State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

2003 WHITEFISH (BARDON) LAKE, DOUGLAS COUNTY, SENSITIVE AREA DESIGNATION SURVEY AND MANAGEMENT GUIDELINES

"Lac Rorschach" photography by Philip Hanft

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WHITEFISH (BARDON) LAKE, DOUGLAS COUNTY
SENSITIVE AREA SURVEY REPORT

Survey Date(s): 14 and 15 August 2003 **Number of Sensitive Areas**: 5

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INTRODUCTION

Sensitive Area Designations

Sensitive Area Designation Surveys are an integrated team approach to resource management because they utilize Wisconsin Department of Natural Resources (DNR) staff with expertise in water resources, fisheries, wildlife, water management, and law enforcement. As a team, resource experts collaborate to identify locations around a lake that are critical to the future health and integrity of the lake's **ecosystem**. Sensitive area surveys provide lake organizations, owners of shoreline property, county zoning officials, DNR personnel, and other interested individuals with site information that can be used to make management recommendations that will help protect and potentially improve the overall health of lakes. DNR staff conducted a sensitive area survey on Whitefish (Bardon) Lake, Douglas County, on 14 and 15, August 2003.

Sensitive Areas Defined

What is meant by the terms 'sensitive area designation?' Sensitive areas are usually located in areas that consist of endangered or rare species, aquatic/wetland vegetation, terrestrial vegetation, gravel/rubble lake bottom substrate, and/or areas that contain large woody cover. These areas often provide water quality benefits to the lake, reduce shoreline **erosion**, and contain the **habitat** needed to sustain many species of fish and wildlife. According to Wisconsin Administrative Code, "Aquatic Plant Managemnt", NR 107.05(3.)(i.)(1.):

> *Sensitive areas are areas of aquatic vegetation identified by the department as offering critical or unique fish and wildlife habitat, including seasonal or life-stage requirements, or offering water quality or erosion control benefits to the body of water.*

During a sensitive area survey, the resource team identifies other important aquatic **habitat** features that may not be limited to vegetation. A designated sensitive area alerts interested individuals (e.g. DNR personnel, county zoning staff, and lake associations) that the area contains important **habitat** that is vital to sustaining a healthy lake **ecosystem** and/or features an endangered or threatened plant or animal. Therefore, existing data that describe sensitive area **habitat** features and concerns at a site will facilitate permit reviews and decisions regarding water-based actions affecting that site. These data will guide a permit decision to protect important ecological features of the site.

General Lake Information

Whitefish Lake (Waterbody Identification Code 2694000) in Douglas County is a moderately-sized **seepage** lake, which has neither a natural surface water inlet nor outlet[1]. Whitefish Lake is also referred to as Bardon and/or Bee Lake. The lake topographically consists of two deep basins that are connected by a narrows section (Figure 1). Whitefish Lake is 832 acres with a maximum depth of 102 feet and an average depth of 30 feet. The lake is **oligotrophic**, meaning it does not contain an abundance of nutrients that encourage plant and algal blooms and is characterized by clear, deep water. According to the 2003 Self-Help Monitoring Report, Whitefish Lake had an average **secchi depth** of 23 feet and a **Trophic State Index (TSI)** rating of 38 in the south basin and an average **secchi depth** of 22 feet and a **TSI** rating of 33 in the north basin.

Whitefish Lake has been designated as an "Outstanding Resource Water" in Natural Resources Administrative Code 102. Wisconsin Legislature 2003 Act 118 changes rules for waterway activities and alterations. Some changes involve the exemptions of certain activities in navigable waters. These new exemptions are generally not available for projects that are in "areas of special natural resource interest," including state natural areas, designated trout streams, Outstanding and Exceptional Resource Waters or in waters with "public rights features," which include designated sensitive areas. Therefore, *the exemptions created by Act 118 may not apply in Whitefish Lake*. Please contact the Water Management Specialist before pursuing a shoreline alteration project.

Fishery

Oligotrophic lakes like Whitefish generally do not support large numbers of fish because of the low nutrients, but they do often develop a food chain that supports large gamefish. Whitefish indeed supports a unique two-story fishery with some trophy-sized fish. In addition to the northern pike, walleye, and large- and smallmouth bass that are commonly found in nearby lakes, Whitefish Lake supports brown and rainbow trout populations. According to Fisheries Biologist Scott Toshner:

- Walleye stocking began in 1978 in order to diversify the fishery and increase predation on bluegill, which were considered overabundant at that time. Walleye stocking continued until 1993 when it was discontinued because

[1] A manmade channel has been constructed and is occasionally dug out that connects Whitefish Lake to Deborah Lake.

natural reproduction was sufficiently maintaining the population. According to the last walleye population estimate in 1991, there were 2.3 adults/acre. This is below the statewide management objective for walleye populations but typical of an **oligotrophic** lake. Walleye **recruitment** surveys have been completed almost every year since 1991, and they indicate that walleye **recruitment** is good from year to year. A standard 15-inch length limit for walleye with bag limits determined by tribal declarations is in effect.

