

Designation of Sensitive Areas Lake Mallalieu, St. Croix County



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

March 2006

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I. INTRODUCTION

Designation of sensitive 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. 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. Sensitive areas are dependent on 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 sensitive area designation will provide a framework for management decisions that impact the ecosystem of the lake.

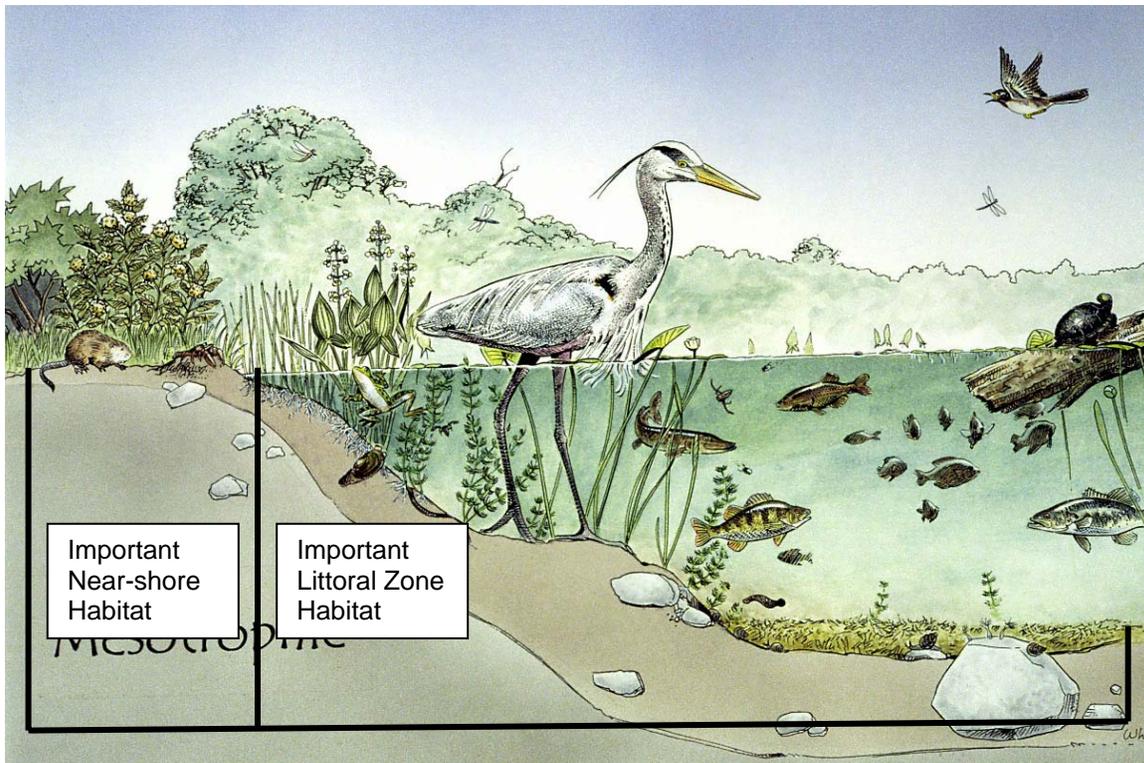


Figure 1. Location of important near-shore and littoral zone habitat.

A Sensitive Area Study was conducted September 12, 2005 on Lake Mallalieu, St. Croix County. The designations were based on aquatic plant data collected during July 1998 and 1999 and August 2005.

The study team included:

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Lake Mallalieu is a 270-acre lake with a maximum depth of 17 ft and an average depth of 5 ft. Lake Mallalieu is a eutrophic lake with poor water quality and clarity. Filamentous algae has increased since 1998 and is abundant in the shallow depth zones.

The aquatic plant community in Lake Mallalieu is characterized by low quality, very poor species diversity and a high tolerance to disturbance. The plant community indicates that Lake Mallalieu is farther from an undisturbed condition than the average lake in Wisconsin or the North Central Hardwoods Region of the state. Less than half of the littoral zone is vegetated, to the maximum rooting depth of 8 feet. Vegetation is most abundant in the 0-1.5ft depth zone.

Najas flexilis, a drawdown tolerant-turbidity tolerant species with a preference for hard substrate, is the dominant plant species in the community, especially in the 1.5-5ft depth zone, exhibiting a growth form of above average density.

