Designation of Sensitive Areas
Mission Lake, Marathon County

Wisconsin Department of Natural Resources
Eau Claire, WI

Sensitive Area Designation
Mission Lake, Marathon County

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.

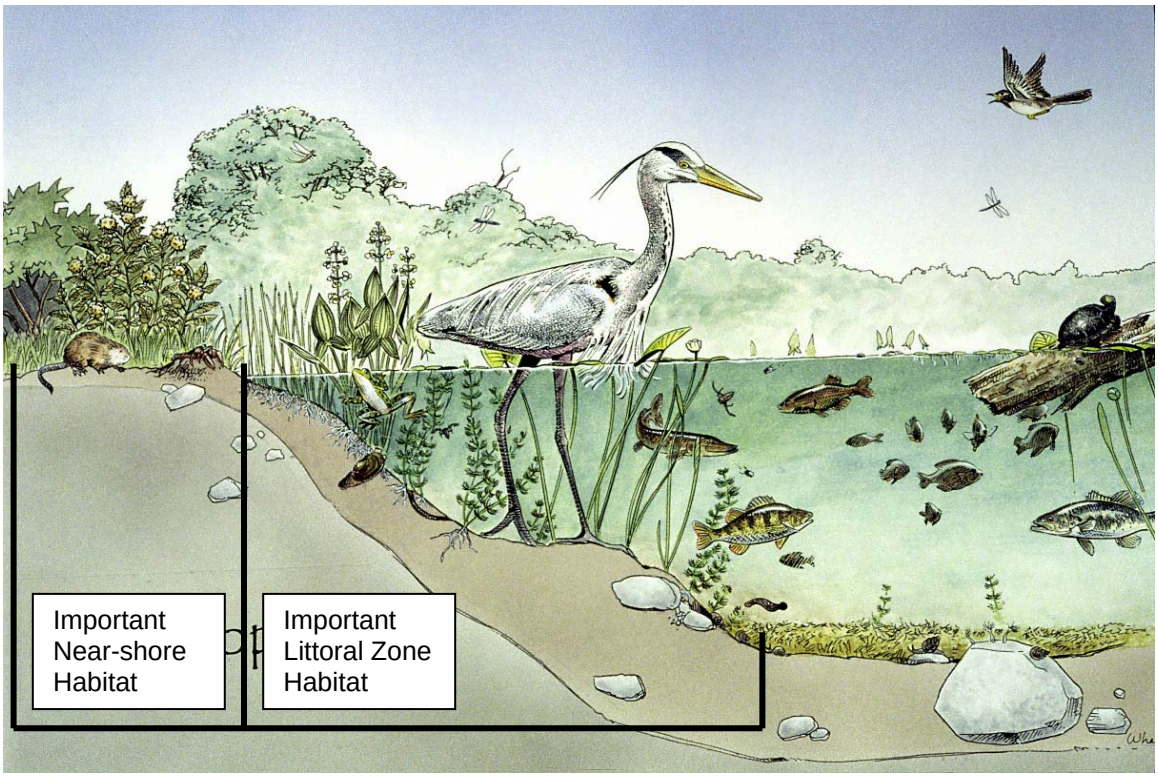

Figure 1. Location of important near-shore and littoral zone habitat.

A Sensitive Area Study was conducted August 2-3, 18, 2004 on Mission Lake, Marathon County.
The study team included:
Tom Meronek, DNR Fish Biologist
Deborah Konkel, DNR, Aquatic Plant Specialist
Buzz Sorge, DNR Lakes Manager
Jon Robaidek, DNR Wildlife Biologist
Mark Hazuga, DNR Water Resource Management Specialist

Mission Lake is a 107-acre lake with a maximum depth of 26 ft and an average depth of 12 ft.

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 their: importance for fish habitat, importance for wildlife habitat, importance for protecting water quality, the natural buffer of terrestrial vegetation, the high quality aquatic plant communities they supported and for their outstanding, natural scenic beauty (Figure 2).

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).

Common Attributes for 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. They provide a physical buffer that protect the shoreline against wave erosion. They provide sediment stabilization, their roots anchoring the sediments and preventing resuspension by boat motors and waves that would result in turbidity. They provide a biological buffer that reduces the chance of invasion by exotic species.