- Brown and rainbow trout have been stocked in the lake since 1961. Trout natural reproduction appears limited, but growth rates are good. Occasionally large trout have been caught, which indicates survival to older ages. Currently brown trout are stocked every third year.
- Largemouth and smallmouth bass are present in better than average abundance.
- Northern pike are not abundant, but they may grow large in Whitefish Lake.
- Panfish abundance appears to have declined dramatically since walleye introduction. The 1991 creel data indicate that they have become a minor component of the overall fishery. Panfish declines are likely related to the newly established walleye fishery.
- Other species present in Whitefish Lake include: white sucker, yellow perch, rock bass, black crappie and creek chub.

The 1991 creel data indicate that fishing pressure is below the regional norm. In 2004, summer fyke netting and fall electrofishing surveys will further assess the Whitefish Lake fishery.

Wildlife

Shoreland areas on Whitefish Lake provide optimum **habitat** for many species of wildlife. On the upland, standing dead and dying trees (snags) provide forage sites for insect-eating birds and eventually nesting sites for woodpeckers and songbirds. Cavities in trees provide den sites for many species of birds and mammals. Downed and rotting logs provide homes to many species of wildlife including salamanders, small mammals and invertebrates. Downed logs in or near the water (**large woody cover**) are especially valuable for resting and feeding areas. Vegetation near the shore and in the water is used for nesting shelter as well as food. Wildlife **habitat** on Whitefish Lake is best where the shoreline is undeveloped or has been allowed to remain mostly natural. Removing **large woody cover** in the water and understory cover (brush) on the shore degrades fish and wildlife habitat. According to Wildlife Biologist Greg Kessler:

- Annual amphibian surveys are conducted at the public boat landing and at Deborah Lake. These surveys have found a wide variety of amphibians including: wood frogs, spring peepers, gray tree frogs (both Eastern and Cope's), American toads, green frogs, mink frog, bull frogs, and occasionally leopard frogs. In general, amphibians are more abundant and diverse in Deborah Lake than in the Whitefish Lake itself. This may be attributed to shallow depth, soft fertile sediment, and abundant undisturbed cover in and adjacent to the water in Deborah Lake as opposed to sandy, deeper, less fertile waters in Whitefish.

- While eagles do not nest immediately on Whitefish lake, they have nested about 1 mile to the east for the past 15 years or more and forage heavily on the Whitefish Lake fish.
- Loons are present and thought to be nesting on Whitefish Lake, but no specific surveys have been done to document nesting location or success rates.
- A variety of waterfowl uses the lake, with mallards being the primary species.
- Prairie cordgrass is found at both the north and south ends of Whitefish Lake and is unique in this area of Wisconsin. This vegetation is beneficial to wildlife.

Whitefish Lake and the adjacent wetlands and small lakes should not be viewed as separate entities, but as a whole that is greater than the sum of each component individually. To reduce the quality or quantity of one will negatively impact the other and thereby degrade wildlife ***habitat****.*

Aquatic Plants

The aquatic plant **diversity** in Whitefish Lake is relatively average for northern Wisconsin, and the aquatic plant **community** is balanced and ecologically beneficial. Plant **diversity** is average not because of poor **habitat** or water quality but rather because of the limited nutrient availability, which is characteristic of **oligotrophic** lakes, and because the **habitat** is generally uniform throughout the lake. Survey staff identified twenty aquatic plant species in Whitefish Lake (Appendix). Generally plant **densities** are low to moderate, with only a couple of large plant beds on the lake.

Aquatic plant management permits are required for plant control in areas with any species of concern and for chemical control and mechanical harvesting. A permit is not required for manual removal of aquatic plants in an area less than 30 feet wide along the shoreline, provided the removal is authorized or performed by the riparian property owner and *is not located within a designated sensitive area*. Almost half of Whitefish Lake shoreline is designated as sensitive area. To avoid degrading important **habitat**, please contact your aquatic plant management specialist before conducting any aquatic plant control on Whitefish Lake.

Exotic Species

Many aquatic **exotic species** (e.g. Eurasian watermilfoil, smelt, and zebra mussels) are introduced by human activities such as boating, fishing, and releasing aquarium pets. **Exotic species** are more likely to become established in disturbed areas (e.g. boat landings, dredge sites, or docks) or where native plants have been removed. Protection of native plant beds may thwart or slow the establishment and spread of exotics should they be introduced into the lake system.

