds, arrowhead.

(d) Navigation thoroughfares or areas traditionally used for navigation during recreational boating, angling, hunting or enjoyment of natural scenic beauty.

Note: Physical features indicative of navigation thoroughfares include shallow water areas typically used by wading anglers or areas frequently occupied by regularly repeated public uses such as water shows.

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

Note: Public Rights Features Designations by rule always include sensitive areas (sensitive areas are one subset of Public Rights Features), however some laws specifically address only Sensitive Areas. Laws which apply only to sensitive areas are denoted by the following symbol:

Chapter NR 107- Aquatic Plant Management. Any person sponsoring or conducting chemical treatment for the management of aquatic plants or control of other aquatic organisms in waters of the state shall obtain a permit from the department. Waters of the state include those portions of Lake Michigan and Lake Superior, and all lakes, bays, rivers, streams, springs, ponds, wells, impounding reservoirs, marshes, watercourses, drainage systems and other ground or surface water, natural or artificial, public or private, within the state or its jurisdiction as specified in s. 281.01 (18), Stats. The department may deny issuance of chemical treatment permits for aquatic plant management if the proposed chemical application is in locations identified by the department as sensitive areas, except when the applicant demonstrates to the satisfaction of the department that treatments can be conducted in a manner that will not alter the ecological character or reduce the ecological value of the area.

Chapter NR 109- Aquatic Plants: Introduction, Manual Removal, and Mechanical Control Regulations. The purpose of this chapter is to establish procedures and requirements for the protection and regulation of aquatic plants pursuant to ss. 23.24 and 30.715, Stats. Diverse and stable communities of native aquatic plants are recognized to be a vital and necessary component of a healthy aquatic ecosystem. This chapter establishes procedures and requirements for issuing aquatic plant management

permits for introduction of aquatic plants or control of aquatic plants by manual removal, burning, use of mechanical means or plant inhibitors. The department may deny issuance of the requested permit if the department determines the proposed introduction or control is in locations identified by the department as sensitive areas, under s. NR 107.05 (3) (i) 1., except when the applicant demonstrates to the satisfaction of the department that the project can be conducted in a manner that will not alter the ecological character or reduce the ecological value of the area.

Chapter NR 109 also provides exemptions for permit requirements for manual removal under limited specified conditions. However, manual removal within a sensitive area is not exempt and is subject to a permit requirement. A permit is required for riparian owners who propose to manually remove aquatic plants from a body of water or use mechanical devices designed for cutting or mowing vegetation to control plants within a **sensitive area** as defined by the department under s. NR 107.05.

Chapter NR 328- Subchapter I — Shore Erosion Control Structures on Inland Lakes and Impoundments. The purpose of this subchapter is to establish reasonable procedures and limitations for exempt activities, general permits and individual permits for placement of shore erosion control structures in inland lakes and impoundments as regulated under s. 30.12, Stats., in order to protect the public rights and interest in the navigable, public waters of the state as defined in s. 30.10, Stats. Except as provided in s. 30.2023, Stats., this subchapter applies to construction, placement and maintenance of shore erosion control structures regulated under s. 30.12 (1), (1g) (a), (i), (j) and (k), (2m), (3) (a) 3c., 3g., 3r. and 13. and (3m), Stats. Any person that intends to construct, place or maintain a shore erosion control structure in any inland lake or impoundment shall comply with all applicable provisions of this chapter and any permit issued under this chapter.

Ch. NR 328 provides for permit exemptions under limited specific designs and locations. However, Repair or replacement of existing riprap within or adjacent to a sensitive area is **not** exempt and is subject to a permit requirement. Additionally, designated sensitive area is a factual consideration in the analysis of individual permit applications.

Chapter NR 103- Water Quality Standards for Wetlands. The provisions of this chapter applies to all department regulatory, planning, resource management, liaison and financial aid determinations that affect wetlands. This chapter shall only apply to specific activities which may require authorization or reauthorization after August 1, 1991 and which are subject to the requirements of statute or rules requiring a department determination concerning effects on water quality or wetlands. **(1)** Activities subject to the requirements of this chapter include, but are not limited to: (a) Permits, reviews, approvals and other actions under chs. 23 and 26 to 31, Stats.; (b) Permits and approvals under chs. 281, 283, 289 and 291, Stats., except as provided in sub. (3); (c) Water quality certification under ch. NR 299; (d) Permits and approvals under chs. NR 500 to 520; (e) Department development and management projects; and (f) Actions under ch. NR 120. **(2)** In addition to the requirements of s. NR 207.03 (5), this chapter shall apply to new or increased point source discharges to wetlands. **(3)** Wetland alterations which are directly caused by operations on a metallic mineral prospecting site or mining site shall be regulated pursuant to specific wetland standards under chs. NR 131 and 132, respectively. The department shall review all proposed activities subject to this chapter and shall determine whether the project proponent has shown, based on the factors in sub. (3), if the activities are in conformance with

