A LAKE PROTECTION PLAN FOR ROUND LAKE

BURNETT COUNTY, WISCONSIN

Prepared by:

Environmental Horizons, Incorporated

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Chapter I

INTRODUCTION

Round Lake is located on the Trade River, downstream of Long Trade Lake, in the Town of Trade Lake in Burnett County, Wisconsin. The Lake is a drainage or through-flow lake, with the Trade River, a tributary stream to the St. Croix River system, forming both the inflow and outflow of the Lake. Round Lake is a valuable natural resource offering a unique setting and variety of recreational and related-use opportunities to the small residential community and to visitors using the Lake. The Lake is an integral part of this lake-oriented community. A public recreational boating access site on the southern shore of the Lake provides adequate public recreational boating access to the Lake, as set forth pursuant to Chapter NR 1 of the *Wisconsin Administrative Code*.

A perception of changing conditions within the Lake, likely to adversely affect the recreational and aesthetic value of the Lake, led to the formation of the Round-Trade Lake Improvement Association The Association seeks to undertake a lake-oriented program of community involvement, education, and management. Pursuant to this mandate, and seeking to improve the usability and prevent the deterioration of the natural assets and recreation potential of Round Lake, the Association has contracted with Environmental Horizons, Incorporated, for the preparation of a lake protection plan for Round Lake.

This report sets forth an inventory of the aquatic plant communities present within Round Lake, data on land use within the drainage area tributary to Round Lake, water quality data, and related information, and represents part of the ongoing commitment of the Round-Trade Lake Improvement Association, in cooperation with the Town of Trade Lake, to sound planning with respect to the Lake. The inventory data presented herein were collected by Environmental Horizons, Inc., with the assistance of the Round-Trade Lake Improvement Association, during 2005.

The aquatic plant survey of Round Lake was conducted during the July 2005 by Environmental Horizons staff. The survey was completed using the modified Jesson and Lound[1] transect-based aquatic plant survey method employed by the Wisconsin Department of Natural Resources for aquatic plant surveys throughout the State. Field inventory data were gathered by Environmental Horizons staff. Fisheries data, gathered by the Wisconsin Department of Natural Resources (WDNR), and water quality data, gathered under the auspices of the WDNR Self-Help Monitoring program, are also incorporated into this plan as appropriate. In addition, data on Round Lake were abstracted from the relevant WDNR Basin Plan for the Upper St. Croix River Basin. This planning program was funded in

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[1] *Jesson, R. and R. Lound, Minnesota Department of Conservation Game Investigational Report No. 6,* An Evaluation of a Survey Technique for Submerged Aquatic Plants*, 1962.*

part by a WDNR Lake Management Planning Grant awarded to the Round-Trade Lake Improvement Association, under the Chapter NR 190 Lake Management Planning Grant Program.

The scope of this report is limited primarily to consideration of the factors affecting water quality, aquatic plant communities, and recreational uses of Round Lake. However, this plan forms an integral part of any future comprehensive lake management plan for Round Lake. The preparation of a comprehensive lake management plan for Round Lake will require additional water quality and biological data collection and analysis.

This plan is intended to address the recreational lake use goals and objectives for Round Lake, developed in consultation with the Round-Trade Lake Improvement Association These goals and objectives are:

1. To protect and maintain public health, and to promote public comfort, convenience, necessity, and welfare, through the environmentally sound management of vegetation, fishery, and wildlife populations, in and around Round Lake;

2. To provide for high-quality, water-oriented recreational and aesthetic opportunities for residents and visitors to Round Lake, and manage the Lake in an environmentally sound manner; and,

3. To effectively manage the water quality of Round Lake to maintain healthy aquatic and riparian wetland plant communities and, thereby, better facilitate the conduct of water-related recreation, improve the aesthetic value of the resource to the community, and enhance the resource value of the waterbody.

This inventory and plan element, which conforms to the requirements and standards set forth in the relevant *Wisconsin Administrative Codes*,[2] should serve as an initial step in achieving these objectives over time.