Fortunately, survey staff did not observe any **exotic plant species** in Whitefish Lake. A local source of Eurasian watermilfoil infestation occurred, however, when the exotic invasive plant was identified in the Minong Flowage in 2002. It is extremely important that lake users make a conscientious effort not to introduce Eurasian watermilfoil and other exotics to Whitefish Lake. Before leaving boat landings, boaters should always remove plant material from the motor, trailer, axles, fishing, swimming, and skiing equipment and any other places where plants may "hitch a ride." All bilges,

livewells, and motors should be drained, as well. Bait buckets should be dumped on land and never released into the waterbody. In order to confidently eliminate the threat of transporting **exotics species** from lake to lake, boaters should either wash their boat, trailer, and equipment with hot tap water, high-pressure water, or allow it to dry out for five days before using it another waterbody.

Shoreland Management

Wisconsin's Shoreland Management Program, a partnership between state, county, and local governments, works to protect clean water, **habitat** for fish and wildlife, and natural scenic beauty. The Program establishes minimum standards for lot sizes, structural setbacks, shoreland **buffers**, vegetation removal and other activities within the shoreland zone. The shoreland zone includes land within 1000 feet of lakes, 300 feet of rivers, and floodplains. With research demonstrating that current standards may be inadequate to protect water resources and the fish and animals that depend on them, many communities have chosen to go beyond the minimum standards to ensure that Wisconsin's natural resources are adequately protected. This report will provide management guidelines for activities within the lake and in the immediate shoreland area. Before any recommendations in this report are completed please check with the DNR and/or local governments for required approvals.

A vital step in protecting Wisconsin's water resources is to maintain an adequate **buffer**. According to the Douglas County Zoning Ordinance, Class 3 lakes such as Whitefish require a shoreland **buffer** that extends from the water onto the land at least 50 feet. Deep **buffers** of 50 feet or more can help provide important wildlife **habitat** for songbirds, turtles, frogs, and other animals, as well as help to filter out pollutants from runoff. In general, no mowing should occur in the required **buffer** area. This **buffer** should match the typical **ecosystem** in Northwestern Wisconsin and include three layers of vegetation: herbaceous, shrub and tree canopy.

In addition, the reader should also investigate other innovative ways to reduce the impacts of runoff flowing into the lake while improving critical shoreline **habitat**. This may include refraining from fertilizer use; installing rain gardens; reducing/eliminating lawn areas; decreasing the area of impervious surfaces by redirecting water flow to where it can seep and filter; and restoring aquatic plant **communities**.

WHOLE-LAKE MANAGEMENT RECOMMENDATIONS

Many people regard Whitefish as one of Wisconsin's premiere lakes. In order to maintain this image and the valuable resource reality, Whitefish riparians, lake users, and local and state governments should work together to preserve this high quality resource. Part of the appeal and resource value of Whitefish Lake is that much of the shoreline and littoral **habitat** has remained in tact. For the most part, it retains the character of a wild lake. A management option may be to do nothing in the areas where the wild lake character remains.

In addition to the site-specific management recommendations that follow, there are general recommendations that could be implemented by riparians who do not own property within designated sensitive areas but would like to restore **habitat** where it has been degraded. They include:

1. Do not remove aquatic plants. Because Whitefish Lake is **oligotrophic**, aquatic plants are not abundant. The plants that do exist are beneficial for floral **diversity**, fisheries and wildlife **habitat**, and water quality.
2. Do not remove **large woody cover**, such as logs, downed trees, and stumps within the **littoral** and shoreland **buffer** zones. The woody cover provides **habitat** for fish, wildlife, and other organisms.
3. Preserve existing shoreline vegetation and restore shoreline **buffers** where the vegetation has been removed and/or degraded. Shoreline **erosion** is more prevalent in areas where the vegetation has been removed, and this results in poor fish and wildlife **habitat**; water quality impacts; and potentially decreased property values.
4. Continue to educate folks that recreate on Whitefish Lake about the threats of **exotic species** and how to properly inspect their boats, trailers, and equipment for potential aquatic invasive "hitchhikers."
5. Remove failing structures that no longer comply with the Douglas County Zoning Ordinance and restore the shoreline to its natural state.
6. Avoid habitat **fragmentation** activities (e.g. mowed lawns, shoreland/wetland fills, and structures) that may affect fish and wildlife values, including amphibian migration. **Cumulative impacts** are often more detrimental than they may seem.
7. Avoid stirring up sediments with motor props. Disturbing the substrate increases phosphorous loading and may impact the sensitive aquatic plant **community**.
8. Drive motorboats at slow-no wake speeds within 200 feet of the shoreline and emergent aquatic plant beds.