Fish Habitat

All of the sensitive areas provide important fish habitat. The sensitive areas are the areas in the lake that are most important for the fish community. Some values are unique to a sensitive area and some habitat values are shared by all the sensitive areas. The various types of vegetation provide

1) spring, summer and fall nursery areas, feeding sites and protective cover for northern pike, musky, large-mouth bass,
2) year-round nursery areas, feeding areas and protective cover for bluegill, pumpkinseed, yellow perch and crappie and bullhead.
3) No exotic fish and crayfish have been found in this lake.

Wildlife Habitat

All of the sensitive areas provide very important wildlife habitat. The emergent vegetation, floating-leaf vegetation, shoreline shrubs, snag trees and fallen logs are the key habitat structure at these sites. Some values are unique to a sensitive area and some wildlife habitat values are shared by all the sensitive areas. All of the shoreline sensitive area sites provide

1) shelter, cover, nesting and feeding areas for songbirds, frogs and toads
2) shelter and cover for ducks
3) shelter, cover and feeding areas for reptiles such as turtles and snakes.

Recommendations for the Mission Lake as a whole

1) Maintain white pines for potential eagle and osprey perch and nest sites on the steep shoreline between the North Bog Site (Sensitive site #1) and the Southeast Bog Site (Sensitive Site #2). This is the only area on the lake with nature white pine.
2) Maintain wooded cover and buffer of unmowed shoreline in the County Park between the North Bog Site (Sensitive Site #1) and the County Park Bog Site (Sensitive Site #2).
3) No chemical or fertilizer use on shorelines to prevent adverse impacts to aquatic vegetation and nutrient enrichment of Mission Lake.
4) Lake resident or camp personnel on Mission Lake contact the DNR for participation in the Self-Help Volunteer Monitoring Program. Involving the camp in the program would be an ideal educational activity that would also provide important data on the water quality of the lake. If the camp director included this as camp activity, campers would learn about water testing and limnology while providing useful information about lake chemistry.

Sensitive Area Mission 1 – North Bog

This sensitive area extends along a 3500-ft section of bog on the north shoreline out to a water depth of 10 feet (Figure 2). The bay includes deep march wetlands and supports important near-shore terrestrial habitat, shoreline habitat and littoral zone habitat. The shoreline is entirely tamarack bog that included herbaceous sedge meadow, tamaracks and abundant alder and leatherleaf shrubs growth. Just offshore, the site supports deep-water marsh habitat. The sediment is composed of silt and peat.

An additional reason for selecting this site is as a water source for Mission Lake. Surface water flow and groundwater flow provides input to the lake. It is important to protect this site to protect the quality of the water flow and the cold water spring flow to the lake.

The Plant Community:

Emergent vegetation, marsh fern, cinnamon fern, sedge, marsh milkweed, marsh harebells, alder shrub, leather leaf brush cattail and marsh cinquefoil, protect the shoreline and provide important food sources, cover and fish spawning habitat. Cattails and marsh fern are the most common emergents at this site.

Floating-leaf vegetation, white water lilies, yellow pond lilies and watershield, dampen wave action and provide important fish cover. White water lily is dominant.

This very diverse submerged plant community provides many important habitat components for the fish and wildlife community (Table 1). Water marigold, waterweed, three species of bladderwort, wild celery and stonewort are present; muskgrass, slender water naiad and northern watermilfoil are common; coontail is abundant at this site. The pondweed family, which is an important food source, is represented at this site by two small pondweeds (*Potamogeton pusillus and P. strictifolius*), floating-leaf pondweed, clasping-leaf pondweed, flat-stem pondweed and Illinois pondweed.

Filamentous algae is abundant at this site.

Fish Habitat

Important habitat components at this site are the emergent plant beds and mosaic of floating-leaf and submergent plant beds. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) Spring and summer spawning sites for yellow perch and bullhead
2) Spring/summer nursery areas, feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The combination of emergent vegetation, floating-leaf lily beds, shoreline shrubs and snag/perch trees is the key to the habitat value of this site. In addition to the habitat values found at all the sites, this site also provides:

1) shelter, cover and feeding areas for deer
2) nesting and feeding areas for ducks
3) feeding areas for loon and osprey
4) shelter, cover and nesting areas for geese
5) shelter, cover, nesting and feeding areas for eagles.