the provisions of this chapter. To protect all present and prospective future uses of wetlands, the following factors shall be considered by the department in making determinations under this section: (a) Wetland dependency of the proposal; (b) Practicable alternatives to the proposal which will avoid and minimize adverse impacts to wetlands and will not result in other significant adverse environmental consequences; (c) Impacts which may result from the activity on the maintenance, protection, restoration or enhancement of standards under s. NR 103.03; (d) Cumulative impacts attributable to the proposed activity which may occur, based upon past or reasonably anticipated impacts on wetland functional values of similar activities in the affected area; (e) Potential secondary impacts on wetland functional values from the proposed activity; and (f) Any potential adverse impacts to wetlands in areas of special natural resource interest as listed in s. NR 103.04. (g) Any potential adverse impact to wetlands in environmentally **sensitive areas** and environmental corridors identified in areawide water quality management plans.

Chapter NR 341- Grading on the Bank of Navigable Waterways

Ch. NR 341 establishes criteria defining those activities needing a grading permit for grading sites as required by s. 30.19 (1g) (c), Stats.; and to specify permit requirements necessary to protect public rights and interest and to protect riparian rights for grading sites regulated under this chapter. An application for a grading permit shall be filed with the department by any person that intends to grade or remove soil from the bank of any navigable waterway where the area exposed by the grading or removal will exceed 10,000 square feet on the surface of the bank as determined in s. NR 341.035. This includes areas that are part of a larger common plan of development or sale where multiple separate and distinct grading activities may be taking place at different times on different schedules, but under one plan, such that the total area exposed by grading or removal will exceed 10,000 square feet on the bank. For purposes of establishing jurisdiction the bank of a navigable waterway is typically determined as 75 feet landward from the ordinary high water mark (there are rule exceptions for steeper slopes where jurisdiction extends more than 75 feet landward). However for banks adjacent to public rights features the bank jurisdiction is typically 300 feet landward from the ordinary high water mark (again there are rule exceptions for steeper slopes where jurisdiction extends more than 300 feet landward).

Chapter NR 323- Fish and Wildlife Habitat Structures in Navigable Waters

Ch. NR 323 establishes reasonable procedures and limitations for exempt activities, general permits and individual permits for placement of fish and wildlife habitat structures in navigable waterways in order to protect the public rights and interest in the navigable, public waters of the state. Any person that intends to construct, place or maintain a fish or wildlife habitat structure in any navigable waterway shall comply with all applicable provisions of this chapter and any permit issued under this chapter. Some fish and wildlife habitat structures are exempt from a department permit, however fish and wildlife structures located within a public rights feature are not exempt and require a state permit.

Chapter NR 329- Miscellaneous Structures in Navigable Waterways

Chapter NR 329 establishes reasonable procedures and limitations for exempt activities, general permits and individual permits for the construction and maintenance of boat landings, dry fire hydrants, fords, intake and outfall structures, pilings, pea gravel blankets and weed rakes structures placed in navigable waterways. Several miscellaneous designed structures in certain settings are exempt from a department permit. However, all miscellaneous structures identified in Ch. NR 329 and located within a public rights feature are not exempt and require a state permit. Additionally general permits are not available for fords, public boat landings, weed rakes, pea gravel blankets, or intake/outfall structures located within public rights features, but are subject to individual permit requirements.

Chapter NR 343- Ponds and Artificial Waterways
Ch. NR 343 establishes criteria defining those activities needing a permit for a pond or artificial water body and specifies permit requirements necessary to protect public health, safety, welfare, rights and interest and to protect riparian landowner's rights and property for pond sites. A permit application shall be filed with the department to construct, dredge or enlarge any part of a pond or artificial water body that either; connects with a navigable waterway, or is located within 500 feet of the ordinary high water mark of an existing navigable waterway. This includes a stormwater management pond that does not discharge into a navigable waterway except as a result of storm events. Sediment basins or stormwater management ponds where the crest of the berm of the basin is within 35 feet from the ordinary high water mark of a navigable waterway or a portion of the basin is within 100 feet of the location of any public rights feature requires a permit from the department. Additionally, permit standards for Landscape ponds require that the portion of the berm or pond may not be any closer than 35 feet from the ordinary high water mark of any navigable waterway or within 100 feet of the location of any public rights feature.