SURVEY METHODS

Survey participants identified a total of five sensitive area sites (Table 1 and Figure 1) in Whitefish Lake. On the first day of the survey, wildlife, water regulation, water resources, fisheries, and law enforcement staff collaborated to identify the sites they deemed most sensitive to impacts; beneficial to fish and wildlife; and/or unique relative to the waterbody as a whole and other lakes in the region. On the second survey day, three staff with aquatic plant identification skills snorkeled on a grid at three sites to identify the aquatic plants. The five designated sensitive area sites include approximately 3 miles of linear shoreline, or about 44% of Whitefish Lake shoreline. The sites were selected primarily because of two major **habitat** features: 1) shoreland and littoral **habitat diversity** or 2) fishery.

In addition to the five sites within Whitefish Lake, survey staff identified a need to protect Deborah Lake, which borders the south shore of Whitefish and the wild lake and wetland complex that borders the northeastern shore. Although staff did not get to survey Deborah Lake and the bog wetland/wild lake in detail, they are considered potential sensitive areas and should be priorities for future Surveys.

Table 1. Whitefish Lake sensitive area designation sites and corresponding primary reason, based on habitat features, for site selection.

Site Number	Unique Site ID	Reason for Selection
1	WF-01	Shoreland and Littoral Habitat Diversity
2	WF-02	Fishery
3	WF-03	Shoreland and Littoral Habitat Diversity
4	WF-04	Shoreland and Littoral Habitat Diversity
5	WF-05	Fishery

RESOURCE VALUES SITE BY SITE

Site 1

Site 1(WF-01) is located along the southeast shore of the lower basin (start point N 46.21063°, W091.87060°). The site includes the shoreline and the **littoral zone** out to the ten-foot depth contour and is approximately 1.2 miles long, as measured along the shoreline. The area consists of undisturbed aquatic and terrestrial vegetation that provide unique shoreland and littoral **habitat**. Part of the shoreland of this site is under the State's ownership. Bottom substrate consists primarily of sand with intermittent gravel. Wooded areas dominate (approximately 80%) the shoreland zone with some areas of wetland (approximately 10%) and a small amount of development (approximately 10%). Herbs, shrubs, and trees dominate the shoreland buffer character from the waters edge to 35 feet inland. Additionally, some lawn is present. The wetland is shrub carr, which consists of sandbar willow, shrubs, and woody plants. **Large woody cover** is common, and the **natural scenic beauty** (NSB) is average with minimal human **disturbance**.

Table 2. Aquatic plants found at Site 1 by plant category and abundance.

Aquatic Vegetation Category	Present	Common	Abundant
Emergents:		*Scirpus americanis, Eleocharis acicularis, Eleocharis palustris*	
Floating-Leaf Plants:			
Submersed Plants:	*Vallisneria americana*		*Najas* spp.
Pondweeds (Potamogetons):	*Potamogeton gramineus, Potamogeton robbinsii,*	*Potamogeton praelongus*	
Turf Formers/Rosettes:	*Isoetes* spp., *Eriocaulon aquaticum*	*Lobelia dortmanna*	
Algae:	*Nitella* spp.	*Chara* spp.	

Emergent vegetation, shoreland shrubs and brush, snagged and perched trees, and fallen logs provide important **habitat** for wildlife. Wildlife that may potentially use this site for protective cover, nesting, and feeding include otter, muskrat, mink, ducks,

songbirds, frogs and toads, and salamanders. Eagles, loons, and turtles may feed here or find cover, as well.

Management Recommendations:
1. Comply with established Douglas County Shoreland Zoning Ordinance.
2. No chemical, mechanical, or manual treatments for aquatic plants should be allowed within this area.
3. Keep **large woody cover** in tact for beneficial **macroinvertebrate**, fish, and wildlife **habitat**.
4. Maintain vegetation, both within the lake and along the shoreline, to prevent **erosion**.
5. Refrain from placing structures, including floating recreational devices, within emergent vegetation zone. These structures should be, or in the case of piers extend, at least approximately 100 feet from shore in order to protect beneficial emergent aquatic plants.
6. Maintain the wildlife corridor by protecting adjacent/nearby wetlands.
7. Minimize fast motorboat activity.