Recommendations

1) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
2) Maintain slow no-wake speed to protect plant beds and shoreline.
3) Maintain and protect the existing habitat, emergent plant beds and floating-leaf vegetation, for wildlife habitat
4) Maintain snag tress for perch sites and cavity nesting
5) Maintain the current buffer of undisturbed shoreline for a wildlife corridor
6) Maintain the current buffer of shoreline vegetation for water quality, nutrient reduction and erosion protection
7) No shoreline erosion control or bank protection needed
8) No bank grading
9) No dredging or lake bed removal or modifications
10) Minimize pier placement, permit required for placement
11) No boat ramp placement
12) Permit required for recreational floating devices
13) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects

Sensitive Area Mission 2 – Southeast Bog

This sensitive area encompasses the bog in the southeast corner of the lake, approximately 700 ft of shoreline out to a depth of 7 feet (Figure 2). The sediment is sand, silt, gravel and peat. The bog supports near-shore terrestrial habitat, shoreline habitat and shallow water littoral zone habitat. The shoreline is entirely tamarack bog, composed of a mixture of tamarack/sphagnum bog, alder thicket, shrub carr. Just offshore the site supports deep-water marsh habitat.

An additional reason for selecting this site is to protect one of the water sources for Mission Lake. Groundwater flow at this site provides cold water input to the lake. It is important to protect this site to protect the quality and temperature of the water flow to the lake.

The Plant Community:

Shoreline and emergent vegetation, marsh fern, native blue-flag iris, marsh cinquefoil, alder and silky dogwood shrubs and cattails, provide wildlife cover and food sources, protect the shoreline and provide spawning habitat dogwood and cattail are common at this site.

Floating leaf-species, white water lily, watershield and yellow pond lily, provide cover and food sources. The water lilies are common at this site.

A very diverse submergent plant community provides a diverse habitat (Table 2). Common bladderwort, wild celery occur here, Common waterweed, norhtern watermilfoil are common. Muskgrass and coontail are abundant. The pondweed family is likely the most important producer of habitat and is represented here by floating-leaf pondweed, clasping-leaf pondweed, flat-stem pondweed and two species of small pondweeds, with floating-leaf pondweed as the most common pondweed.

Fish Habitat

Important habitat components at this site are the emergent plant beds and mosaic of floating-leaf vegetation and submergent plant beds with open areas. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) Spring and summer spawning sites for yellow perch and bullhead
2) Spring/summer/fall nursery areas for bullhead
3) feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The combination of emergent vegetation, floating-leaf lily beds and shoreline shrubs is the key to the habitat value of this site. The lesser number of perch trees for predators at this site may benefit prey species such as small reptiles. In addition to the habitat values found at all the sites, this site also provides

1) nesting and feeding areas for ducks
2) habitat for reptiles.

Recommendations

1) Maintain a 100ft buffer of natural, undisturbed shoreline at this site
2) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
3) Do not remove fallen trees along shoreline that provide fish and wildlife habitat.
4) Maintain slow no-wake speed to protect plant beds and shoreline
5) Maintain and protect the existing habitat, emergent plant beds and floating-leaf vegetation, for wildlife habitat
6) Minimize all emergent vegetation and aquatic plant
7) Maintain the current buffer of shoreline vegetation for water quality, nutrient reduction and erosion protection
8) No shoreline erosion control or bank protection needed
9) No bank grading
10) No dredging or lake bed removal or modifications
11) Minimize pier placement, permit required for placement
12) No boat ramp placement
13) Permit required for recreational floating devices
14) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects

Sensitive Area Mission 3 – Panfish Spawning Area

This sensitive area encompasses approximately 600 feet of wooded shoreline on the southwest portion of the lake out to a water depth of 6 feet (Figure 2). It supports important near-shore terrestrial habitat. The sediment is mainly sand with a small amount of peat and provides substrate for fish spawning. The shoreline is mostly wooded with a footpath paralleling the shore. Large woody cover from fallen trees is common in the shallow water along the shoreline. This large woody cover present along the shore provides important habitat for fish cover and wildlife resting areas. Areas of large rock and boulder are important for fish spawning.

The Plant Community:

Small rosette species colonize the lake bottom, anchoring the substrate. These submerged rosette species include quillwort and rosettes of small rushes and arrowhead.