Chapter NR 320- Bridges and Culverts in or Over Navigable Waterways
Ch. NR 320 establishes reasonable procedures and limitations for exempt activities, general permits and individual permits for placement of bridges and culverts in or over navigable waterways as regulated under s. 30.123, Stats. These standards protect the public rights and interest in the navigable, public waters of the state as defined in s. 30.10, Stats. This chapter applies to construction, placement and maintenance of bridges and culverts in or over navigable waterways as regulated under s. 30.123, Stats. Any person that intends to construct, place or maintain a bridge or culvert in or over any navigable waterway shall comply with all applicable provisions of this chapter and any permit issued under this chapter. Some replacement culverts are exempt from a department permit, however replacement culverts located in a public rights feature are not exempt and do require a state permit. Additionally non-professionally engineered culvert placement on navigable streams in a public rights feature is only eligible for an individual permit.


Chapter NR 1 – Natural Resource Board Policies
NR 1.91 Public boating access standards applies to department decisions related to acquiring, developing, maintaining and improving public boating access sites, providing natural resources enhancement services and to other department decisions relating to protection and use of navigable waters. Public boating access standards are described and must be met to be eligible for natural resource enhancement services. Natural resource enhancement services may still be provided for waters that have less public boating access provided an alternative public access plan is submitted. These alternative access plans must, among other items, consider sensitive areas for fish, wildlife and aquatic plants.


Chapter NR 118- Standards for the Lower St. Croix National Scenic Riverway. Ch. NR 118 establishes rules necessary to reduce the adverse effects of overcrowding and poorly planned shoreline and bluff area development, to prevent pollution and contamination of surface waters and groundwaters and soil erosion, to provide sufficient space on lots for sanitary facilities, to minimize flood damage, to maintain

property values, and to preserve and maintain the exceptional scenic, cultural and natural characteristics of the water and related land of the Lower St. Croix riverway in a manner consistent with the national wild and scenic rivers act (P.L. 90−542), the federal Lower St. Croix river act of 1972 (P.L. 92−560) and the Wisconsin Lower St. Croix river act (s. 30.27, Stats.). Ch. NR 118 establishes more restrictive vegetation management standards which aim prevent disturbance of environmentally **sensitive areas** such as steep slopes, shorelines and blufftop areas.

Chapter NR 110- Sewerage Systems

Ch. NR 110 applies to all new or modified sewerage systems, excluding only industrial waste treatment facilities. This chapter also applies to sewerage systems employing land disposal of sewage effluent, except those systems defined as plumbing within the purview of s. 145.01 (10) (b), Stats. . The department may require the submittal of an environmental assessment meeting the requirements of s. NR 110.09 (3) for large or complex sewer projects, or large or complex lift station projects which are proposed to be constructed in environmentally **sensitive areas.**

Chapter NR 185- Solid Waste Management Planning Criteria

Ch NR 185 establishes minimum solid waste management planning criteria pursuant to chapter 377, laws of 1977, consistent with the intent of the Resource Conservation and Recovery Act of 1976 (Public Law 94–580). Ch. NR 185 governs the development of comprehensive solid waste management plans and their submittal to the department for approval. Inventory maps and narratives must address, among other items, environmentally sensitive areas.

Chapter NR 169- Dry Cleaner Environmental Response Program

Ch. NR 169 establishes rules to implement and administer a grant program to reimburse eligible applicants for a portion of their costs associated with the investigation and cleanup of soil or groundwater, or both, contaminated by a discharge and applies to all applicants for and recipients of reimbursements of costs paid to investigate and remediate soil and groundwater contaminated by a discharge of a dry cleaning product. Applicants are required to examine for potential impacts to sensitive areas in their site scoping investigation.

Chapter NR 167- Land Recycling Loan Program

Ch. NR 167 establish rules under ss. 281.59 and 281.60, Stats., for the implementation and administration of the land recycling loan program. and applies to all land recycling loan program applicants and recipients. Compliance with the applicable requirements of this chapter is a prerequisite to receiving financial assistance under ss. 281.59 and 281.60, Stats. Sites that have special designated environmentally sensitive areas are assigned more weight in grant rankings.