Site 2

Site 2 includes the shoreline along Forbes Point and Tuomenin Point in the middle of Whitefish Lake and the sandbar and emergent aquatic plant bed that connect them. This site includes approximately 0.3 mile of shoreline. Fisheries are the primary reason for site selection because walleye spawning has been documented along the shorelines, and unique **habitat** features, including steep ledges and an offshore emergent aquatic plant **community** provide nursery, feeding, and cover **habitat**. The important **habitat** of the sensitive area is located in the **littoral zone**, with shoreland cover enhancing the **habitat** features. Bottom substrate consists primarily of sand. Wooded areas dominate (approximately 90%) the shoreland zone with some development present (approximately 10%). Herbs, shrubs, and trees are the dominant features of shoreland buffer character from the waters edge to 35 feet inland. **Large woody cover** is present, and the **natural scenic beauty** (NSB) is average with minimal human **disturbance**.

This site provides unique features and important seasonal **habitat** for all of Whitefish Lake's fish species. More specifically, the shorelines along both penninsulas provide excellent spawning **habitat** for walleye. The ledges and aquatic plants along the sandbars provide nursery, feeding, and cover areas for game as well as forage fish. During the snorkel survey, staff observed schools of bluegill, as well as some large bass along the ledge. Unfortunately, litter, including aluminum cans, rope, and plastic, was also commonplace at this site.

In addition to the unique topographic features of Site 2, there is an offshore emergent aquatic plant **community** that is a unique habitat feature in Whitefish Lake. This offshore plant **community** is beneficial to wildlife and fish. The emergent plant bed is located in a natural travel route and showed evidence of motor propeller damage. Boat traffic, including wave action and prop troughs, may degrade this unique feature and promote disturbed **habitat** where **exotic species** often establish. Additionally, off-shore

emergent aquatic plant **communities** are exceedingly valuable, although they are becoming more rare in lakes.

Table 3. Aquatic plants found at Site 2 by plant category and abundance.

Aquatic Vegetation Category	Present	Common	Abundant
Emergents:		*Eleocharis palustris*	*Eleocharis acicularis*
Floating-Leaf Plants:			
Submersed Plants:	*Elodea canadensis*	*Vallisneria americana*	*Najas* spp.
Pondweeds (Potamogetons):	*Potamogeton robbinsii*	*Potamogeton amplifolius*	*Potamogeton gramineus, Potamogeton praelongus*
Turf Formers/Rosettes:	*Isoetes* spp.	*Juncus pelocarpus, Sagittaria*	*Lobelia dortmanna*

Management Recommendations:

1. No alterations of the shoreline or **littoral zone** should occur at this site location unless an alteration would improve the **habitat** for the fisheries.
2. Motorboat traffic should be limited or slowed, especially near the offshore emergent aquatic plant bed to prevent **habitat** degradation and **disturbance** that may provide an opportunity for **exotic species** to establish.
3. Keep **large woody cover** in tact for beneficial **macroinvertebrate**, fish, and wildlife **habitat**.
4. Educate the public about the value of this site and encourage its protection, including litter prevention.

Site 3

Site 3 is located along the northeastern shore of the upper basin (start point N 46.21343°, W 091.86985°). Site 3 includes approximately 0.81 mile of linear shoreline and extends to the ten-foot depth contour. The area consists of intermittent undisturbed aquatic and terrestrial vegetation that provide unique shoreland and littoral **habitat**. Because shoreland degradation and habitat **fragmentation** have already occurred, the vegetative **habitat** that remains is especially sensitive to future threats. Site 3 generally has similar physical **habitat** features as Site 1, with the exception that Site 3 has more riparian development. The continuous emergent aquatic stands that are characteristic of Site 1 have been removed along lawn fragments here, and thereby, the **habitat** quality has degraded**. Large woody cover** is common along the wooded shoreline, but it has mostly been removed along developed shorelines. **Natural scenic beauty** (NSB) is poor, with moderate human **disturbance**.

DNR staff did not do a detailed aquatic plant survey with snorkeling gear at Site 3. Because of the physical similarity of Site 1 to Site 3, the aquatic plants are expected to be similar.

Emergent vegetation, shoreland shrubs and brush, snagged and perched trees, and fallen logs provide important **habitat** for wildlife. Wildlife that may potentially use this site for protective cover, nesting, and feeding include otter, muskrat, mink, ducks, songbirds, frogs and toads, and salamanders. Eagles, loons, and turtles may feed here or find cover, as well. Emergent and submersed aquatic vegetation provide spawning, nursery, feeding, and/or protective cover **habitat** for northern pike, large- and smallmouth bass, and panfish species at this site. Geese, which are often a nuisance and contribute to water quality degradation, have easy access and are attracted to the manicured shorelines at this site.