A diverse submergent plant community provides many fish and wildlife benefits (Table 3). Muskgrass and water marigold occur here; common waterweed, northern watermilfoil and bushy pondweed are common; coontail is common at this site. The pondweed family is an important habitat stucture and food source for fish and waterfowl and is represented at this site by the small pondweed, clasping-leaf pondweed, variable-leaf pondweed and flat-stem pondweed. Flat-stem pondweed is the most common pondweed at this site.

Water Quality

Maintaining the integrity of this sensitive area is especially important for protecting the water quality of Mission Lake as this site contains springs that provide water flow to the lake.

Fish Habitat

Important habitat components at this site are the emergent plant beds, the large woody cover and mosaic of floating-leaf vegetation and submergent plant beds with open areas. The sand substrate offers great spawning habitat. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) Spring and summer spawning sites for northern pike, musky, bluegill, pumpkinseed, crappie and bullhead on the sandy substrate
2) Year round nursery areas for bullhead
3) Feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The combination of emergent vegetation, floating-leaf lily beds, shoreline shrubs, large woody cover from fallen trees, snag/perch trees and transition/edge between the bogs and upland is the key to the habitat value of this site. Although this site is a small wooded area, it breaks up the bog habitats, providing variety of habitats and edge habitat. The edge and transition between the bogs and dry

upland woods benefit many species that depend on edges. In addition to the habitat values found at all the sites, this site also provides:

1) shelter, cover nesting and feeding areas for deer.
2) feeding areas for ducks and loon
3) shelter, cover, nesting and feeding areas for eagles, salamander
4) shelter, cover and feeding areas for osprey
5) probable shelter and cover for raptors such as owls
6) nesting areas for reptiles such as turtles and snakes.

Recommendations

1) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
2) Do not remove fallen trees along shoreline that provide fish and wildlife habitat.
3) Do not alter the littoral zone except for improvement of spawning habitat
4) Maintain slow no-wake speed to protect plant beds and shoreline
5) Maintain and protect the existing habitat, emergent plant beds and floating-leaf vegetation, for wildlife habitat
6) Maintain snag trees for cavity nesting and perch sites
7) Minimize removal of any shoreline or aquatic vegetation in order to protect water quality and habitat and reduce nutrient input. Allow removal of minimum necessary for lake access.
8) No chemical or fertilizer use on shoreline
9) No shoreline erosion control or bank protection needed
10) No bank grading
11) No dredging or lake bed removal or modifications
12) Minimize pier placement, permit required for placement
13) No boat ramp placement
14) Permit required for recreational floating devices
15) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects

Sensitive Area Mission 4 – South Bog

This sensitive area encompasses the bog on the south shore of the lake, approximately 700 ft of shoreline, out to water depths of 12 feet (Figure 2). The bay supports important near-shore terrestrial habitat, shoreline habitat and shallow water littoral zone habitat composed of mostly hardwood forest with some shrub and herbaceous cover. The shoreline is entirely tamarack bog, with alder thicket, shrub carr and herbaceous fern growth. The sediment is composed of sand, silt and peat.

The Plant Community:

Emergent vegetation, marsh fern, alder shrub and leather-leaf brush, protect the shoreline and provide important food sources, cover and fish spawning habitat.

Floating-leaf vegetation, white water lilies, yellow pond lilies and watershield, is common at this site and dampen wave action and provide important fish cover.

A very diverse submerged plant community provide many important habitat components for the fish and wildlife community (Table 4). Stonewort, water marigold, wild celery, northern watermilfoil, water stargrass, bushy pondweed are present at this site; three species of bladderwort are common; muskgrass is abundant at this site. Small rosette species colonize the bottom, anchoring the sediments, rosettes of arrowhead. The pondweed family, which is an important food source and habitat structure, is represented by small pondweed, Illinois pondweed, floating-leaf pondweed, variable pondweed, clasping-leaf pondweed and flat-stem pondweed.

One plant species at this site is a special concern species because of its rarity and sensitivity to disturbance: *Utricularia purpurea* (purple bladderwort).

Filamentous algae is present at this site.