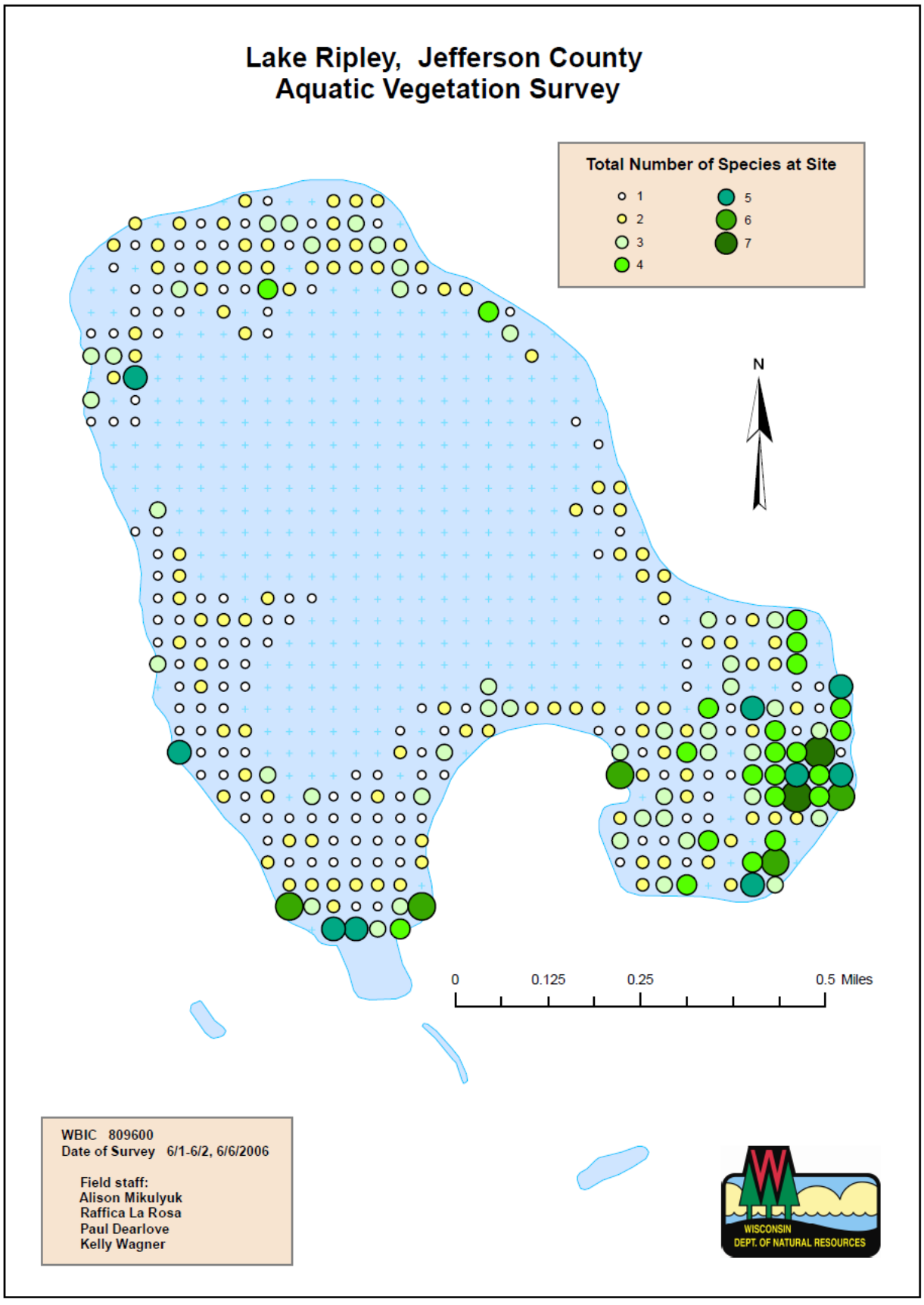
Table 1. Relative frequency of Aquatic Plants in Lake Ripley, 2006.

Scientific Name	Common Name	Relative Frequency (%)
Ceratophyllum demersum	Coontail	7.6
Chara	Muskgrass	33.3
Elodea canadensis	Common waterweed	0.5
Heteranthera dubia	Water star-grass	2.7
Lemna minor	Small duckweed	0.7
Lemna trisulca	Forked duckweed	0.2
Myriophyllum sibricum	Northern watermilfoil	2.4
Myriophyllum spicatum	Eurasian watermilfoil	4.2
Myriophyllum sp.	Unknown watermilfoil	2.9
Najas flexilis	Bushy naiad	0.7
Najas marina	Spiny naiad	20.9
Nuphar variegata	Spatterdock	1.2
Nymphaea odorata	Water water-lily	1.0
Potamogeton crispus	Curly-leaf pondweed	0.8
Potamogeton foliosus	Leafy pondweed	0.5
Potamogeton friesii	Frie's pondweed	4.6
Potamogeton illinoensis	Illinois pondweed	3.1
Potamogeton pusillis	Small pondweed	0.2
Stuckenia pectinata	Sago pondweed	10.5
Vallisneria americana	Wild celery	1.9

Table 1. Impact of Critical Habitat Designation on Proposed Activities (also see Appendix A).