[2]*This plan has been prepared pursuant to the standards and requirements set forth in the* Wisconsin Administrative Code*: Chapter NR 1, "Public Access Policy for Waterways;" Chapter NR 103, "Water Quality Standards for Wetlands;" Chapter NR 107, "Aquatic Plant Management;" and Chapter NR 109, "Aquatic Plants Introduction, Manual Removal and Mechanical Control Regulations."*

Chapter II

INVENTORY FINDINGS

INTRODUCTION

Round Lake is located in the Town of Trade Lake, in the southwestern portion of Burnett County, Wisconsin, as shown on Map 1. The Lake is a flow-through or drainage lake, comprised of a single basin. The Trade River comprises the primary inflow to, and outflow from, the Lake, entering the Lake from the southwest and draining from the Lake to the north. Spirit Creek, draining Spirit Lake and Rice Lake (Polk County), and Rice Lake (Burnett County), enters Round Lake from the east. The Trade River ultimately forms a tributary to the St. Croix River system draining to the Mississippi River southwest of the Trade Lake Chain-of-Lakes.

Round Lake is the second in a chain of four lakes formed along the Trade River within Polk and Burnett Counties.[1] It lies in a roughly circular depression formed within glacial till deposited approximately 15,000 years ago by the Superior Lobe of the continental glacier. The Lake basin lies within a hummocky topography, comprised of the reddish-brown sandy till of the Copper Falls Formation and the gray silty till of the Trade River Formation. From its outlet from Round Lake, the Trade River drains in a northerly and westerly direction through Little and Big Trade Lakes, and continues in a generally southwesterly direction to its confluence with the St. Croix River in the Eastern Unit of the Governor Knowles State Forest in the Town of Sterling in Polk County. Round Lake is located approximately in the upper one-quarter of the 195 square mile Trade River watershed, shown on Map 2.

Round Lake lies within the portion of the Northern Highlands of Wisconsin known as the Lake Superior Rift, shown on Map 3.[2] Around 1.1 billion years ago, basaltic lava upwelling from the earth's mantle created a broad valley extending approximately 1,400 miles in a southwesterly direction from Lake Superior into present-day Kansas, and about 500 miles southeasterly direction from Lake Superior into present-day northern Michigan. Subsequent subsidence of the dense basaltic rocks and more recent uplift caused by continental movements to the south—that limited the continental split that may otherwise have occurred in this region, resulted in the present day bedrock topography, upon which the

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[1] *From upstream to downstream, these waterbodies include Long Trade Lake upstream of Round Lake, and Little Trade Lake and Big Trade Lake downstream of Round Lake. As noted, Spirit Lake, Rice Lake (Polk County), and Rice Lake (Burnett County), draining to Spirit Creek, also drain to Round Lake.*

[2] *For a complete description of the geological history of Northwestern Wisconsin, see Robert H. Dott, Jr. and John W. Attig,* Roadside Geology of Wisconsin*, Mountain Press, Missoula MT, 2004.*

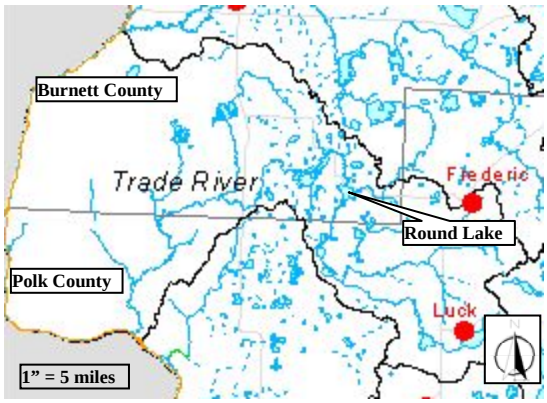
Map 1

LOCATION MAP OF ROUND LAKE

Source: MapQuest.com, Inc. and Environmental Horizons, Inc.

Map 2

Trade River Drainage Basin



Source: Wisconsin Department of Natural Resources and Environmental Horizons, Inc.

relatively recent glaciation has sculpted the hummocky terrain observed today.[3]