Fish Habitat

Important habitat components at this site are the emergent plant beds, overhanging vegetation and mosaic of floating-leaf and submergent plant beds. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) Spring and summer spawning sites for yellow perch and bullhead
2) Spring/summer/fall nursery areas, feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The combination of emergent vegetation, floating-leaf lily beds, shoreline shrubs, snag/perch trees and edge created by the change in habitat types is the key to the habitat value of this site. Although this is a small bog, it breaks up the wooded shoreline creating edge. This increases nesting territory for songbirds. In addition to the habitat values found at all the sites, this site also provides

1) feeding areas for loon
2) shelter and cover for geese
3) nesting areas for songbirds

Recommendations

1) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
2) Do not remove fallen trees along shoreline that provide fish and wildlife habitat.
3) Do not alter the littoral zone except for improvement of spawning habitat
4) Maintain slow no-wake speed to protect plant beds and shoreline
5) Maintain and protect the existing habitat, emergent plant beds and floating-leaf vegetation, for wildlife habitat
6) Maintain snag trees for cavity nesting and perch sites
7) Maintain all emergent plants, shoreline vegetation and aquatic vegetation in an undisturbed condition for water quality protection.
8) No shoreline or bank erosion control needed
9) No bank grading
10) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects
11) No dredging or lake bed removal or modifications
12) Minimize pier placement, permit required for placement
13) No boat ramp placement
14) Permit required for recreational floating devices

Sensitive Area Mission 5 – South Wooded Area

This sensitive area encompasses approximately 100 ft of wooded shoreline, out to a water depth of 11 feet (Figure 2). The sediment is sand, silt, gravel and detritus. The sand and gravel substrate provides additional benefits for fish spawning.

The bay supports near-shore terrestrial habitat, shoreline habitat and shallow water littoral zone habitat. The shoreline is entirely wooded with some shrub understory. Offshore, the site supports deepwater marsh and shallow water marsh wetlands. Large woody cover that is an important structural component of fish and wildlife habitat is abundant along the shoreline.

The Plant Community:

Floating leaf-species, white water lily, watershield and yellow pond lily, provide cover and food sources. Yellow pond lily dominates the floating-leaf community.

A very diverse submergent plant community provides a diverse habitat (Table 5). Coontail, wild celery, northern watermilfoila and water stargrass colonize the underwater community; muskgrass and waterweed are common; bushy pondweed is abundant. The pondweed family is likely the most important producer of habitat and is represented here by variable-leaf pondweed, clasping-leaf pondweed, flat-stem pondweed and Illinois pondweed.

Small rosette species protect the lake bottom and anchor the sediment. Arrowhead rosettes and quillwort colonize the lake bed.

Filamentous algae is present at this site.

Fish Habitat

Important habitat components at this site are the emergent plant beds, the large woody cover and mosaic of floating-leaf vegetation and submergent plant beds with open areas. The sand substrate offers great spawning habitat. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) Spring and summer spawning sites for northern pike, musky, bluegill, pumpkinseed, crappie and bullhead on the sand substrate
2) Year round nursery areas for bullhead
3) Feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The combination of emergent vegetation, floating-leaf lily beds, shoreline shrubs, large woody cover from fallen trees, snag/perch trees and transition/edge between the bogs and upland is the key to the habitat value of this site. The edge and transition between the bogs and dry upland woods benefit many species that depend on edges. In addition to the habitat values found at all the sites, this site also provides:

1) shelter, cover nesting and feeding areas for deer.
2) feeding areas for ducks and loon
3) shelter, cover, nesting and feeding areas for eagles, salamander

4) shelter, cover and feeding areas for osprey
5) probable shelter and cover for raptors such as owls
6) nesting areas for reptiles such as turtles and snakes

Recommendations

1) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
2) Do not remove fallen trees along shoreline that provide fish and wildlife habitat.
3) Do not alter the littoral zone except for improvement of spawning habitat
4) Maintain slow no-wake speed to protect plant beds and shoreline
5) Maintain and protect the existing habitat, emergent plant beds and floating-leaf vegetation, for wildlife habitat
6) Maintain snag trees for cavity nesting and perch sites
7) Minimize removal of any shoreline or aquatic vegetation as a buffer for water quality protection, reducing erosion and nutrient input. Allow removal of minimum necessary for lake access.
8) No chemical or fertilizer use on shoreline
9) No shoreline or bank erosion control needed
10) No bank grading
11) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects
3) Nor dredging or lake bed removal or modifications
4) Minimize pier placement, permit required for placement
5) No boat ramp placement
6) Permit required for recreational floating devices

*** Sensitive Area Mission 6 – Southwest Bog ***

This is the premier sensitive area in the lake for wildlife habitat, fish habitat and quality plant communities. This sensitive area encompasses approximately 14 acres bordered by the southwest bay, including the approximately 2600 feet of shoreline bordering it and out to water depths of 10 feet (Figure 2). It supports important near-shore terrestrial habitat, shoreline habitat and shallow water habitat. The sediment is sand, silt and peat. The shoreline is 80% tamarack bog and 20% wooded. The bog contains some sedge meadow habitat and tamarack/sphagnum bog and even alder thicket and shrub carr. Offshore, the site contains deepwater marsh and shallow water marsh habitat. Large woody cover from fallen trees is present in the shallow water along the shoreline. This woody cover provides important habitat for fish cover and wildlife resting areas. Areas of large rock and boulder are important for fish spawning.