Activity	Relevant Administrative Code	Impact of Critical Habitat Designation (Sensitive Areas and Other Public R
New Riprap, Biostabilization	NR 328	Inside and Outside a PRF – No exemptions available; general permits availa sites For more information, see our website: http://dnr.wi.gov/org/water/fhp/
Riprap Repair or Replacement where permit was previously issued	NR 328	Inside a PRF - Exemptions available; general permits available Outside a PRF – Exemptions available; general permits available For more information, see our website: http://dnr.wi.gov/org/water/fhp/
Riprap Repair or Replacement where NO permit was previously issued	NR 328	Inside a PRF – No exemptions available; general permits available Outside a PRF – Exemptions available; general permits available For more information, see our website: http://dnr.wi.gov/org/water/fhp/
Piers, Boat Shelters, and Swim Rafts	NR 326	Piers, shelters and swim rafts meeting certain construction specifications d they do not interfere with public rights in navigable waters regardless of lo http://dnr.wi.gov/org/water/fhp/waterway/
Fish and Wildlife Habitat Structures	NR 323	General permits are required for fish and wildlife structures proposed for p these structures may be placed without permits as long as certain standar http://dnr.wi.gov/org/water/fhp/waterway/fishhabitat.html
Bank Grading	NR 341	If grading is to occur in or next to a PRF site, the area of bank disturbance (requirements) is calculated using the amount of grading to occur within 30 steep slopes) instead of within 75 feet from OHWM (more for steep slopes http://dnr.wi.gov/org/water/fhp/waterway/grading.html
Maintenance Dredging of a previously authorized area	NR 345	Inside and Outside a PRF – No exemptions available; general permits availa For more information, see our website: http://dnr.wi.gov/org/water/fhp/
Dredging – New activity with no previous permit		Inside a PRF – No exemptions or general permits available; individual perm Outside a PRF – No exemptions available; general permits available For more information, see our website: http://dnr.wi.gov/org/water/fhp/
Public boat landings, weed rakes, pea gravel	NR 329	No exemptions currently exist for boat landings, weed rakes or pea gravel however, general permits are available for these activities. Individual perm placement within a PRF site.

blankets, intake/ outfall structures		Permit exemptions and general permits are not available for intake/outfall sites and individual permits would be necessary for this activity as well. http://dnr.wi.gov/org/water/fhp/waterway/peagravelblankets.html and http://dnr.wi.gov/org/water/fhp/waterway/intakeoutfall.html
Chemical treatment	NR 107	If treatment is to occur in a designated sensitive area, permit applicants m will not affect the ecological value of the sensitive area before a permit wi accomplished by using an herbicide selective for invasive species, timing th season of native species, or reducing the treated area. http://dnr.wi.gov/org/water/fhp/waterway/aquaticplantcontrol.html (Table continued next page)
Mechanical/man ual plant removal	NR 109	Riparian owners manually removing rooted plants from the lake next to th permit requirements and must obtain a general permit before removing pl area. If removal is to occur in a sensitive area, permit applicants must dem not reduce the ecological value of the area. This can be achieved using tec selective removal, timing removal to avoid the growing season of native pl removal. http://dnr.wi.gov/org/water/fhp/waterway/aquaticplantcontrol
Boat access standards	NR 1.91	Alternative access plans must consider the effects of the plan on designate access plan is required in order to obtain natural resources enhancement s boating access than described in NR 1.91 and for waters that have more bo 1.91. http://www.legis.state.wi.us/rsb/code/nr/nr001.pdf


Lake Ripley, Jefferson County
Aquatic Vegetation Survey
Total Number of Species at Site
1
2
3
4
5
6
7
N
0
0.125
0.25
0.5 Miles
WBIC 809600
Date of Survey 6/1-6/2, 6/6/2006
Field staff:
Alison Mikulyuk
Raffica La Rosa
Paul Dearlove
Kelly Wagner
WISCONSIN
DEPT. OF NATURAL RESOURCES