

## Sensitive Area Designation for the Upper White River Millpond



May 2004

**Upper White River Mill Pond  
WIBIC #152200  
Sensitive Area Designation Report**

Date of survey: 17 July 2003 and 30 September 2003  
Number of sensitive areas: 8

Site Evaluators:        Scott Provost, Water Resources Specialist – Wautoma  
                              Shawn Eisch, Water Management Specialist – Wautoma  
                              Dave Bartz, Fishery Biologist – Montello  
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**General Lake Information:**

The Upper White River Millpond is a 64-acre impoundment of the spring pond to the West Branch of the White River. Maximum depth is 29 feet, average depth is 13 feet with 2.1 miles of shoreline. A dam on the east end artificially raises the water level approximately 11.5 feet.

The shoreline has varying levels of development with the south shoreline being the least developed on the lake. The undeveloped shorelines have diverse, high value aquatic plants and are buffered by forest. There are 42 homes on the lake with the majority being on the north side. The lake is a no-wake lake thus some activities such as water skiing are prohibited. Despite the no-wake ordinance, the lake is popular for fishing, swimming, canoeing and relaxation. A public access boat ramp off of Lake Drive along the northeast side of the lake offers access to a wide variety of users. The preservation of the lake as a whole is a goal of the Lake District.

The Millpond is warm water fishery. Primary game species are largemouth bass and northern pike. The millpond was historically stocked with rainbow and brown trout from the 1950's through the early 90's, however very low carryover of trout from one year to another and the possibility of jeopardizing the integrity of the trout stream below the dam led to discontinuing the stocking of trout. Bluegill, pumpkinseed, yellow perch, crappie and sunfish are the common panfish.

The undisturbed shoreline of the Upper White River Millpond provides very important habitat for wildlife, fish and invertebrates. Large trees, brush and other plants provide diversity in habitat that is well suited for many species. The common occurrence of dead trees provides snags for birds and cavity dwellers as well as aquatic habitat when these snags fall into the water.

Fallen trees should be considered an asset and beneficial to the wildlife and fish community. When snags fall into the water they provide very important functions to the lake such as habitat for fish, wildlife and invertebrates. Species that need to bask in the sun such as painted turtles can use these to rest. Fallen trees also absorb wave energy that



would otherwise erode banks and decrease water clarity and quality. The loss of this woody debris affects many things. Christensen et al. (1996) found that recent losses of woody debris on developed shorelines could affect those areas for two centuries.

Near shore aquatic vegetation works in concert with fallen trees to add diversity, which improves fish, wildlife and macro-invertebrate production. Almost all living things in a lake ecosystem (94%) depend on shorelines for feeding, shelter or raising their young during all or some of their life. These undisturbed areas provide this habitat, which makes the Upper White River Millpond a truly unique lake.

### **Introduction:**

This survey was conducted on 17 July 2003 and 30 September 2003 using the Wisconsin Department of Natural Resources protocol guidelines for conducting and implementing sensitive area designations (SAD). The purpose of the SAD is to identify areas within the lake that have unique characteristics based on the aquatic plant community, fish and wildlife use. This SAD can provide lake organizations, shoreline property owners, county zoning officials, DNR personnel and other users with specific information that can be used for management recommendations and for educational efforts.

The companion document “Guidelines for Protecting, Maintaining, and Understanding Lake Sensitive Area” is attached in Appendix I. This is a generic document designed to be used in conjunction with specific lake sensitive area designation reports to help the user plan for future needs such as, zoning changes, specific town ordinances or land purchases for protection.

### **What is a Sensitive Area Designation?**

Sensitive area designations are defined in Wisconsin Administrative Code 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.* These areas may consist of valuable aquatic/wetland vegetation, terrestrial vegetation, gravel/rubble substrate, downed woody cover and water quality buffers.

Following is a list of potential ways sensitive area designations could be used:

- To inform and educate the public of potential impacts to the aquatic ecosystem from shoreline alteration
- By managers to guide permitting processes of aquatic plant management, water regulations, fisheries management, wildlife management and local zoning activities
- By local lake organizations to help guide lake use and management activities
- As a foundation for further research or study
- As a complement to local land-use planning activities
- To provide information to potential shoreland buyers and existing shoreland owners
- As baseline data for various resource management decisions
- To provide education to the public about the benefits of protecting and restoring aquatic life habitat.

It is a goal of this SAD to include an educational component as well. A “Lake Water Trail” is also included so an interested party can follow a path through each sensitive area to gain a better understanding of why these areas were selected. We encourage you to explore these sensitive areas and witness the many living things that use these unique areas. Appendix I has a map of the SAD, a suggested travel route, and a brief narrative to explain some of the uniqueness associated with the area.

**The Sensitive Area Designations:**

Eight sites on the Upper White River Millpond during a field survey were designated as sensitive areas because they contain critical or unique habitat (figure 1.). These areas are highly recommended for additional protection. No removal of any rooted vegetation should take place in these areas unless the local Aquatic Plant Management Coordinator has approved the removal. Table 1 below contains the GPS coordinates for the start and end of each SAD.

**Coordinates for SAD's of Upper White River Millpond**

Table 1. GPS coordinates for the start and end of all SAD's .

SAD No.	Start		Finish		Type
	Lat.	Long.	Lat.	Long.	
1	44 05' 15.7"	89 22' 2.3"	44 05' 14.5"	89 22' 8.2"	I
2	44 05' 14.5"	89 22' 8.2"	44 05' 12.9"	89 22' 10.8"	II
3	44 05' 11.8"	89 22' 17.7"	44 05' 10.5"	89 22' 23.2"	I
4	44 05' 8.97"	89 22' 20.4"	44 05' 10.59"	89 22' 23.24"	I
5	44 05' 17.71"	89 22' 24.51"	44 05' 17.71"	89 22' 21.43"	I
6	44 05' 18.21"	89 22' 21.43"	44 05' 26.5"	89 22' 28.63"	I
7	44 05' 26.5"	89 22' 28.63"	44 05' 31.08"	89 22' 27.62"	I
8	44 05' 30.18"	89 22' 20.77"	44 05' 30.61"	89 22' 17.18"	II

**The Field Survey:**

Several surveys were conducted in the summer of 2003. The first survey DNR personnel met with representatives from the Upper White River Lake District and received some preliminary input. The second survey consisted of the local Water Management Specialist – Shawn Eisch and the Local Water Resource Specialist – Scott Provost. The objective was to identify areas of interest before the final Department survey. The third and final survey, involved Fishery Biologist – Dave Bartz, Wildlife Biologist – Paul Samerdyke, Water Management Specialist – Shawn Eisch, and Water Resources Specialist – Scott Provost.

The objectives of the field surveys were similar in most respects but intensified as they progressed. All surveys pointed out unique areas that served fish and wildlife functions, provided aesthetic qualities, and/or had unique characteristics that differ from other lakes in the area. Each specialist identified areas that they feel provide the most habitat and protection for the lake. The results were meshed together and compared to the previous aquatic Plant Survey from Aron and Associates to develop the sensitive areas delineated on the map.

The SAD's were divided into two types. This was done to have different levels of management around high use areas and to effectively manage exotic species.

**Type I:** This type of SAD is designed to maximize protection of the most unique and beneficial areas of the lake. Type I sensitive areas were chosen based on the lack of disturbance, lack of exotic species, unique habitat for fish and wildlife and relative importance to maintaining the integrity of the lake. Shoreline disturbance above and below the OHWM should be limited.

Suggested Management Criteria of Type I SAD:

- No native aquatic plant control/removal of native rooted plants
- Maintain a 75-foot buffer of undisturbed vegetation above OHWM except a path to lake.
- Limit shoreline alteration to correction of only the most degraded cases
- Discourage all bank armoring with rock or concrete

**Type II:** This type of sensitive area may be threatened by human development or exotics and so it may be a candidate for limited management strategies. For example, a site may have the quality characteristics of a Type I but Eurasian Watermilfoil may be spreading in that area. Certain management options may need to be employed.

Suggested Management Criteria of Type II SAD:

- No native aquatic plant control/removal of native rooted plants
- Discuss treatment regimens to control exotic species
- Restore existing manicured shorelines into healthier lawns with unmowed buffers
- Limit shoreline alteration to correction of the most degraded cases
- Discourage all bank armoring with rock or concrete

### **Resource Value of Site 1:**

This site starts on a small bay along the south shoreline, south from the boat landing and goes westward around to a point with large Northern White Cedars (*Thuja occidentalis*). It is about 50 feet wide from the shore lakeward to a depth of 10 feet and combines the upland. The site consists of submergent plants (see Aron and Associates Aquatic Plant



Management Plan for more detailed information on species present) and woody debris. The shoreline has a large amount of woody canopy of dogwood (*Cornus spp.*) and cedar overhanging the water. Figure 2. Shows the woody debris and start of SAD #1.

Figure 2. Start of SAD #1 showing the fallen woody debris and Water Celery (*Valisneria americana*).