Potamogeton pectinatus is the sub-dominant.

Comparisons of the plant community at natural shoreline sites vs. disturbed shoreline sites corroborates that disturbance has impacted the aquatic plant community. The most sensitive species in Lake Mallalieu occurred at a higher frequency at the sites near natural shoreline.

The quality of the aquatic plant community at the natural shoreline sites is slightly greater than the quality of the plant community at the disturbed sites. Greater Species Richness at natural shoreline sites provides greater diversity of aquatic plant species for a more diverse habitat. Plant cover at natural shoreline sites is greater, providing more habitat. Cover of submergent vegetation, emergent vegetation and floating-leaf vegetation were all higher at natural shoreline plant communities providing a greater diversity of structural types which supports greater diversity in the fish and wildlife community.

Exotic, invasive species occurred at a slightly lower frequency at natural shoreline sites. Disturbance creates an ideal condition for the invasion and spread of exotic species.

II. THE SENSITIVE AREAS

The reasons for selection of each sensitive area are important, as this is what drives the selection process, their importance to the whole lake community.

All sites were selected because of the natural buffer of terrestrial vegetation that protected a large portion of the site.

All of the sensitive areas that were selected have the potential to be used for educational purposes; they provide visual and sound buffers, buffers against the invasion of non-native species and areas of beauty for lake residents and visitors (Figure 2).

Attributes Common to All the Sensitive Areas

Water Quality

The vegetation at all of the sites provides important water quality protections. The plants provide a nutrient buffer by absorbing nutrients thus reducing algae growth. The plants provide a physical buffer that protects the shoreline against wave erosion. Aquatic plants provide sediment stabilization, their roots anchoring the sediments and preventing resuspension by boat motors and waves and the resulting turbidity. They provide a biological buffer that reduces the chance of invasion by exotic species.

Wildlife Habitat

All of the sensitive areas provide very important wildlife habitat. Some values are unique to a sensitive area and some habitat values are shared by all the sensitive areas. All of the sites provide shelter, cover, nesting and feeding areas for song birds.

Recommendations for the entire lake

- 1) Leave fallen trees in the waster as large woody debris habitat that is very important to wildlife and fish as habitat. This habitat is the preferred habitat of bass.
- 2) Leave large trees and snag trees at shoreline for future woody debris habitat
- 3) Use tree plantings in buffer restorations for future woody debris
- 4) Aquatic plant management should focus on removal of exotic, invasive species and allow native specie to remain undisturbed.
- 5) Restore developed shoreline on all heavily developed sites that have lost natural buffers. Information on shoreline restorations can be found at:
www.dnr.wi.gov/org/water/wm/dsfm/shore/restoration.htm

Sensitive Area Mallalieu 1 – Shallow Willow River Inlet

This site was selected for its high quality fish and wildlife habitat, diverse aquatic vegetation, undisturbed and unique terrestrial vegetation, its importance for protecting water quality and its natural scenic beauty (Figure 3).

This sensitive area includes 70 acres of the upper end of the impoundment, to the 2-foot depth contour (Figure 2). The site includes deep marsh wetlands, sedge meadows, shrub carr and a small tamarack bog. Important near-shore terrestrial habitat, shoreline habitat and littoral zone habitat make up this site and is composed a mixture of herbaceous cover, forest growth and shrub cover.

The sediment is composed of gravel, sand, silt and organic muck. Fallen trees and other large woody debris are abundant at the site for fish and wildlife habitat.

The Plant Community:

This site supports 24 species of aquatic plants.

Emergent vegetation: sedges, blue-joint grass, blue-flag iris, marsh milkweed, water horehound, jewelweed Joe-pye weed, cattail and bulrush, protect the shoreline and provide important food sources, cover and fish spawning habitat.

Floating-leaf vegetation: white water lilies and duckweeds dampen wave action and provide important fish cover.

A very diverse submerged plant community provides many important habitat components for the fish and wildlife community (Table 1). Water buttercup and water stargrass are present; waterweed and coontail are common. The pondweed family, which is an important food source for waterfowl and fish, is represented by flat-stem pondweed and small pondweed; sago pondweed, long-leaf pondweed and leafy pondweed commonly occur at this site.