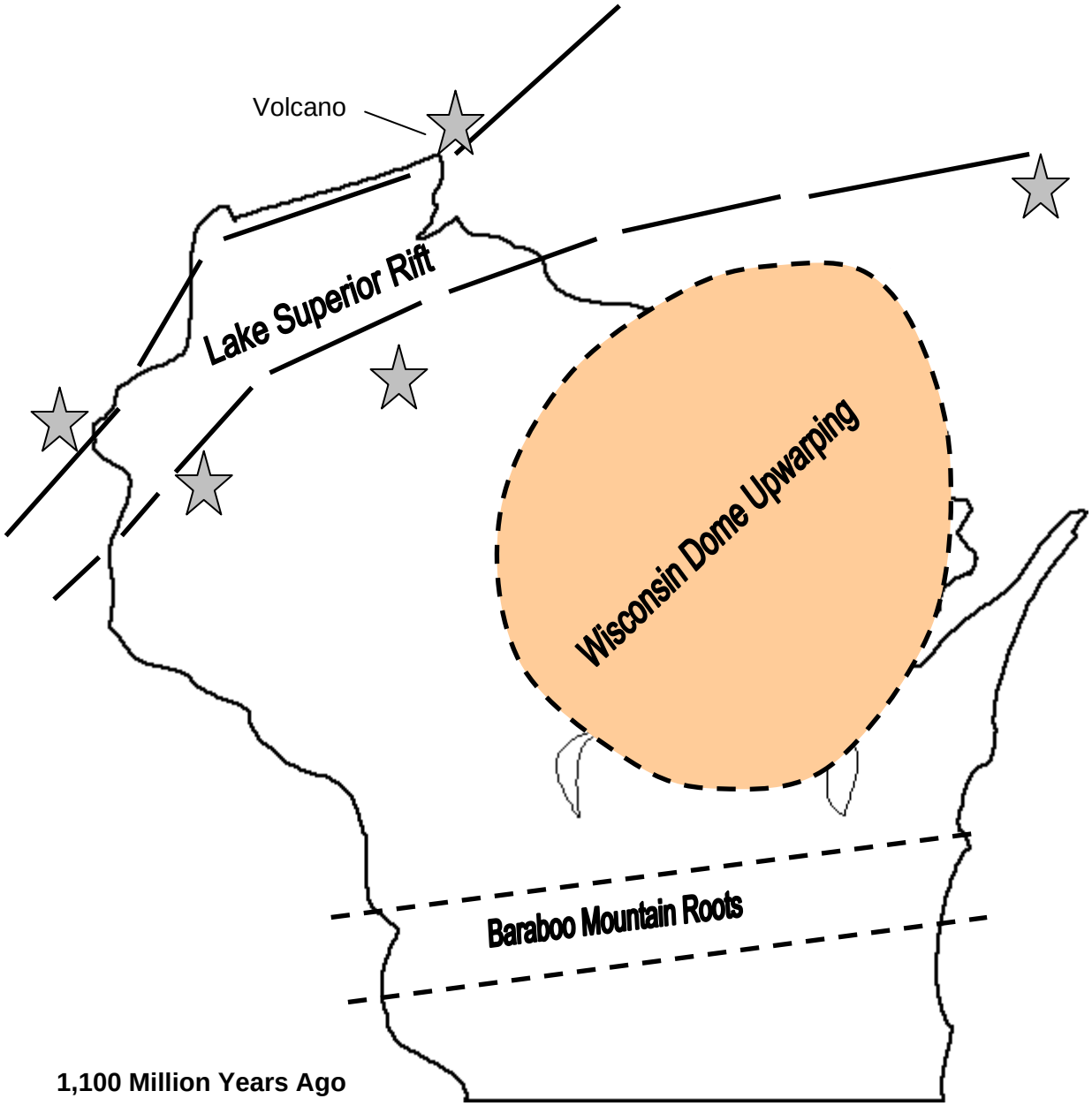
WATERBODY CHARACTERISTICS

Round Lake is a 204-acre waterbody, the hydrographical characteristics of which are set forth in Table 1. The Lake has a maximum depth of 27 feet, a mean depth of 15 feet, and a volume of 3,050 acre-feet. The bathymetry of the Lake is shown on Map 4. The Lake is comprised of a single deep basin. Lake depths quickly drop to more than 20 feet. Approximately one-quarter of the Lake has a water depth of greater than 20 feet, while less than 5 percent of the Lake has a depth of 3 feet or less. The shoreline slopes steeply into the Lake basin, although portions of the shoreland,

[3] Ibid.