Primary reasons for site selection were fishery values, wildlife values, water quality protection and aesthetic qualities. This area has a diverse aquatic plant community that can provide important habitat for wildlife and fish. These plants provide important spawning, nursery, and cover area for fish and invertebrates. The aquatic vegetation provides excellent habitat for the production of macroinvertebrates (aquatic insects). The invertebrates are an essential part of the food chain. The woody debris that is exposed provides roosting and hunting area for birds as well as basking areas for reptiles and amphibians. The site also offers a physical buffer that protects water quality by anchoring and stabilizing sediments and protecting shorelines from wave erosion. The small bay also provides shelter during windy periods for birds and a feeding area during these times as well as food is blown into the bay. The bay also adds a relaxing area that is used by boaters who can anchor there to enjoy the aesthetics.

### **Management Recommendation:**

- Protect the woody debris and shoreline buffer
- Exotics should be monitored
- Do not remove native plants by physical, mechanical, or chemical means
- This area should not have any bank armorment such as riprap installed unless erosion is clearly present.

### **Resource Value of Site 2:**

This site is located along the shoreline immediately south of SAD #1 and has been designated a Type II. Residential development is present but the impacts to the shore are minimal. The continuous wooded shoreline has been broken along the upland side but still useable as a travel corridor for many species. Chara is the primary aquatic plant species but there is a diverse aquatic plant community closer to shore that has many of the same attributes as SAD #1. Woody debris is present but more should be encouraged. Figure 3 shows the existing woody debris with valisneria.

Primary reasons for site selection include fishery values, wildlife values and water quality protection. The aquatic plants and woody debris provide important spawning areas for northern pike and yellow perch. The site is used as a fish nursery and for feeding and cover for other fish and wildlife. Forage species such as minnows also utilize this area. The aquatic vegetation provides excellent habitat for the production of macroinvertebrates. The site also offers a physical buffer that protects water quality by anchoring and stabilizing sediments and protecting shorelines from wave erosion. Shoreline development is present and has had an impact on the site by a decrease in woody debris and lack of aquatic plants near piers.



Figure 3. example of the remaining woody debris along with valisneria. Similar to SAD #1, but development has had an impact on this shoreline by the reduction of woody debris and other habitat.

### **Management Recommendations:**

- Protect the aquatic rooted plants, minimize raking of the lake bed
- Protect woody debris and shoreline buffer that exists
- This area should not have any bank armorment
- Riparian owners are encouraged to participate in shoreline restoration programs

### **Resource Value of Site 3:**

This site is along the southeast shore near the southern most bay of the lake. The site consists of well buffered shoreline, woody debris submergent and floating leaf vegetation. The site extends out into the lake to a depth of 10 feet.

Primary reasons for site selection include fishery values, wildlife values, water quality protection, and natural scenic beauty. White water lily (*Nymphaea odorata*) and spatterdock (*Nuphar variegata*) provides natural and scenic beauty and vital habitat for

Figure 4. showing White water lily (*Nymphaea cordata*) near the start of SAD #3.



fish and wildlife (see figure 4.) This is also an important spawning area for northern pike and yellow perch. Vegetation and woody debris at this site provides a nursery and forage area for fish and wildlife. The aquatic vegetation provides excellent habitat for the production of macroinvertebrates that will utilize the floating leaf vegetation.. Emergent plants

also offers a physical buffer that protects water quality by anchoring and stabilizing sediments and protecting shorelines from wave erosion.

The natural scenic beauty rating was above average compared to other areas of the lake. Although this area is quite small, the more natural looking, minimally disturbed shoreline provides aesthetic values as well as water quality, fisheries, and wildlife values.

### **Management Recommendation:**

- Only a navigational lane through the lilies to the existing structure should be cleared
- Monitor this site for exotic species
- Maintain natural deposition of woody debris.

### **Resource Value of Site 4:**

This site is located along the south shore and adjacent to SAD #3. This site is separated from SAD #3 due to a navigational channel cut through the lilies and extends westward to the developed portions of the south shore (see figure 5.)

Primary reasons for site selection. Like SAD #3, this site includes fishery values, wildlife values, water quality protection, and natural scenic beauty. White water lily and

Figure 5 showing the west end of SAD #4. The wooded shoreline provides a travel corridor for animals. Overhanging branches provide perches for birds who feed on minnows. Eventually these branches will fall into the water where they will provide additional habitat.



spatterdock provides natural and scenic beauty near the start of the SAD. Large oaks and jewelweed dominate the shoreline, which provides habitat for wildlife. The upland area is currently used by many species of wildlife such as, deer, wood ducks, squirrels and songbirds.

### **Management Recommendation:**

- Protect the upland area and trees to maintain woody habitat
- Maintain a minimum of 75-foot setback from the OHWM on all buffers for future development.
- No riprap should be permitted now or in the future
- Do not remove native rooted aquatic vegetation

### **Resource Value of Site 5:**

This site begins along the south shore and continues along the west shore the swim area of the Church Beach. This site contains a large continuous upland buffer consisting of oaks and snags. There are abundant fallen trees into the water and a diverse stand of aquatic native species. Figure 6 shows the undisturbed shoreline with snags near the center of SAD #5.

Figure 6. Note woody debris in the water and dead snags. These will eventually fall into the water providing additional habitat.



The primary reason for site selection was fishery and wildlife values. This site provides an important northern Pike and yellow perch spawning area. Other species such as, bluegill crappie and largemouth bass also utilize this area for feeding and spawning and are commonly seen here throughout the day. Many species of wildlife will use this area for basking, rearing young and feeding. Songbirds use this area for nesting and cover. The large amount of woody debris is a critical component to the life

cycle of some invertebrates. These invertebrates provide food for several fish species, amphibians, reptiles and birds.

**Management Recommendation:**

- Protect woody habitat 75-feet from OHWM
- Do not clear woody debris from lake
- Monitor for exotic species
- Do not remove/control rooted native aquatic plant species
- Avoid rip-rap for shoreline protection in the event of development

**Resource Value of Site 6:**

This site begins on the west side of the Church Beach and continues to the wetland complex on the northwest side of the lake. It is the most continuous undeveloped shoreline along the lake, which provides extensive habitat for wildlife, aesthetic quality, and a source of woody debris in the lake. Figure 7 shows the end of SAD #6 where the wetland complex begins. This area is very rich in plant life and wildlife.

The primary reason for site selection was wildlife, fish habitat and natural scenic beauty. This site is an important wildlife area. The shoreline and upland area are relatively unimpacted. A diverse minimally disturbed near-shore terrestrial plant community provides habitat for a variety of wildlife species. This site also provides good habitat for fish. A healthy stand of Large-leaf Pondweed (*Potamogeton amplifolious*) exists along the shore, which provides excellent cover for fish. This area contains the largest stand of Large-leaf Pondweed than anywhere else on the lake. The natural scenic beauty rating was above average compared to others areas of the lake.



Figure 7. Near the west end of SAD #6. The near shore wetland complex is an example of the diversity found along the shoreline.

**Management Recommendation:**

- Protect the near-shore terrestrial vegetation that currently exists at this site
- Maintain shrubs, herbaceous cover, snags, cavity trees, and perch trees for wildlife for minimum distance of 75 feet from the OHWM
- Do not remove/control any rooted native aquatic vegetation
- Monitor for, and aggressively manage any exotic species

**Resource Value of Site 7**

This site begins after the wooded shore ends at SAD #6 and goes north past the small shallow bay. This is truly one of the unique areas of the lake due to the large number of springs that are above the OHWM, which creates a wetland complex.

Figure 8. Near the west end of SAD #7. The wetland complex provides essential cover for wildlife.



The primary reason for site selection was the wetland complex and shallow bay. This provides diverse habitat areas for many species of wildlife. Many animals that depend on surface water for all or part of the life cycle will use this area.

Many wood ducks were

spotted on separate occasions in the shallow bay where nesting of other ducks is common. This site has a diverse desirable aquatic plant community in the littoral area from shore out through the littoral zone. This diverse plant community just off shore adjacent to the wetland complex dominated by *Angelica* (*Angelica atropurpurea*) and sedges (*Carex spp.*), provides excellent brooding areas for wildlife that feed on the macroinvertebrates associated with this setting.

#### **Management Recommendations:**

- Leave a 75-foot setback from the OHWM to all development
- Protect the natural vegetation on land as well as in the lake
- Prohibit alteration of the topography to avoid damaging the springs
- Prohibit the placement of riprap and seawalls to avoid damage to springs
- Monitor for, and aggressively manage against the spread of exotic species

#### **Resource Value of Site 8:**

This site is on the north shore of the millpond. It has unique attributes such as the point and shallow spring bay. This site is designated a Type II because of development and the presence of exotic species. Eurasian Watermilfoil and Curly-leaf Pondweed are common and should be managed. A large amount of piers in this area detract from the natural scenic beauty of the lake. Figure 9 shows one of the springs that contribute cool water year-round to the lake.



Figure 9 showing a large spring in the bay near the east end of SAD #8.

The primary reasons for site selection were aquatic vegetation and the number of springs. This site offers a desirable aquatic plant community in the littoral area that is under threat by exotic species, but it is manageable (see figure 10.). The large springs in the area provide thermal protection for fish in the summer and winter. The lake in this area is often open

year round due to the uniform, above freezing temperatures. The point also provides a wetland complex similar to SAD #7 that provides excellent habitat for wildlife.