Three non-native aquatic plant species were recorded at this site: curly-leaf pondweed, Eurasian watermilfoil and purple loosestrife

Wildlife Habitat

The important habitat features at this site are the emergent vegetation, floating-leaf vegetation, shoreline shrubs, snag trees and perch trees. In addition to the habitat values found at all the sites, this site also provides:

- 1) possible habitat for otter
- 2) shelter, cover and feeding areas for deer
 - 1) shelter, cover, denning and feeding areas for mink, raccoon, ducks, frogs, toads and turtle
 - 2) winter feeding areas for goose and trumpeter swans
 - 3) feeding areas for wading birds such as herons and egrets
 - 4) nesting areas for woodduck
 - 5) nesting and feeding areas for eagle. An eagle's nest has been recorded upstream (Appendix I).
 - 6) Ducks, geese, eagles, herons, egrets, trumpeter swans have been recorded at the site.

Fish Habitat

Large woody cover in the water, emergent vegetation, floating-leaf vegetation, submergent vegetation and over-hanging vegetation provide important fish habitat. The high diversity of habitat and cover types provide:

- 1) spring spawning and spring nursery areas for northern pike and crappie
- 2) spring spawning, spring nursery areas, feeding areas and cover for small mouth bass
- 3) spring spawning, spring and summer nursery areas, feeding areas and cover for large-mouth bass

Recommendations for Area 1

- 1) This site provides excellent wildlife habitat and this quality of habitat needs to be maintained
- 2) Maintain snag and cavity trees along the shore.
- 3) Purple loosestrife has colonized a wetland at this site. Lake association should become involved in the loosestrife beetle release program, raising and releasing loosestrife beetles into the wetlands.
- 4) Maintain current fish habitat. Do not remove fallen trees in the water along the shoreline.
- 5) Do not alter the shallow water area unless for a DNR approved spawning habitat improvement.
- 6) Minimize removal of any shoreline vegetation. Allow removal of a maximum corridor width of 30 feet. Permits required for any vegetation removal.
- 7) Protect emergent vegetation.
- 8) Designate slow no-wake in the upper end.
- 9) If riparian land is developed in the future, existing shoreline must be maintained.
- 10) No permitting for shoreline erosion control needed at this time.
- 11) No bank grading.
- 12) No permit approval for pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects.
- 13) No dredging or lake bed removal or modifications.
- 14) Pier placement by permit only to minimize number of piers and their size and disturbance; require light-penetrating pier material such as metal grating.
- 15) No boat ramp placement.
- 16) Permit required for recreational floating devices.

Sensitive Area Mallalieu 2 – South Shore

This site was selected for the diverse aquatic vegetation and the natural terrestrial vegetation found over much of the site, these plant communities important for fish habitat, wildlife habitat, protecting water quality and providing natural scenic beauty (Figure 4).

This sensitive area encompasses approximately 3400 feet of shoreline, out to the maximum rooting depth of 4 feet (Figure 2). The sediment is sand and silt. The shoreline habitats include large areas of wooded cover with an understory cover of shrub and herbaceous growth and scattered home development in the area. Some homes have retained their buffer of natural vegetation and some have cleared the natural shoreline out.

Large woody cover that is an important structural component of fish and wildlife habitat is present along most of the shore, but is being lost over time. In areas it is abundant, but in some developed areas, it is conspicuously absent.

The Plant Community:

The aquatic plant community at this site supports 7 species of plants.

Floating-leaf plants, white water lily is common and provide cover and food sources.

A very diverse submergent plant community provides a diverse habitat (Table 2). Water stargrass and coontail are common and waterweed is also present. The pondweed family is likely the most important producer of habitat and is represented here by sago pondweed, small pondweed and flat-stem pondweed.

The non-native species, Eurasian watermilfoil also occurs at this site.

Wildlife Habitat

The important habitat features at this site include shoreline shrubs and brush and snag and perch trees on shore. In addition to the habitat values found at all the sites, this site also provides

- 1) shelter, cover and feeding areas for deer and ducks.
 - 2) shelter, cover, denning and feeding areas for mink, raccoon, frogs, toads and turtle.
 - 3) feeding areas for eagles and wading birds such as herons and egrets
- Ducks and wading birds have been observed at the site.

Fish Habitat

The large woody debris fallen in the water, submerged vegetation, floating-leaf vegetation and over-hanging vegetation at this site provide important fish habitat. During fish surveys, this site is always full of fish.