Management Recommendations:

1. Comply with established Douglas County Shoreland Zoning Ordinance.
2. No chemical, mechanical, or manual treatments for aquatic plants should be allowed within this area. Shoreline **erosion** and **habitat** degradation are more evident along shorelines where emergents have been removed and replaced with lawns.
3. Restore native vegetation to protect banks and prevent further **erosion** and deter nuisance geese.
4. Keep **large woody cover** in tact for beneficial **macroinvertebrate**, fish, and wildlife **habitat**.
5. Refrain from placing structures, including floating recreational devices, within emergent vegetation zone. These structures should be, or in the case of piers extend, at least approximately 100 feet from shore in order to protect beneficial emergent aquatic plants.
6. Minimize fast motorboat activity.

Site 4

Site 4 consists of the northeastermost shore of Whitefish Lake (start point N46.22551°, W091.86084°). The site extends to the ten-foot depth contour and includes approximately 0.44 linear mile of shoreline. The area consists of undisturbed aquatic and terrestrial/wetland vegetation that provide unique shoreland and littoral **habitat**. Bottom substrate consists primarily of sand with a thin layer of silt. Wooded areas dominate (approximately 100%) the shoreland zone, and wetland is common (approximately 25%). Herbs, shrubs, and trees dominate the shoreland buffer character from the water's edge to 35 feet inland. The wetland that seeps into the lake is bog, which is characterized by sphagnum moss, tamarack, and leatherleaf. **Large woody cover** is common, and the **natural scenic beauty** (NSB) is good with no human **disturbance**.

Emergent vegetation, shoreland shrubs and brush, snagged and perched trees, and fallen logs provide important **habitat** for wildlife. Wildlife that may potentially use this site for protective cover, nesting, and feeding include otter, muskrat, mink, ducks, songbirds, frogs and toads, and salamanders. Eagles, loons, and turtles may feed here or find cover, as well. Emergent and submersed aquatic vegetation provide spawning, nursery, feeding, and/or protective cover **habitat** for northern pike, large- and smallmouth bass, and panfish species at this site.

Table 4. Aquatic plants found at Site 4 by category and abundance.

Aquatic Vegetation Category	Present	Common	Abundant	Dominant
Emergents:	*Scirpus americanis*	*Eleocharis acicularis*	*Eleocharis palustris*	
Floating-Leaf Plants:				
Submersed Plants:	*Vallisneria americana, Najas* spp.			
Pondweeds (Potamogetons):	*Potamogeton spirilis*			
Turf Formers/Rosettes:	*Ranunculus flammula*	*Eriocaulon aquaticum, Myriophyllum tenellum*		*Lobelia dortmanna*

Management Recommendations:

1. Shorelands and wetlands should be protected as much as possible under existing regulations, and shoreland management that is more protective than the minimum (state and county) standards is encouraged.
2. No chemical or mechanical treatments for aquatic plants should be allowed within this area.
3. Maintain biological integrity of the site to preserve the existing wildlife species.
4. Protect the bog wetland complex that serves as Whitefish Lake's headwaters.
5. Minimize fast motorboat activity.

Site 5

Site 5 is located along the penninsula on the southwestern shore of Whitefish Lake (start point N46.20941°, W091.88076°). The site extends to the **littoral zone's** ten-foot depth contour and includes approximately 0.23 mile of linear shoreline. Fisheries are the primary reason for site selection because walleye spawning has been documented along the shorelines. The important **habitat** of the sensitive area is located along the shoreline, with shoreland cover enhancing the habitat features. Bottom substrate consists primarily of sand.

Management Recommendations:

1. No alterations of the shoreline or **littoral zone** should occur at this site location unless an alteration would improve the **habitat** for the fisheries.
2. Encourage restoration of shoreline and aquatic vegetation to prevent **erosion** and sedimentation and to improve fish and wildlife **habitat**.

Deborah Lake and Wetland Complex/Wild Lake

Although staff did not survey Deborah Lake, along Whitefish's south shore, and the bog wetland complex and wild lake, along Whitefish's northeastern shore, both are essential components of the Whitefish Lake **ecosystem**, and both should be protected as such. Deborah Lake has great plant **diversity** and abundance, which benefits wildlife **communities** that may migrate to Whitefish. The wetland enhances water quality by filtering potential pollutants that may otherwise flush into Whitefish; by recharging/discharging groundwater; and by controlling flooding and/or high water. Indeed while surveying Site 4, staff observed the seep from the wetland. If the wetland were to be degraded, the water quality of Whitefish Lake would most likely degrade, as well. Since Deborah Lake and the wetland complex/wild lake appear to essentially remain wild and generally not disturbed, the best management option may be to do nothing (i.e. leave it as it is). If areas have been degraded, they should be restored to their natural character by following the applicable management recommendations previously discussed.