Figure 10 shows a healthy stand of smartweed (*Polygonum amphibium*). The seed heads are an excellent food source for waterfowl and the canopy helps inhibit the spread of Eurasian Watermilfoil.



#### **Management Recommendations:**

- Protect the existing plant community from the further spread of exotic species
- Protect the springs and wetland point from development pressure
- Remove dilapidated piers
- Protect the native plant community
- Prohibit the placement of riprap or seawalls to avoid damage to spring near shore.

#### **Exotic Species:**

There are two exotic aquatic plant species found in the Upper White River Millpond. Eurasian Watermilfoil (*Myriophyllum spicatum*) and Curly-leaf Pondweed (*Potamogeton crispus*). These are found in various locations around the lake and appear to be concentrated near disturbed shorelines. Eurasian water milfoil is more frequent than Curly-leaf Pondweed, which may lead to major changes in the aquatic plant community. Efforts should be made to curb the spread of these exotics. Aron and Associates (2000) plant survey shows the locations where it was found with the relative density.

Exotics are mainly spread by human activities. Therefore, efforts should concentrate on controlling the spread by 1) Prevention of new introductions, 2) Preventing the spread of existing stands. These exotics are not uncommon in area lakes, but preventing the spread to other lakes by properly cleaning equipment before entering other bodies of water will ultimately help the local ecosystem and break the “circle” of re-infestation. This is required by law, however it will take cooperation from the public to ensure the spread is stopped.

The dedication of SAD's will also help prevent the spread. Exotic plants can easily become established in areas that are disturbed and where native plants have been removed therefor, protection of native plant communities is vital to slow the spread of exotics once they are introduced into the lake. Management efforts should continue to try to control this exotic species as much as possible to preserve the overall integrity of the aquatic plant community.

For additional information on the exotics mentioned above and others now entering Waushara County, please call Scott Provost, Wisconsin Department of Natural Resources at (920) 787-4686 extension 3017.

### **Threatened, Endangered and Species of Concern:**

Currently, there are no registered threatened, endangered or species of concern found in the Upper White River Millpond proper. However, there are such species nearby that are mobile and are attracted to similar habitats that can be found near the shoreline.

Moreover, activities on the lake such as harvesting directly affect these species. The disposal of harvested plants from the lake is near areas known to have populations of the Western Slender Glass Lizard (*Ophisaurus attenuatus*). This one of the four species of lizards found in Wisconsin. It prefers oak savannas and open oak woodlands and adjacent moist prairies. It is also found in sand prairies, abandoned agricultural fields. This lizard appears more like a snake because it is long slender and does not have any limbs, however it has moveable eyelids and external ears unlike snakes. Another threatened species found in the area is Blanding's Turtle (*Emydoidea blandingii*). Blanding's Turtles prefer marshy areas with dense vegetation, but can live in many aquatic habitats. They can also live on land, which demonstrates the importance of undisturbed shorelines to wildlife. These turtles must live 17-20 years before they can breed so destruction caused on shorelines and adjacent wetlands can severely limit the population. For more information on Threatened and Endangered species go to [www.dnr.state.wi.us/orgland/er](http://www.dnr.state.wi.us/orgland/er) or contact the Bureau of Endangered Resources at (608) 264-6057.

### **Emergent Aquatic Plants:**

Several of the sensitive areas designated in the Upper White River Millpond (SAD 3, 4, 7 and 8) have emergent species of aquatic plants. Emergent aquatic plants are defined as plants that have the majority of their vegetative material above the surface of the water. Examples include cattails, bulrush, blue-flag iris, bottle brush sedge, pickerelweed and arrowhead. Emergent plants can tolerate fluctuating water levels and their dense stands can dampen shoreline waves.

Emergent plants are highly valuable in aquatic communities for several reasons. The standing dead stalks in the early spring are primary spawning habitat for northern pike and perch. These species of fish do not spawn on beds like bass and other panfish but spawn by broadcasting their eggs on standing material such as old stems, aquatic plants or fallen timber. Without this material spawning will not be successful. Another benefit these plants have is due to the leaves having extensive spongy tissue and air spaces. This makes them great nesting material for ducks shorebirds and muskrats. Nest made of these buoyant leaves float up and down with changing water levels.

Roots of emergent plants spread horizontally creating an interlocking network like a jute-backed carpet. This growth pattern is very important for stabilizing sediment. It also helps these plants withstand wave action and dissipate the force of upland runoff. Flexible reproductive strategies allow emergents to take advantage of variable conditions. When water levels are low, they reproduce from seeds that germinate on exposed

lakebed. When water levels are high, they are equally successful at staking out territory with spreading roots and horizontal buried stems, called rhizomes that send up new shoots.

There is an important connection with emergent plants to the shoreline and all aquatic organisms and the creatures that depend on them. Emergents are part of the “Transitional Area” between the aquatic world and the terrestrial (land) world. Fish utilize these areas for cover from predators and to feed on a large array of invertebrates such as insects that uses these plants. Not only do fish use these areas year-round, but also many animals you typically don’t associate with lakes utilize these areas. Raccoon, Whitetail Deer, Red Fox, songbirds and reptiles are just some animals from a long list of organisms that depend on these areas. An interesting fact, 80 percent of all the threatened and endangered species live near the shore. It’s no wonder when you think about the diversity of plant life near the shoreline.

Many lakes in the area were once home too vast and extensive stands of emergent vegetation. These areas are disappearing due to development and human activities near the shore. A recent study found nearly a 66 percent reduction of vegetative cover in developed lots when compared to undeveloped lots. That can be interpreted as 66 percent less habitat for fish and wildlife.

The resource values of emergent vegetation have been pointed out but there are several values to the riparian landowner. A common complaint, and a major reason for the harvesting operation, on the Upper White River Millpond is the floating mats of dead and decaying vegetation that accumulate along the shoreline. Stands of emergent vegetation prevent these mats from reaching the shoreline, thus preventing the nuisance to the landowner. Emergent vegetation also protects against shoreline erosion, thus reducing the need for bank armorment along the shoreline such as rock riprap or concrete seawalls. These plants can also be very aesthetically pleasing.

### **Shoreland Management:**

Wisconsin’s Shoreland Management Program, a partnership between state and local government, 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 1,000 feet of lakes and 300 feet of rivers and floodplains.

A critical part of protecting our water resources is the establishment and protection of an adequate buffer. A shoreland buffer should extend from the water onto the land at least 35 to 50 feet. Recent studies have shown that many species of wildlife may require up to 500 feet of buffer for habitat. Buffers of 50 feet and more help filter pollutants from runoff associated with impervious surfaces such as driveways, rooftops, roads and fertilized lawns.

Water gardens have been an increasing trend in the United States the last decade. By using native shoreline plants a riparian owner may have a very exquisite water garden with very little effort. Many of these species are visually attractive. By leaving these plants undisturbed, one can add a water garden to your property that would benefit everything on the lake. Incorporating aquatic plants with other natural features and very relaxing space can be developed that would still allow room for watercraft.

Shoreland restorations should focus on native plant communities and should include aquatic vegetation as well as the canopy, herbaceous, shrub and tree layers. Please contact your local DNR Lake Management Coordinator, Mark Sesing (920) 485-3023 to learn more about shoreland restoration and associated grant programs.

There are also programs through the Waushara County Land Conservation Department that can offer grants to qualifying applicants to help pay up to 70 percent of the cost of shoreline restoration. Please contact the Waushara County Land Conservation Department at (920) 787-0443.

### **History and Cultural Sites:**

Waushara County has been inhabited for millennia by humans. Native Americans utilize the rich diversity of the native flora and fauna for everyday purposes and actually were the first residents around the Millpond. Burial sites, campgrounds, food caches and mounds have all been found in the area. Some of these are believed to be along the shores and nearby the lake. Native Americans used these areas for gathering and storing food, as well as for ceremonial purposes.

The Upper White River Millpond was traditionally a spring pond or a drainage lake where groundwater feeds the lake and the lake discharges to a stream. It is the headwaters to the White River, which becomes a fairly large river downstream. Perhaps they may have been some spiritual connection to the headwaters of a stream, a place of birth. We may not exactly know why these areas were chosen but we can rely on history to tell us something. A historical search of the area would be a thing to consider in the future, but it is beyond the scope of this project. The point to remember is that these areas were considered “special” for many years, which leads to further need to protect these areas.

### **Whole Lake Management Recommendations:**

Resource managers made several recommendations on a whole lake basis.

1. Maintain as much of naturally felled woody debris as possible.
2. Restore shoreland buffers and discourage sea walls and riprap on developed sites.
3. Educate landowners about the importance of a healthy lakeshore buffer.
4. Protect terrestrial vegetation within 75 feet of the shore.
5. Manage and prevent the spread of Eurasian Watermilfoil and Curly-leaf Pondweed
6. Reduce entire tree removal for viewing purposes; try to trim choice limbs.
7. Protect adjacent wetlands and spring areas from development pressures.
8. Encourage periodic water level manipulation.
9. Properly maintain septic systems to protect water quality.

- 10. Obey the slow no-wake.
- 11. Restrict harvesting to floating mats of vegetation and leave rooted plants in place.