The site provides

- 1) spring spawning, spring and summer nursery areas, feeding areas and protective cover for large-mouth bass and small-mouth bass
- 2) spring and summer spawning, spring and summer nursery areas and feeding areas for bluegill.

Recommendations for Area 2

- 1) Maintain current wildlife habitat
- 2) Maintain snag and perch trees on shore
- 3) Minimize removal of any shoreline vegetation. Allow removal of a maximum corridor width of 30 feet. Permits required for any vegetation removal.
- 4) Restore natural shoreline in areas that have more than 30' of cleared access and leave fallen trees in the water. Restore a band of natural shoreline vegetation with species that are native and appropriate for the site. . Information on shoreline restorations can be found at: www.dnr.wi.gov/org/water/wm/dsfm/shore/restoration.htm
- 5) Maintain current fish habitat.
- 6) Do not remove trees fallen (large woody debris) in the water along the shoreline, leave for habitat.
- 7) Leave large trees and snag trees at shoreline and use tree plantings in buffer restorations for future woody debris habitat for future woody debris
- 8) Do not alter the shallow water zone except for DNR approved spawning habitat improvements
- 9) Create fish cover via cribs and tree crops.
- 10) Protect emergent vegetation.
- 11) Aquatic plant control to focus on controlling Eurasian watermilfoil and restoring native vegetation.
- 12) No permitting for shoreline erosion control needed such as rip-rap, retaining walls. Site has sufficient natural vegetation buffer.
- 13) No bank grading.
- 14) No permit approval for pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects.
- 15) No dredging or lake bed removal or modifications.
- 16) Pier placement by permit only to minimize number of piers and their size and disturbance; require light-penetrating pier material such as metal grating.
- 17) No boat ramp placement.
- 18) Permit required for recreational floating devices.

Sensitive Area Mallalieu 3 – Rock Cliff

This sensitive area encompasses approximately 600 feet along the southern shore, just east of the boat landing, to a maximum rooting depth of 7 feet. It includes shoreline habitat and shallow water habitat (Figure 2, 6). The sediment is rubble, sand, and gravel. The shoreline at this sensitive area is composed mostly of a steep rock wall with wooded cover on top. Large woody cover from fallen trees is present in the shallow water and provides important habitat for fish cover and wildlife resting areas.

The Plant Community:

The submergent plant community provides fish and wildlife benefits. Slender water-nymph occurred at this site.

Recommendations for Site 3

- 1) Minimize removal of any shoreline vegetation. Allow removal of a maximum corridor width of 30 feet.
- 2) Maintain any aquatic vegetation in an undisturbed condition for wildlife habitat, fish cover and as a buffer for water quality protection. Permits required for any vegetation removal.
- 3) Maintain current natural vegetation buffer for water quality protection
- 4) Place conservation easement on undeveloped shoreline to protect habitat, water quality and natural beauty
- 5) Do not use lawn chemicals or fertilizers
- 6) No permitting for shoreline erosion control needed such as rip-rap, retaining walls. Site has sufficient natural vegetation buffer that needs to be protected.
- 7) No bank grading.
- 8) No permit approval for pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects.
- 9) No dredging or lake bed removal or modifications.
- 10) Pier placement by permit only to minimize number of piers and their size and disturbance; require light-penetrating pier material such as metal grating.
- 11) No boat ramp placement.
- 12) Permit required for recreational floating devices.

Sensitive Area Mallalieu 4 – West Basin

This sensitive area encompasses approximately 15 acres of the basin west of the Highway 35 bridge. It includes important shoreline habitat and shallow water habitat (Figure 2, 7). The sediment is a mixture of sand, silt, gravel and rubble. The shoreline at this sensitive area is composed of mainly wooded cover with some shrub growth in previously cleared areas.

Large woody cover from fallen trees is present in the shallow water and provides important habitat for fish cover and wildlife resting areas.

The Plant Community:

The aquatic plant community is composed of 7 species at this site.

Floating-leaf vegetation, white water lilies and duckweed, dampen wave action and provide important fish habitat (Table 4).

A diverse submergent plant community provides many fish and wildlife benefits. Slender naiad is abundant in at this site and water stargrass and common waterweed also occur.

The pondweed family is an important food source for fish and waterfowl and is represented at this site by small pondweed and sago pondweed.