CONCLUSION

Recent studies have found that riparian property values are highest on lakes that have clear water and undisturbed shorelines. Whitefish Lake is a stand-out among Wisconsin's many lakes because it retains its wild character along most of its shoreline; contains deep, clear waters; cultivates a complex fishery that may result in trophy fish; and provides important **habitat** for many species of wildlife. The Sensitive Area Designation is a first step in the process to protect the ecological and economic resources of Whitefish Lake.

In August 2003 Wisconsin Department of Natural Resources staff designated five sites on Whitefish Lake, Douglas County as sensitive areas that contain important **habitat** for aquatic plants, fish, and/or wildlife. In addition to these five sites, staff recommended that Deborah Lake along the southern shore and the wetland complex and wild lake along the northeastern shore be surveyed and included as sensitive area sites in the future. There are general and specific management recommendations to protect these sites and the entire lake as a whole. These recommendations generally fall into two categories:

1) if the **habitat** retains its native and wild character, leave it alone; and
2) if the **habitat** has been degraded or removed, restore it to its native and historic character.

As shoreline development continues to increase, decision-makers and the general public must find ways to ensure that fish and wildlife **habitat** is not degraded. Sensitive area designations and reports provide detailed data that describe specific sites as well as the means to protect those sites. Designated sensitive area sites are defined in administrative codes and have legal precedence as a tool for DNR management decisions. All the data used to compile this report are available at the Department’s Superior Service Center.

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Bob Korth, Wisconsin Lakes Partnership - University of Wisconsin Extension, provided permission to duplicate images and information from *Through the Looking Glass: A Field Guide to Aquatic Plants* (Appendix). Sales of this book support the Wisconsin Lakes Partnership. To purchase a copy, please call (715) 346-2116, or visit the Wisconsin Lakes Partnership webpage (http://www.uwsp.edu/cnr/uwexlakes/).