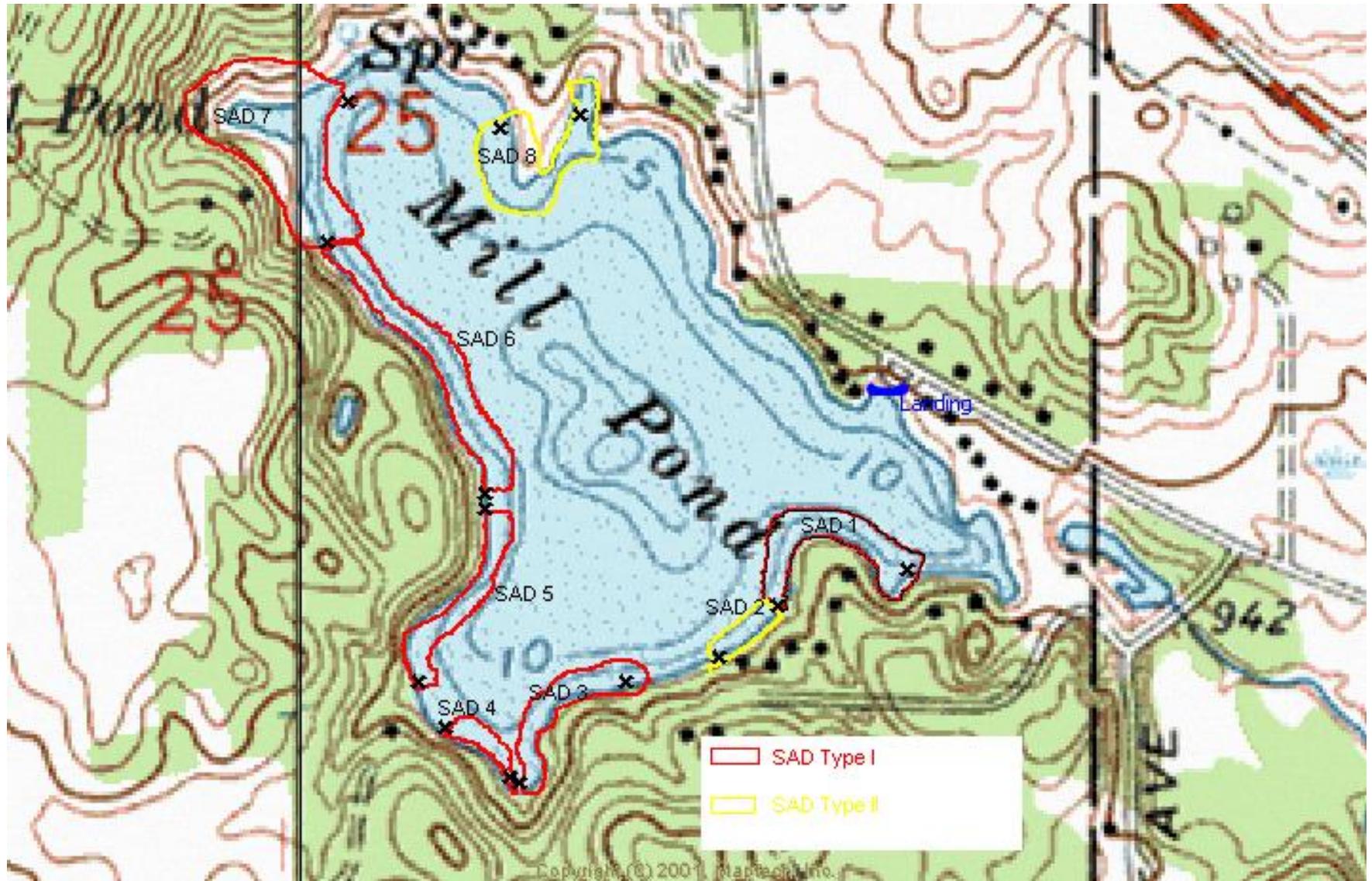
**Conclusions:**

Upper White River Millpond is a beautiful little lake that deserves special attention. It is truly a unique setting in Central Wisconsin due in part, to the large undeveloped shoreline and near shore vegetation. Eight sensitive areas were designated on the lake because they contribute to the uniqueness of the lake as a whole. These areas also provide essential functions that make the lake what it is. Special care should be taken to protect these areas and other areas on the lake from further disturbance. Restoring disturbed shorelines and shoreland buffers to a more natural state would be even more desirable to aquatic life and wildlife. The large amount of woody debris in the millpond provides exceptional habitat for fish and wildlife. The slow no-wake speed restriction combined with the attributes of the shoreline will dramatically decrease, or eliminate, shoreline erosion and therefore there will be no need for bank armorment. Lakes are one of the state’s most valuable resources and without proper protection, the water quality will quickly deteriorate resulting in degradation of fish and wildlife habitat. All lake ecosystems are sensitive to change and human impacts. It is critical that we protect and restore these valuable resources.

**MILESTONE**

Complete review of draft from residents.....	April 1, 2004
Revise and Final Draft.....	May 1, 2004
Present and Annual Meeting.....	May 29, 2004
Coordinate SAD’s with APM permit.....	June 15, 2004
Resolution with Township.....	January 2005
Develop applicable shoreline ordinances.....	2005-2006
Pursue funding to purchase property.....	ongoing

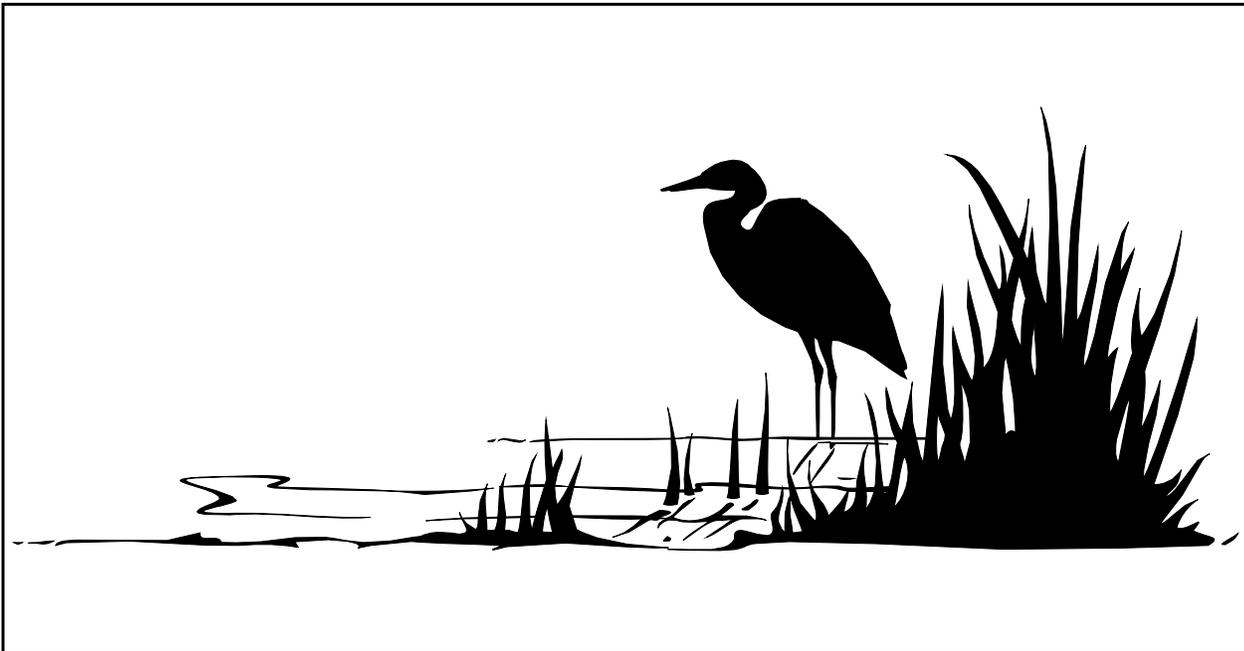
Figure 1. Arial view of SAD's for the Upper White River Millpond.



## **Appendix I**

### **Guidelines for Protecting, Maintaining, and Understanding Lake Sensitive Area**

# **GUIDELINES FOR PROTECTING, MAINTAINING, AND UNDERSTANDING LAKE SENSITIVE AREAS AND CRITICAL HABITAT**



**A companion document to better help  
understand lakes sensitive area reports**

# **GUIDELINES FOR PROTECTING, MAINTAINING, AND UNDERSTANDING LAKE SENSITIVE AREAS AND CRITICAL HABITAT**

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understand lakes sensitive area reports**

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# **GUIDELINES FOR PROTECTING, MAINTAINING, AND UNDERSTANDING LAKE SENSITIVE AREAS AND CRITICAL HABITAT**

This document was originally designed to be used in conjunction with specific lake sensitive area survey reports; **but it can also be useful to other parties interested in protecting lakes by helping them understand important factors which affect water quality and lake ecosystem health.** This document will concentrate on several main areas within the lake and its' shoreline areas that can be protected or restored to maintain water quality and lake ecosystem health. These main areas include aquatic plant sensitive areas, shoreline land use and lakeshore buffers, gravel and coarse rock rubble habitat, large woody debris, and various water regulations and zoning concerns.