Surface flow exits Mission Lake in this area into a series of wetlands. Maintaining this sensitive area will also preserve the health of the wetlands to the southwest.

The Plant Community:

A very diverse emergent vegetation community, marsh fern, Canada bluejoint grass, spikerush, marsh milkweed, marsh St.John's wort, alder and winterberry bush, bog rosemary, pickerelweed, cattail, marsh cinquefoil, horsetail and leatherleaf brush protect the shore and water quality, providing habitat. Cattail and leatherfeaf are most abundant and horsetail is common.

Floating-leaf vegetation, white water lilies, yellow pond lilies, large duckweed, water smartweed and watershield, dampen wave action and provide important fish cover. Yellow pond lily was most abundant.

A very diverse submergent plant community provides many fish and wildlife benefits (Table 6). Bushy pondweed is dominant at this site; muskgrass, wild celery, are abundant; water marigold, waterweed are all common at this site; four bladderwort species, coontail, northern watermilfoil occur at this site. The pondweed family is an important food source for fish and waterfowl and is represented at this site by small pondweed, leafy pondweed, Illinois pondweed, flat-stem pondweed, clasping-leaf pondweed and variable-leaf pondweed make up the pondweed community at this site. Variable-leaf and flat-stem pondweeds were most common.

One plant species at this site is a special concern species because of its rarity and sensitivity to disturbance: *Utricularia. purpurea* (purple bladderwort).

Water Quality

Maintaining the integrity of this sensitive area is especially important for protecting the water quality of Mission Lake as this site contains springs that provide water flow to the lake.

Fish Habitat

Important habitat components at this site are the emergent plant beds, overhanging vegetation, the large woody cover and mosaic of floating-leaf and submergent plant beds. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) This site is the primary spawning area for Mission Lake for most fish species.
2) Spring and summer spawning sites for yellow perch and bullhead
3) Spring/summer/fall nursery areas, feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The combination of emergent vegetation, floating-leaf lily beds, shoreline shrubs and snag/perch trees is the key to the habitat value of this site. This site is the most impressive of the designated bog areas. The diversity of and number of shrub, live trees, standing dead trees will support a greater diversity of habitat. The standing dead trees provide perches, nesting and cavity nesting opportunities. In addition to the habitat values found at all the sites, this site also provides

1) nesting and feeding areas for ducks
2) feeding areas for loon
3) shelter, cover and nesting areas for geese
4) shelter, cover, nesting and feeding areas for eagles, osprey and green heron
5) shelter, cover and feeding areas for kingfisher
6) nesting areas for reptiles such as turtles and snakes

Recommendations

1) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
2) Do not remove fallen trees along shoreline that provide fish and wildlife habitat.
3) Do not alter the littoral zone except for improvement of spawning habitat
4) Maintain slow no-wake speed to protect plant beds and shoreline
5) Maintain and protect the existing habitat, emergent plant beds and floating-leaf vegetation, for wildlife habitat
6) Maintain snag trees for cavity nesting and perch sites
7) Maintain the emergent, shoreline and aquatic vegetation in an undisturbed condition for habitat and as a buffer for water quality protection, preventing nutrient input and erosion.
8) No shoreline or bank erosion control needed
9) No bank grading
10) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects
11) No dredging or lake bed removal or modifications
12) Minimize pier placement, permit required for placement
13) No boat ramp placement
14) Permit required for recreational floating devices

Sensitive Area Mission 7 – County Park Bog

This sensitive area encompasses approximately 600 ft of shoreline, out to water depths of 8 feet, bordered on the east by the County Park (Figure 2). It includes deep marsh and shallow marsh habitats that support important near-shore terrestrial habitat and shoreline habitat. The sediment is sand and peat. The shoreline is entirely sphagnum bog, with abundant herbaceous cover and good cover of alder thicket. Just offshore, the site supports deep-water marsh habitat.