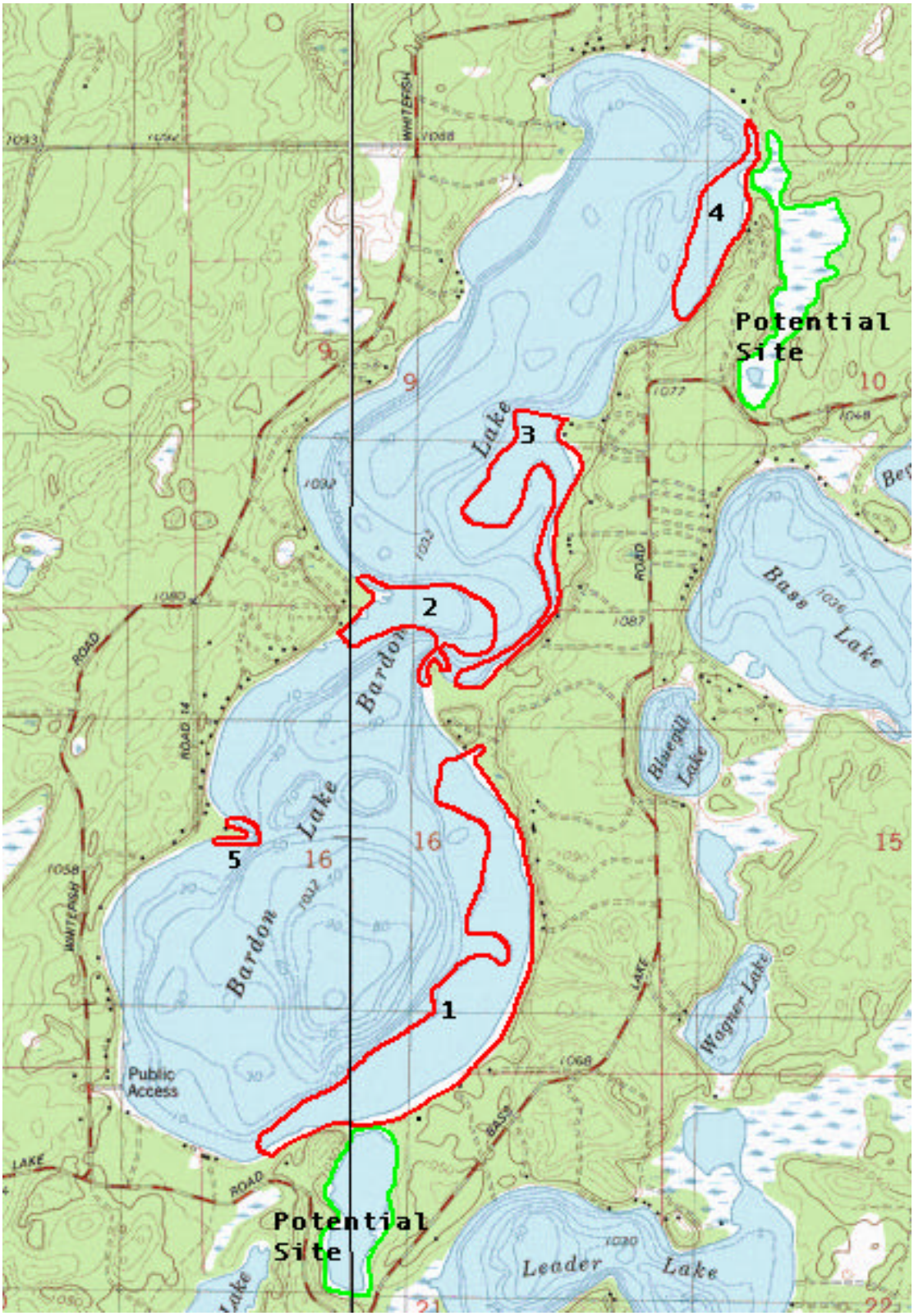

FIGURE 1. Designated Sensitive Area sites on Whitefish (Bardon) Lake and potential Sensitive Area Sites at Deborah Lake (on southern shore of Whitefish) and a wetland complex/wild lake (on the northeastern shore of Whitefish).

GLOSSARY

Buffer: A vegetation strip maintained along a stream, lake, road, or different vegetative zone to mitigate the impacts of actions on adjacent lands. Buffer strips may block views that may be undesirable. Buffers reduce abrupt change to fish and wildlife habitat.

Community: An assemblage of plants and animals living together and occupying a given area.

Cumulative impacts: Effects on the environment that result from separate, individual actions that, collectively, become significant over time.

Disturbance: Any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment.

(biological) Diversity: The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and the ecological processes that connect everything in a common environment.

Ecosystem: All the organisms in a particular region and the environment in which they live. The elements of an ecosystem interact with each other in some way, and so depend on each other either directly or indirectly.

Erosion: The wearing down or washing away of the soil and land surface by the action of water, wind, or ice.

Exotic species: A species that is 1) non-native (or alien) to the ecosystem under consideration **and** 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. They can invade and degrade even high-quality natural communities. Human actions are the primary means of invasive species introductions.

Fragmentation: The splitting or isolating of patches of similar habitat. Habitat can be fragmented naturally or from human activities, such as wetland filling or clearing land.

Habitat: The place, including physical and biotic conditions, where a plant or an animal usually occurs.

Large woody cover: Logs, stumps, and coarse roots in all stages of decay that provide habitat for plants, animals, and insects.

Littoral zone: The biogeographic zone in a body of fresh water where light penetration is sufficient for the growth of plants.

Macroinvertebrates: Organisms without backbones. In lakes and rivers, these include aquatic insects, crustaceans, worms, clams, and snails.

Natural scenic beauty (NSB): A way to rate the aesthetic attributes of a shoreline. The rating is qualitative and hence subjective. The NSB is determined relative to other sites within the same waterway. Therefore, a "poor" site in one area of the state may be deemed an "outstanding" site in another area of the state.

Oligotrophic: Waters or soils that are poor in nutrients and have low primary productivity.

Recruitment: The influx of new members into a population by reproduction or immigration.

Secchi disk/depth: A disk with a 4-6 inch radius that is divided into 4 equal quadrates of alternating black and white colors and is used to measure water clarity. It is lowered into a section of shaded water until it can no longer be seen and then lifted back up until it can be seen once again.

Seepage lake: Lakes that do not have an inlet or outlet and only occasionally overflow. The principle source of water is precipitation runoff, supplemented by groundwater from the immediate drainage area. Since seepage lakes commonly reflect groundwater levels and rainfall patterns, water levels may fluctuate seasonally. Seepage lakes are the most common lake type in Wisconsin.

Trophic State Index (TSI): The total weight of living biological material (*biomass*) in a waterbody at a specific location and time. Time and location-specific measurements can be aggregated to produce waterbody-level estimations of trophic state. Trophic state is understood to be the biological response to forcing factors such as nutrient additions, but the effect of nutrients can be modified by factors such as season, grazing, mixing depth, etc. See the Self-Help Monitoring Report(s) for more information.

Definitions from WDNR and http://biology.usgs.gov/s+t/SNT/noframe/zy198.htm#B.

APPENDIX

Excerpts from *Through the Looking Glass: A Field Guide to Aquatic Plants (*Borman et al. 1997). Illustrations by Carol Watkins.

Aquatic plants identified in Whitefish Lake. Plants are in alphabetical order by species name.

Borman, S., R. Korth and J. Temte. 1997. Through the Looking Glass: A Field Guide to Aquatic Plants. Wisconsin Lakes Partnership, UWEX-CNR, UWSP, Stevens Point, WI.