This document will not attempt to deal with land use problems that do not fall within the immediate shoreline areas; although it should be recognized that lakes may have problems that occur in these outlying areas of their watershed resulting in significant nutrient and sediments additions that threaten the overall health of the lake ecosystem and should be dealt with through land acquisition and subsequent deed restrictions and implementation of non-point source control best management practices.

## **UNDERSTANDING AQUATIC PLANT SENSITIVE AREAS**

The importance of aquatic plant communities are frequently under appreciated and their importance to a lake's ecosystem health misunderstood. This is often evident by the way people refer to aquatic plant habitat as problem weeds or weed beds. A weed by definition is a plant that is out of place or a plant of no value. The vast majority of native aquatic plants grow where they should be growing based on available light (water clarity & light penetration), water depth, and bottom substrate or soils and are not out of place and as previously stated are extremely important for the proper functioning of a healthy lake ecosystem and are an integral part of the biotic integrity. Aquatic plants (macrophytes & algae) are the primary energy source upon which the rest of the lake food chain is based and dependent upon. Fisheries are dependent upon them for cover, spawning habitat, important habitat and cover for fingerlings and young of the year, critical habitat for aquatic insects and other important food or forage species (minnows). They

also serve an important function in reducing the shoreline erosion associated with wave action while stabilizing sediments in place, and aquatic plants lock up available phosphorus which would otherwise be available to drive undesirable algae blooms.

Aquatic plants also provide many important functional values for wildlife: Loons require aquatic vegetation for their nests, and waterfowl and furbearers require aquatic vegetation for food and cover. Songbirds, shoreline waterbirds, frogs and other amphibians, reptiles, and a host of other wildlife require aquatic vegetation for some critical need throughout different life cycles.

### **Use of Aquatic Herbicides**

Because the potential ecological risks associated with aquatic herbicide applications are so high, most aquatic herbicide applications must be approved through the DNR permitting system and the application must be completed by a DATCP certified aquatic herbicide applicator. Those herbicides that don't require a DNR permit are often inappropriate for the existing site conditions or species present resulting in potential impacts without real nuisance relief.

The herbicides that don't require a permit are restricted to granular or pelletized forms and usually will only work in a narrow set of environmental conditions. If the site conditions include much of any fine flocculent sediments effectiveness can be dramatically reduced or eliminated. Many of these herbicides will work on only a limited number of species which may not even occur on the site increasing the importance of having a qualified applicator capable of identifying the species present and the site conditions which can limit herbicide effectiveness. In the long run most people would be far better off trying to limit vegetation by hand pulling or raking and if these are not feasible contacting a DATCP certified aquatic herbicide applicator to have them assess the different control methods suitable for the site.

In most cases aquatic herbicide applications should be discouraged because:

- I. Less invasive or less destructive methods of control are feasible for the site and may include one or more of the following: mechanical harvesting, hand pulling, hand raking, hand cutting, and nutrient controls within the watershed. All too often herbicide treatments are

conducted adjacent to private docks in situations where hand pulling or raking were easily a viable option and should have been the only allowable practice.

**Before taking action a careful assessment of existing conditions should be conducted and should include: importance of existing habitat areas, actual needs for clearing of aquatic plant habitat (navigational access does not require removal of all vegetation; only a reduction in density), and consideration of the cumulative impacts of removing aquatic plant habitat or treating it and the organisms living in it or around it with herbicides.**

- II. Can result in an overall reduction or fragmentation of important native aquatic plant habitat.
- III. Creates openings in areas that should be colonized by native aquatic plant species. These openings provide increased opportunities for exotic species to become established in the lake and once established provide opportunities for their expansion.
- IV. Results in direct and indirect mortality of sensitive or intolerant immobile species such as mussels and other invertebrates. Some treatments can also result in the gradual build up of copper in the lake bed sediments to the point of being toxic to aquatic organisms. Several lakes in Northwestern Wisconsin have already reached or are approaching copper concentrations or levels that would be toxic or considered a lethal dose to 50% (LD50) of selected aquatic organisms exposed to similar concentrations under laboratory conditions. A serious problem that needs to be carefully considered is that copper does not break down, and it continues to build in concentration in the lake bed sediments with each subsequent treatment containing copper.

If people are going to treat aquatic plants they must understand that the available phosphorus will be expressed in larger plants or algae. Any attempts to suppress the expression of the available phosphorus will usually be very short term (7 days). It is difficult to justify adding toxic chemicals which do not break down and continue to build up towards toxic levels with each subsequent treatment. For this reason aquatic herbicide treatments containing copper should be

restricted to exceptional circumstances and not used on a regularly reoccurring basis.

- V. If the average landowner width is 100' or less and the minimum effective herbicide treatment width of 30' is applied by most shoreline property owners around a lake, the cumulative impacts of the treatment could eliminate or seriously impact greater than 30% of the available habitat. This reduction in available habitat can result in an even greater percentage reduction in the overall fish populations for the lake. Elimination of habitat in even a small percentage of a lake, especially in critical habitat areas, can cause the collapse of a fishery.
- VI. Aquatic plants lock up available phosphorus which would otherwise be available to drive undesirable algae blooms.
- VII. Aquatic plants serve an important function in reducing the shoreline erosion associated with wave action while stabilizing sediments in place.
- VIII. Aquatic plant management staff routinely hear complaints from shoreline property owners who expected their contracted aquatic herbicide application to eliminate all of the vegetation from the treatment area for a significant portion of the summer period. Most aquatic herbicides are effective on only a portion of the total aquatic plant community at a given site (species selective).

Free-floating species such as coon tail (*Ceratophyllum* sp.) and duckweed (*Lemna* sp.) also often drift back into treated areas with the next pervasive wind, eliminating the benefits they had expected from the chemical treatment. Other species such as Elodea, curly-leaf pondweed, milfoil, and other species easily fragment at times of the year and also drift into treatment areas eliminating or reducing the benefits of the previous treatment.

Hand raking or pulling near docks and in front of private developed properties eliminates the guess work out of what will be removed or eliminated when compared to expensive herbicide treatments with health concerns, use restrictions, and limited effectiveness.

## **Recent changes affecting mechanical removal and hand pulling of aquatic vegetation.**

Prior to the passing of Senate Bill 55 in September 2001, mechanical removal of aquatic plants were unregulated provided the following: the lake bottom was not disturbed, cut plants were removed from the lake and not allowed to drift free, the plants were not wild rice or plants were not part of a floating bog mat.

As exotic species, such as Eurasian Water Milfoil, expand their distribution within the state, more opportunities for spreading these exotics will occur. The risk of an exotic becoming established in a new lake is dramatically increased if the native species of aquatic plants that normally occupy a specific habitat type have been eliminated or reduced. When exotics are introduced into an area they have to find a suitable location to become established. If all the suitable growing sites are occupied by native species the exotic will have a much more difficult time establishing a reproducing population.

The Department has recently developed the necessary administrative rules within NR 109 to comply with the legislative mandates of SB 55. These focus on protecting native aquatic plant habitat to reduce the risk of exotic species invasions, while also recognizing the importance of protecting and maintaining the native aquatic plant habitat and the functions it performs in maintaining overall lake health. These rules limit shoreline removals of aquatic plant habitat without a permit to less than a 30' width; with the restrictions that this 30' width also include docks and other human activity areas that result in the loss or degradation of aquatic plant habitat.

If individual shoreline owners would like to consider removing vegetation by hand pulling or raking in widths greater than 30' they must apply for an aquatic plant management permit with their local DNR aquatic plant management specialist. It is unlikely that the Department will approve many alterations beyond the standard 30' width because of the concerns related to: creating more areas devoid of native vegetation which increases opportunities for possible colonization sites for exotics, cumulative losses of overall habitat, and the fragmentation and degradation that impairs the remaining habitat.

## Summary of management recommendations for the protection and restoration of aquatic plant communities

The following management recommendations provide some basic concepts that can be used or implemented to insure the long term health of aquatic plant communities and the overall health of lakes ecosystems.

1. Prohibit chemical treatment of aquatic plants except under extenuating circumstances such as:
  - A. The habitat to be treated is a dominant feature in the lake and the cumulative treatment of small areas will not reduce the overall percentage of coverage from historic coverages.
  - B. There is no other management alternative that will work to clear necessary navigational access channels identified in a Department approved management plan (post 2000)
  - C. Treatment will not result in a loss of critical habitat
  - D. It can be shown that chemical treatment will result in an improvement to the overall health of the ecosystem.
  - E. a serious use problem clearly exists
2. Discourage mechanical harvesting of aquatic plants in most circumstances. Clear only Department approved NR 109 permitted navigational channels 20'-30' wide. If small areas adjacent to docks are to be cleared of vegetation hand raking or pulling should be used if at all possible. Please consider the cumulative impacts if everyone was to duplicate the actions you take on your property around the rest of the lake.
3. Educate lake users about the value and importance of native aquatic plant habitats. Lake districts and associations should try to educate new property owners as soon as possible about the value of critical habitat and the laws associated with protecting lakes and lake front property.
4. Apply aggressive erosion control measures to all bare soil areas
5. **Protect** existing natural plant cover in upland areas within at least a 50'-60' corridor of the waters edge and **reestablish** an **effective buffer** of natural plant cover where it has been eliminated. This corridor or buffer is an important component in protecting water quality and habitat against eutrophication and sedimentation and provides critical habitat for our shoreline species of wildlife. Lake districts and

associations should try to educate new property owners as soon as possible about the value of **shoreline buffers** and the laws associated with protecting lakes and lake front property.