Wildlife Habitat

The important habitat features at this site include shoreline shrubs and brush and snag and perch trees on shore. In addition to the habitat values found at all the sites, this site also provides

- 1) shelter, cover and feeding areas for deer and ducks.
- 2) shelter, cover, denning and feeding areas for mink, raccoon, frogs, toads and turtle.
- 3) feeding areas for eagles and wading birds such as herons and egrets

Fish Habitat

Fallen woody debris in the water and over-hanging vegetation provide fish habitat at this site.

- 1) Spring and summer spawning areas, feeding areas and protective cover for large-mouth bass, small-mouth bass and bluegill.

Recommendations for Area 4

- 1) Maintain current wildlife habitat
- 2) Maintain snag and perch trees on shore for habitat and future woody cover.
- 3) Restore natural shoreline in areas that have more than 30' of cleared access and leave fallen trees in the water. Restore bank and shoreline vegetation.
- 4) Maintain current fish habitat.
- 5) Do not remove trees fallen in the water along the shore.
- 6) Do not alter the shallow water zone except for DNR approved spawning habitat improvements.
- 7) Protect emergent vegetation.
- 8) Minimize removal of any shoreline vegetation. Allow removal of a maximum corridor width of 30 feet.
- 9) 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.
- 10) No permitting for shoreline erosion control needed such as rip-rap, retaining walls.
- 11) No bank grading.
- 12) No permit approval for pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects.
- 13) No dredging or lake bed removal or modifications.
- 14) Pier placement by permit only to minimize number of piers and their size and disturbance; require light-penetrating pier material such as metal grating.
- 15) No boat ramp placement.
- 16) Permit required for recreational floating devices.

Sensitive Area Mallalieu 5 – North Point

This sensitive area includes approximately 1500 feet of shoreline on the north point and its west side. It includes important near-shore terrestrial habitat, and shoreline habitat (Figure 2, 8). The sediment is sand, silt and rock. The shoreline at this sensitive area is composed mostly of wooded cover with some shrub growth, housing development on the top of the slope and small areas of erosion. Large woody cover from fallen trees is present in the shallow water, providing important habitat for fish cover and wildlife resting areas.

The Plant Community:

The aquatic plant community consists of 6 species at this sensitive area.

Floating-leaf vegetation, white water lilies, dampen wave action and provide important fish habitat (Table 5).

A diverse submergent plant community provides many fish and wildlife benefits. Water stargrass is abundant at his site and coontail is also present.

The pondweed family is an important food source for fish and waterfowl and is represented at this site by floating-leaf pondweed, sago pondweed and flat-stem pondweed.

Wildlife Habitat

The important habitat features at this site include shoreline shrubs and brush and snag and perch trees on shore. In addition to the habitat values found at all the sites, this site also provides

- 1) shelter, cover and feeding areas for deer and ducks.
- 2) shelter, cover, denning and feeding areas for mink, raccoon, frogs, toads and turtle.
- 3) feeding areas for eagles and wading birds such as herons and egrets

Fish Habitat

Fallen woody debris in the water and over-hanging vegetation provide fish habitat at this site.

- 1) Spring and summer spawning areas, feeding areas and protective cover for large-mouth bass, small-mouth bass and bluegill.

Recommendations for Area 5

- 1) Maintain current wildlife habitat
- 2) Maintain snag and perch trees on shore for habitat and future in-water woody debris habitat
- 3) Maintain current fish habitat. Do not remove trees fallen in the water along the shore.
- 4) Do not alter the shallow water zone except for DNR approved spawning habitat improvements.
- 5) Revegetate eroded slopes with native plant species appropriate to the site. Information on shoreline restorations can be found at: www.dnr.wi.gov/org/water/wm/dsfm/shore/restoration.htm
- 6) Minimize removal of any shoreline vegetation. Keep corridor width as narrow as possible for use, to a maximum corridor width of 30 feet.
- 7) 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.
- 8) Do not use lawn chemicals or fertilizers.
- 9) No permitting for shoreline erosion control needed such as rip-rap, retaining walls.
- 10) No bank grading.
- 11) No permit approval for pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects.
- 12) No dredging or lake bed removal or modifications.
- 13) Pier placement by permit only to minimize number of piers and their size and disturbance; require light-penetrating pier material such as metal grating.
- 14) No boat ramp placement.
- 15) Recreational floating devices by permit only.