The Plant Community:

Emergent vegetation, bluejoint grass, cattails, sedges, alder bushes and leatherleaf brush, along the shore protects the shoreline, the water quality and provides excellent wildlife habitat.

A diverse submergent plant community provides many fish and wildlife benefits (Table 7). Waterweed and bladderwort species occur at this site; wild celery, muskgrass and bushy pondweed are common at this site. The pondweed family is an important food source and habitat structure for fish and waterfowl and is represented at this site by clasping-leaf pondweed, flat-stem pondweed, leafy pondweed and Illinois pondweed.

Water Quality

Maintaining the integrity of this sensitive area is especially important for protecting the water quality of Mission Lake as this site contains springs that provide water flow to the lake.

Fish Habitat

Important habitat components at this site are the emergent plant beds, overhanging vegetation, and mosaic of floating-leaf vegetation and submergent plant beds with open areas. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) Spring and summer spawning sites for yellow perch and bullhead
2) Spring/summer/fall nursery areas, feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The combination of emergent vegetation, floating-leaf lily beds, shoreline shrubs and snag/perch trees is the key to the habitat value of this site. In addition to the habitat values found at all the sites, this site also provides

1) nesting and feeding areas for ducks
2) feeding areas for loon
3) shelter, cover and nesting areas for geese
4) shelter, cover, nesting and feeding areas for eagles, osprey and green heron
5) shelter, cover and feeding areas for kingfisher
6) nesting areas for reptiles such as turtles and snakes.

Recommendations

1) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
2) Do not remove fallen trees along shoreline that provide fish and wildlife habitat.
3) Do not alter the littoral zone except for improvement of spawning habitat
4) Maintain slow no-wake speed to protect plant beds and shoreline
5) Maintain and protect the existing habitat, emergent plant beds and floating-leaf vegetation, for wildlife habitat
6) Maintain snag trees for cavity nesting and perch sites.
7) Maintain all aquatic, emergent and shoreline vegetation in an undisturbed condition for habitat and as a buffer for water quality protection.
8) No shoreline erosion control needed
9) No bank grading
10) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects
11) No dredging or lake bed removal or modifications
12) Minimize pier placement, permit required for placement
13) No boat ramp placement
14) Permit required for recreational floating devices

Sensitive Area Mission 8 – Mid-Lake Plant Bed

This is a popular fishing area as evidenced by fishing boats observed on the edges of this plant bed.

This sensitive area, approximately 2 acres, occurs in the middle of the east basin of Mission Lake (Figure 2). The site is entirely deep-water marsh habitat. The sediment is sand, silt, gravel and rock.

The Plant Community:

Floating-leaf yellow pond lilies are dominant, dampen wave action and provide important fish cover.

A diverse submergent plant community provides many fish and wildlife benefits (Table 8). Muskgrass, wild celery and northern watermilfoil occur at this site; bushy pondweed is common at this site. The pondweed family is an important food source and habitat structure for fish and waterfowl and is represented at this site by clasping-leaf pondweed and the abundant Illinois pondweed.

Water Quality

Maintaining the integrity of this sensitive area is especially important for protecting the water quality of Mission Lake as this site contains springs that provide water flow to the lake.

Fish Habitat

The mosaic of floating-leaf vegetation and submergent plant beds with open areas is an important habitat component at this site. In addition to the fish habitat provided at all the sites, this site provides additional habitat values.

1) Winter nursery areas for northern pike, musky and large-mouth bass.
2) Fall and winter nursery areas, feeding areas and protective cover for bullhead and sucker

Wildlife Habitat

The primary wildlife habitat at this site is the cover and food provided by the floating-leaf lily beds.

Recommendations

1) Maintain and protect aquatic vegetation (submerged, floating-leaf and emergent) for fish habitat
2) Create fish cover with cribs or half logs
3) Maintain slow no-wake speed to protect plant beds and shoreline
4) Maintain the aquatic vegetation in an undisturbed condition to protect the sediments from resusupension due to wave action. This shallow area would be particularly vulnerable to wind fetch waves
5) No pea gravel beds or sand blankets, except for DNR fishery or wildlife approved projects
6) No dredging or lake bed removal or modifications
7) No recreational floating devices