6. Encourage the strict enforcement of existing zoning regulations and encourage their strengthening and uniform enforcement.
7. Provide follow through and feed back with public officials when it comes to waivers and variances of existing zoning regulations and building codes
8. Encourage the requirement of mandatory erosion control plans for all building permits that require ground breaking
9. Filling, dredging, or other shoreline or littoral zone alterations covered by chapter 30, Wisconsin Statutes, should be prohibited unless there is clear evidence that such an alteration would benefit the lake's ecosystem.
10. Lake districts should carefully consider the value of purchasing shallow water bays with extensive aquatic plant communities to insure that future development does not result in an impact or a loss of this valuable habitat.

## **SHORELINE LANDUSE AND LAKESHORE BUFFERS**

The impacts that can result from shoreline development can be greatly reduced if done carefully with respect to the many important functional values that must exist to maintain a healthy lakes ecosystem. Natural shoreline vegetation provides important protection for lake water quality as well as ecosystem health and should be maintained for at least a 50-60' buffer strip adjacent to any waterbody. If shorelines have a steeper gradient than 10-15% the buffer strip width should be increased. Access corridors through this buffer zone are restricted by most county zoning regulations. Restrictions usually prevent the clearing of woody vegetation and mowing to no more than a 30' width of the shoreline. Property owners that care about the health of their lake's ecosystem can go a step further by reducing the clearing of vegetation to a narrow foot path. The best design for a foot path is an irregular trail that does not go in a direct line to the lake but has irregular meanders much like a stream with small berms and humps to prevent runoff from flowing directly down the path and preventing the path from become an area of concentrated flow for the direct delivery of sediments and nutrients.

The importance of maintaining the zone of no disturbance of the natural vegetation along the lake shoreline is important for several reasons. As land is cleared and developed irregular surface areas are lost, leveled, and filled in by earth moving equipment, reducing infiltration and increasing runoff. The natural spongy layer of decaying leaves and plant matter is also removed further reducing infiltration and increasing runoff. Soil porosity is also decreased, decreasing infiltration and increasing runoff. As we lose or simplify the layers present (trees, shrubs, and unmowed herbaceous ground cover) in the shoreline areas we decrease the layers present for the interception of rainfall; each layer present reduces the energy and volume of rainfall striking the ground's surface thereby reducing what is available for the mobilization and transport of sediments and nutrients from the ground's surface to the lake. The greater the volume of runoff the more energy available for the transport of nutrients and sediments from surrounding land uses into the lake to drive algae blooms and bury important shoreline habitats.

Shoreline buffers also increase the build up of leaf litter forming a spongy layer to absorb more precipitation and runoff reducing the amount of sediment and nutrients reaching the lake and negatively impacting water quality and habitat. The denser unmowed vegetation also filters sediments and nutrients from runoff.

Each of these three layers (trees, shrubs, and herbaceous ground cover) provide different important habitat components for different life cycle requirements of various wildlife. If any one layer is missing the ability of certain wildlife species to survive may be compromised. Leaving wider areas of uncut vegetation (Buffer Zones) increases the likelihood that adequate habitat will exist for many species of songbirds, who are at risk from the loss of this valuable lake shoreline habitat. Furbearers, raptors, frogs, deer, and other wildlife also benefit from these wider natural areas.

The aesthetic perspective also needs to be evaluated. Everyone likes to look out and see the lake, but very few people like to look at an intensively developed shoreline that reminds them of the urban yards and hectic pace they were trying to get away from. Maintaining the natural wild character of a lake should be the highest priority guiding any development activities. Both man and wildlife will lose if the natural character is allowed to be manipulated to the point our lakeshores begin to resemble urban yards and lawns. This emphasizes the importance of insuring that development is done carefully to maintain as many of the important functional values that the natural undeveloped shoreline had.

The restoration of a naturally vegetated buffer for at least 50'-60' from waters edge should be a very high priority for properties that have been cleared or converted. As previously stated a healthy buffer includes the native trees, shrubs, and herbaceous ground cover that would naturally have existed on a given site or location. The native species can usually be identified by looking at undeveloped shoreline areas.

### **Summary of management recommendations for the protection and restoration of natural vegetative shoreline buffers**

1. Educate landowners about the importance of a healthy lakeshore buffer
2. Encourage the strict enforcement of existing zoning regulations and encourage their strengthening and uniform enforcement.
3. Provide follow through and feed back with public officials when it comes to waivers and variances of existing zoning regulations and building codes
4. Encourage the requirement of mandatory erosion control plans for all building permits that require ground breaking
5. Provide direct oversight of all building crews and insure that as little as possible of the natural plant cover is disturbed during the construction phases.
6. Utilize only the native indigenous species for shoreline buffer restoration efforts and carefully consider site limitations (soil type, soil moisture regime, and shade preferences of plantings) when selecting appropriate species. Restoration efforts should follow a least disturbance scenario; by first halting mowing within at least the shoreline buffer zone (35' back from the waters edge and with no more than 30' width of the shoreline cleared for access purposes; landowners that care about the health of their lake ecosystem are encouraged to go beyond the minimum requirements of the law and increase buffer width and decrease the length of shoreline cleared of vegetation for access). It is important to remember that any ground breaking activities increases the opportunity for transport of sediments

and nutrients into the lake; especially within the lakeshore buffer zone.

Landowners should expect that initial recovery of the natural vegetation within the ground cover layer may take one or two full growing seasons, after halting mowing activities. Vegetation can usually re-establish itself from the natural seed bank available within the existing soils and from the seeds and rootstalks of adjacent plant communities. Plug plantings of the native herbaceous groundcover species can be used to achieve adequate density and diversity if recovery appears to be sparse in successive years. Supplemental plantings to establish adequate densities for the tree and shrub layer will have to be used in most situations.

The native species that should be used to restore the lakeshore buffer in order to provide the proper habitat and water quality protection functions necessary to insure a healthy Northern Wisconsin lake ecosystem are available through County Land and Water Resources District Conservation staff, please refer to the list of contact names and numbers at the end of this document.

## **ZONING AND REGULATION CONSIDERATIONS FOR LAKE PROTECTION**

Filling, dredging, or other shoreline or littoral zone alterations covered by chapter 30, Wisconsin Statutes, should be prohibited unless there is clear evidence that such an alteration would benefit the lake's ecosystem. Sea-walls should not be used and sand blankets should not be allowed in almost all situations. Rock rip-rap should be used only when anchoring difficult shorelines with problematic erosion which can not be handled with just restoration of the native vegetation. If questions arise or problem areas exist lakeshore property owners should call their local DNR water regs staff for assistance or to report a problem area which may be negatively impacting lake water quality or habitat. A list of locally available technical assistance contact names and phone numbers is provided at the end of this document for easy reference.

County shoreland and wetland zoning regulations apply to the areas within 1000 feet of lakes, ponds, and flowages and within 300 feet of rivers, streams, and creeks. The intent of zoning regulations is to promote wise land use planning while allowing careful development around our precious surface water resources. Most of the counties in northwestern Wisconsin now have lakes classifications which require or prescribe certain setbacks for all structures and the maintenance or re-establishment of shoreline buffers to protect water quality and habitat needs. Most of them **as a minimum** allow for reasonable use of shoreline areas by allowing a 30' wide access/viewing corridor through the buffer. The remainder of the lot from the waters edge back 35' should be restored to a natural condition with trees, shrubs, and unmowed herbaceous ground cover including various grasses, sedges, forbs, and wildflowers. On more sensitive lakes county classifications may require or prescribe a wider buffer width and lakeshore property owners are encouraged to contact their **local county conservatoinist** and determine what the specific requirements are for shoreline buffers on their lake. A list of locally available technical assistance contact names and phone numbers is provided at the end of this document for easy reference.

In all cases during development, the maintenance of a naturally vegetated buffer zone is critical to preserve a healthy lake ecosystem. In situations where the vegetation has been removed or altered landowners are encouraged to reestablish a buffer zone composed of the natural plant communities that belong there. For technical assistance in restoring your shoreline buffer please contact your local

county conservationist or county shoreline BPM technician using the names and numbers provided at the end of this document. This ensures that you not only get water quality protection, but you also get the important functional values that the native plants provide for food and cover for shoreline species of wildlife dependent upon them.

## **EROSION CONTROL DURING LOT DEVELOPMENT**

This is one area that can have a dramatic effect on water quality and habitat if it is not done correctly. The volume of sediments and nutrients that can be transported to a lake during the construction phase can equal the amount that would normally have only come off from the same parcel of land over a period of hundreds of years. The compounding effect of this nutrient load can have a dramatic effect on long term lake water quality. By following some basic rules during the construction phase we can keep most of these sediments and nutrients in place and prevent them from becoming a part of the lakes internal nutrient cycle that could cause a shift from a clear lake to one that has ample nutrients to drive extensive algae blooms each year.

Adequate soil erosion control measures and their proper maintenance during construction are very important and should become a very high priority for individual property owners. Lake association members could play an active part in reaching property owners before the damage is done or minimizing impacts by identifying active sites that need erosion control measures and contacting property owners to encourage proper implementation of erosion control measures. County zoning staff and officials need public support to get more effective zoning regulations on the books. Public support needs to be expressed if adequate county staff are to be hired to meet the increasing demands that are being placed on them by expanding development. As is most counties suffer from inadequate staff to deal with existing work demands. Mandatory erosion control plans should be a requirement for all building permits that will involve ground breaking. This needs to be coupled with adequate staff to insure that erosion control plans are being followed and properly implemented and that erosion control measures are properly maintained. More recently county governments have begun to deal with these difficult issues.

Until county wide erosion control ordinances can be established it is strongly recommended that individuals require contractors to develop erosion control plans prior to the initiation of any construction, then the landowner should ensure that it is adequate. Aggressive follow through after construction has begun is also important to insure erosion control practices are properly implemented and maintained.

By giving erosion control careful consideration prior to construction serious impacts to our lakes and streams can be minimized or avoided entirely. Yards can be designed with subtle berms to divert runoff into internally drained areas or into constructed depressions to allow sediments and nutrients to settle out and be trapped before reaching our streams and lakes. Silt screen fences, properly installed during construction can protect against "sheet" runoff. Other erosion control methods are required on steep slopes or difficult sites. Your county land conservation staff or DNR technical support can provide expert advice about erosion control.

Protect all top soil piles by properly locating them away from drainage ways and as far away from the lake as possible. Surround them with a ring of silt screen fence while also seeding them down with an annual rye grass to provide additional stabilization until they are needed.

Never divert rainfall runoff from driveways, roofs, or access roads directly to the lake through drain tiles, culverts, or waterways. Instead, divert runoff into internally drained areas, constructed depressions to allow for settling of sediments and nutrients, or at least into a thickly vegetated site that will provide some degree of filtration and infiltration of runoff.

### **Management recommendations for constructions site erosion control**

1. Minimize disturbance of natural plant communities within shoreline areas (50'-60' from waters edge) so they can continue to act as a buffer protecting lake water quality by filtering runoff and providing for infiltration before it reaches the lake.
2. Provide direct oversight of the construction crew during development. Insure that clearing of vegetation is kept to the minimum needed to accomplish the desired construction and avoid any disturbances within at least 50'-60' of any shoreline

- A. Insure that silt screen fences are installed and maintained.
  - B. Apply mulch to all bare soil areas that may be exposed to precipitation during none work hours, and especially make sure mulch is applied before weekends. Purchase and use excelsior erosion control mats and other products where necessary.
  - C. Provide coarse gravel and crushed rock cover for all areas that have regular heavy equipment traffic, i.e. driveways. Keep all vehicle traffic confined to these protected road surfaces.
  - D. Include landscape designs for the protection of water quality i.e., such as holding ponds and depressions which provide for the opportunity to capture and hold runoff while maximizing infiltration and allowing sediments and nutrients to settle out.
  - E. Try to eliminate or minimize areas of concentrated flow by reducing the surface area draining through a single path or channel and encouraging flow over multiple paths into depressional areas through the use of berms and other best management practices (BMPs).
3. Report serious erosion control problems that aren't being dealt with in a timely manner; before, they can result in significant impacts to water quality and habitat.

## **PROTECTION OF GRAVEL AND COARSE ROCK RUBBLE HABITAT**

Gravel and coarse rock rubble free of silt and sediments are critical to the successful reproduction of some walleye stocks. Gravel and coarse rock rubble free of silt and sediments are also critical to the survival of different components of the aquatic food chain that supports a healthy lake ecosystem, including aquatic insects, crayfish, and other forage or food species. The greatest threat to these critical habitats is shoreline development that is not accomplished in a manner that maintains an adequate buffer of undisturbed land and does not implement and maintain proper erosion control measures. This buffer is particularly important during ground breaking and construction of lake shoreline areas, because it traps sediments and nutrients within the vegetation and irregular surface areas and small depressions preventing them from reaching the lake and driving algae blooms or burying important habitat.

### **Summary of management recommendations for the protection of rock rubble *spawning* habitat**

1. Educate landowners about the importance of a healthy lakeshore buffer (filter out sediments)
2. Encourage the strict enforcement of existing zoning regulations and encourage their strengthening and uniform enforcement.
3. Provide follow through and feed back with public officials when it comes to waivers and variances of existing zoning regulations and building codes.
4. Encourage the requirement of a mandatory erosion control plan for all building permits that require ground breaking.
5. Provide direct oversight of all building crews and insure that as little as possible of the natural plant cover is disturbed during the construction phases.
6. Do not use sand blankets to convert natural bottom types to sterile beach sand.

7. Filling, dredging, or other shoreline or littoral zone alterations covered by chapter 30, Wisconsin Statutes, should be prohibited unless there is clear evidence that such an alteration would benefit the lake's ecosystem.

## **MAINTENANCE OF LARGE WOODY DEBRIS**

Large woody debris or trees should be left in the lake as they naturally collapse and fall into the lake. Large woody debris is often overlooked for its importance in providing critical fish habitat. Species such as largemouth bass require some sort of cover to successfully nest and rear offspring. Bluegills and other species also benefit from the presence of large woody debris. The conversion or removal of natural plant cover within a 50'-60' corridor of the lake reduces or eliminates completely the opportunity for the replacement of large woody debris as well as other important functional areas important to the any lake's ecosystem health and should be discouraged. The way we look at large woody debris should be in the context of its importance to the health of the lake ecosystem. Pre-formulated perceptions drawn from urban experiences or practices used in urban areas can be very destructive to the way natural environments function in a complex interconnected fashion. A shoreline ringed with fallen trees should not be looked at as untidy or unkempt but one that is providing important habitat for fish and wildlife. Fishermen have recognized for decades that fallen trees are often some of the best habitat to fish for bass and panfish. This emphasizes the need to re-assess our value system and begin leaving them for important habitat. Fisheries managers in recent years have begun to increase their educational efforts in this particular area but still have a majority of the public to reach with this important message.

### **Management recommendations for woody debris**

1. Educate lake shore owners about the value of allowing trees to fall into the lake naturally in order to provide valuable habitat for fish and wildlife.
2. Encourage lake shore property owners to become involved in the long term planning for woody debris on their property. Plant young trees for the replacement of older trees.

## **USE OF FERTILIZERS ON LAKE SIDE LAWNS**

From a water quality standpoint lawn fertilizers are a recognizable source of nutrients that property owners can eliminate or control through proper application. More is not better. Landowners are also encouraged to strongly consider the consequences of having a large lawn that extends into the recommended buffer area (within 50'- 60' of the lakeshore). By reducing your lawn size you not only reduce the amount of sediments and nutrients entering the lake you also provide important habitat necessary to support Wisconsin's wildlife species dependent upon this important shoreline habitat that is quickly disappearing in the face of increasing development pressures. Another benefit to decreasing lawn size is the reduction in work load necessary to maintain it; hence you can spend more time relaxing and enjoying your property.

If you feel the need to fertilize your lawn have your soil tested for phosphorus and potassium levels. When applying fertilizers consider the need to have soil phosphorus levels at the maximum recommended level. By applying fertilizers at a lesser rate you can still enhance your lawn without the increased risk of having excess drain into the lake to drive undesirable algae blooms. Remember that fertilizer suppliers are in the business to sell chemicals. The recommended bag application rates are often too high. Get advice from your county or university extension offices and remind them that you are applying the fertilizers to a lakeshore lawn and do not want to over-apply.

Never burn brush or leaves, especially along the lakeshore, in road ditches, or in drainage ways that drain into the lake. The ashes are very high in phosphorus and nitrogen and are soluble in rainwater. The best way to deal with leaves is to compost them. Spreading them in a wooded area that does not drain to the lake is also a good way to deal leaf disposal. If neither of these is an option bag your leaves and take them to a yard waste collection site for proper disposal.

Do not remove grass clippings from lawns. They contain all the nitrogen and phosphorus your lawn needs which you will not have to replace with annual fertilizer applications. Use a mulching lawnmower it recycles the clippings into your lawn more efficiently. Never spread wood stove ashes in areas draining to the lake; instead dispose of them with your household garbage during normal refuse pickup times.

## **Management recommendations for fertilizer use**

1. Apply fertilizers only if a soils test has determined that it is nutrient deficient and add less than the maximum recommendation.
2. The use of a low phosphorus content fertilizers or no-phosphorus fertilizers is strongly recommended if the fertilizer is to be applied on lakeshore property.

## **SEPTIC SYSTEM MAINTENANCE AND NECESSARY REPLACEMENT OF OLD FAILING SYSTEMS**

Failing septic systems can pose a significant threat to water quality, especially when large portions of shoreline are developed and when the overall percentage of a lakes watershed is dominated by lakeshore properties. Septic systems that are older than 20 years should be looked at to insure that the filtration field is properly functioning and that waste is not perching above the drain field and entering the lake directly without adequate filtration of nutrients and other components. There is no specific rule that septic systems have to be evaluated to determine if they are functioning properly, unless there is a complaint filed.

It is generally recommended that you have your septic system pumped of the normal sludge buildup every two to three years. This sludge removal is essential for maintaining the absorptive capacity of your drainfield.

Inspect your system regularly for surfacing effluent around the drainfield. Are there wet areas or strong odors? Do the drains in your home seem to work properly or are they sluggish? Do they make noisy gurgling sounds? If your septic system has any of these systems you should have it inspected by a licensed installer.

Never make any changes to your sanitary system or wastewater piping. This work must be done by a licensed installer. It is not only dangerous to health and human safety, as well as water quality, it is also illegal and can result in fines or penalties.

Avoid using a garbage disposal with private septic systems. Put kitchen scraps in a compost pile if at all possible; otherwise, as a last resort put them in with your household garbage. Limit the use washing machines, if

possible. Laundry washwater is high in lint, synthetic fibers, and pet hair all of which can cause premature failure of your drainfield. Use a commercial laundry if possible or if you are a weekend resident with a lakeshore septic system wait until you return to your midweek residence with public water and sewer.

A septic system is only intended to break down organic wastes. Never put solvents, furniture stripping solutions, degreasers, petroleum compounds, oil based paints and stains, or other chemicals into your sanitary system.

Diverting sink and shower drains (so called gray water) to lawns and other properties adjacent to the lake will not only impact lake water quality it is also illegal. Gray water must be run through your septic system to allow for the proper filtration of pollutants. There are no exceptions to this without first obtaining necessary permits.

## ***Lakes Technical Assistance Contact Information List***

### **Waushara County:**

Land Conservation Department: Mark Schumacher – 920/ 787-7819

DNR Water Regulations: Shawn Eisch – 920/ 787-4686 ext. #3016

DNR Water Resources Biologist: Scott Provost – 920/ 787-4686 ext. #3017

DNR Dam Safety and Flood Plain Engineer and Sub-basin Leader:

Linda Hyatt – 920/ 787-4686 ext. #3010

DNR Conservation Warden: Dave Algrem – 920/ 787-4686 ext. #3027

DNR Fishery Biologist: Dave Bartz – 608/ 297-7058

DNR Wildlife Biologist: Paul Samerdyke – 920/ 787-4686 ext. #3012

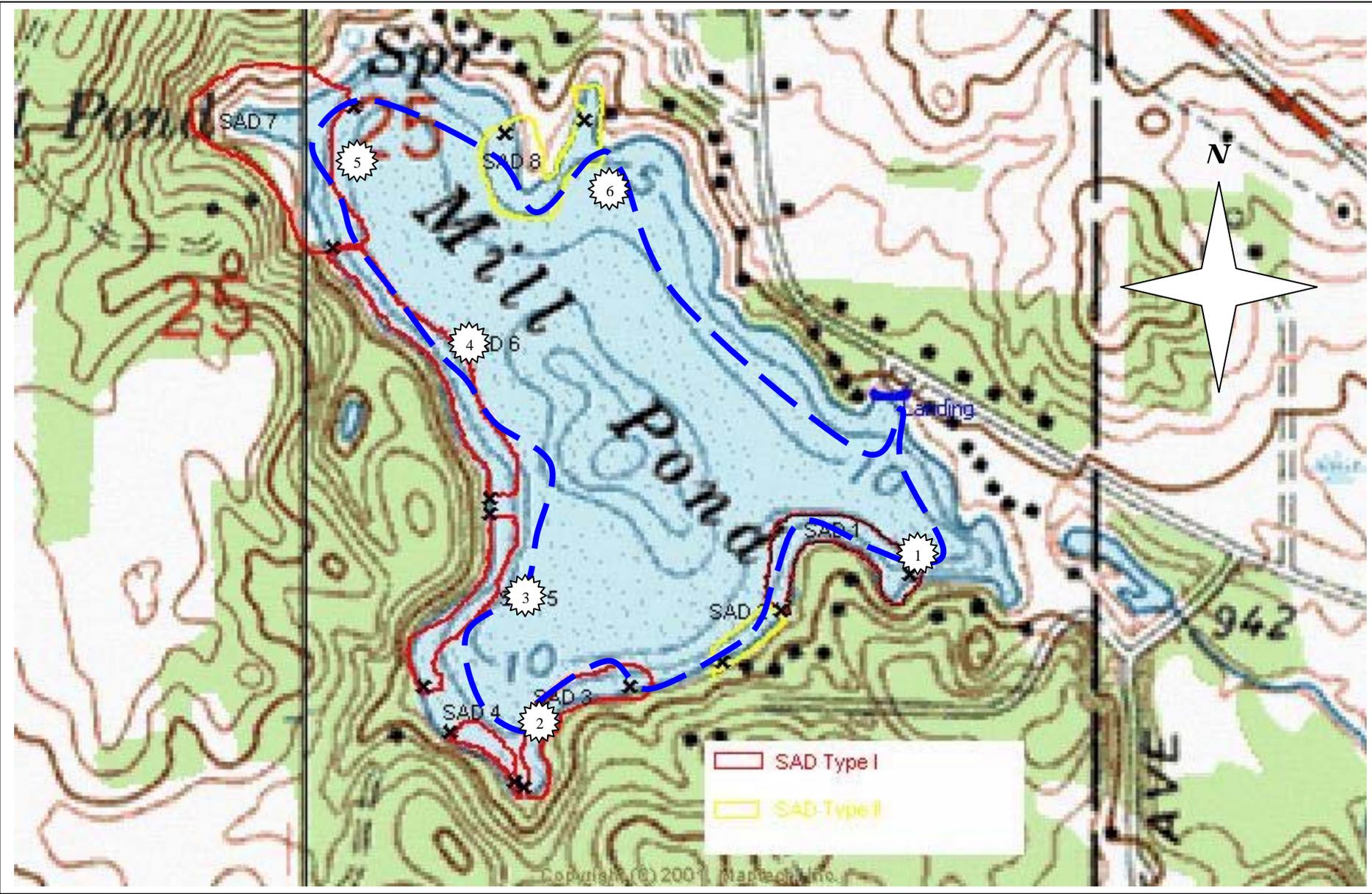


## **Appendix II**

### **Upper White River Millpond Water Trail**



# Upper White River Water Trail



# The Upper White River Water Trail

Use the SAD descriptions with this or just follow the Water Trail.

Your first stop will be near Sensitive Area Designation (SAD)

#1.



Observe the shoreline and notice the dogwoods and white cedars. Relax in the quiescent waters of the little bay and notice the fish near the fallen timber and water celery (looks like grass). Move slowly along the trail and you may see birds bathing or a kingfisher, fishing for food. Along the way to site 2, watch the shoreline and near shore for minnows and fish feeding, where do you see them?

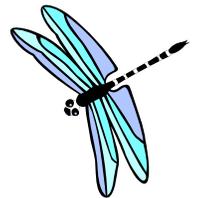


Quietly turn around the little point into the bay, what do you see? Watch for turtles basking on logs or frogs on the white water lilies. Look under the pads and what do you see? Maybe some perch spawn or insects looking to hide. Soak up the beauty of the flowers from the White Water Lily, on a calm summer morning you may be able to smell them.

Move along the shore and notice the change on your way to site 3. Notice the large oaks they hang over the water, good spot to perch if you're a bird with fish on the menu. See the jewelweed along the shore – watch for chipmunks, bees and turtles.



Along the shore near site #3, watch for fish in the timber. See if you can catch one. Do you notice any erosion? Not much with the shorelines natural protection. Keep watching and listening for songbirds.



You're approaching site #4, look down. No over the other side! What is that? From June until September you should see Large-leaf Pondweed (aka Musky Weed, Bass Weed, Cabbage). The nicknames should give you a clue to their importance. Fish love this stuff. Got a

big pike in mind, try here. Lose yourself in the canopy of the overhanging oaks and forget the world for a moment - enjoy this one.



Your moving slowly to site 5, look up and then down, what do you see? A continuous carpet of forest of trees, shrubs and plants. The forest extends from the land into the water. Notice how the woods transforms to a meadow of Angelica then to sedges, then to the underwater forest. That's it; that's the living shoreline. Study the underwater forest for a spell. Quietly creep to the little northeast bay, watch for ducks taking a snooze.

On your way to site 6 watch the changes in shoreline due to development. Notice the lack of woody debris, plants and the natural appearance. That is a lack of habitat, which affects fish and wildlife. It also impacts water quality. Natural shorelines can intercept unwanted nutrients from reaching the lake.



When you approach the point notice the sedges creeping into the water. Look for dragonflies shedding their old skins as the change into adult flies. Strolling around the point you will see a quiet bay. This bay is formed from large springs. The soft sediment boils as water discharges to the lake leaving a soft bottom – stay in your boat! You may notice a pink to purplish film on the bottom, it's a purple-sulfur bacteria!



**Thank you for touring the Upper White River Millpond. Like the seasons changing, so does the shoreline from season to season. Try it different times of the year and different times of the day and you should see something different every time. Enjoy.**