Map 3

SCHEMATIC REPRESENTATION OF THE LAKE SUPERIOR RIFT



Source: Adapted from Dott, Robert, H. and Attig, John, W., Roadside Geology of Wisconsin, *2004, Mountain Press Publishing Company.*

Table 1

HYDROGRAPHIC CHARACTERISTICS OF ROUND LAKE

Parameter	Measurement
Surface Area	206 acres
Volume	3,044 acre-feet
Shoreline Length	3.2 miles
Maximum Depth	27 feet
Mean Depth	15 feet
Tributary Drainage Area	35,699 acres

Source: Wisconsin Department of Natural Resources and Environmental Horizons, Inc.

especially along the southwestern and northwestern shores support some wetlands. The topographic features and landscape relief of the area surrounding Round Lake are illustrated on Map 5. The wetlands at the point of entry of the Trade River into Round Lake support a relatively extensive wetland plant community.

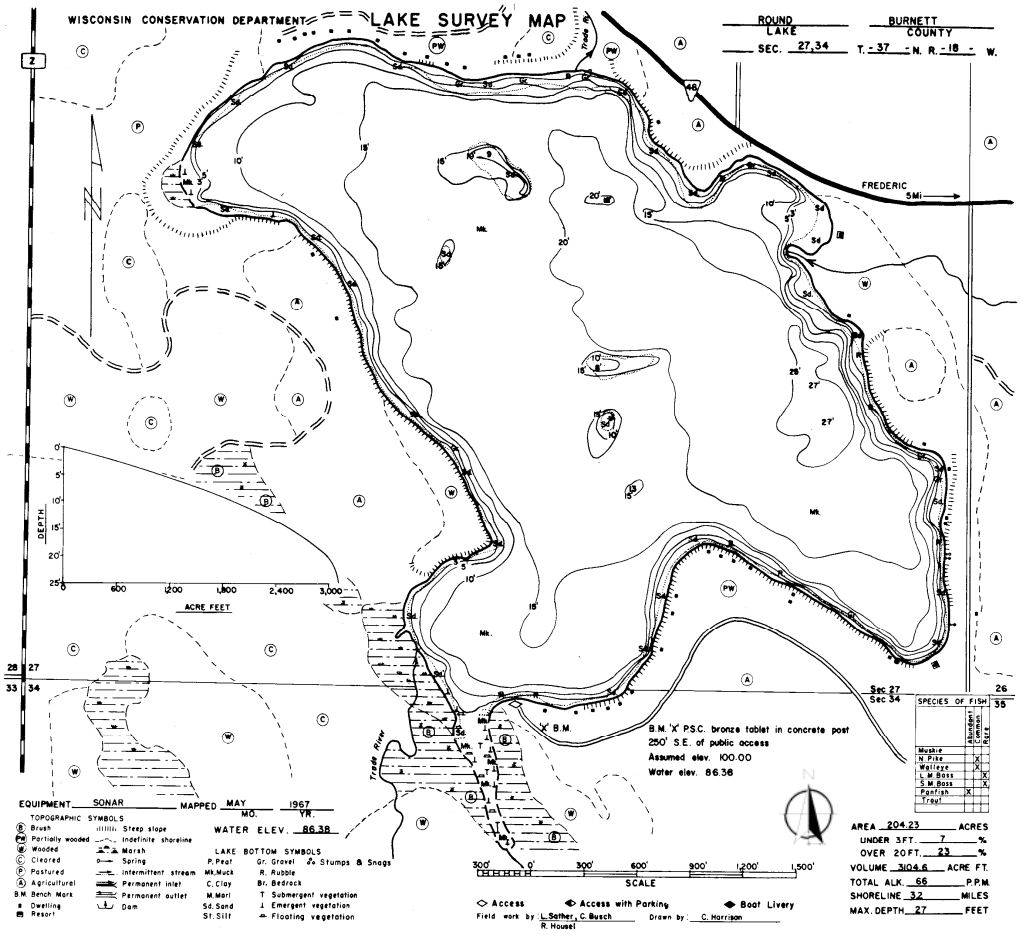
WATERSHED CHARACTERISTICS

Population and Land Use

As of 1990, there were approximately 1,160 persons residing within the area surrounding Round Lake and the adjacent portions of the Towns of Anderson and Trade Lake in Burnett County. There were approximately 850 housing units located within this area. By 2000, the population in this geographic area had increased to about 1,250 persons residing in about 900 housing units. The Round Lake community formed a subset of this regional community.

Map 4

BATHYMETRIC MAP OF ROUND LAKE



Source: Wisconsin Department of Natural Resources and Environmental Horizons, Inc.

Map 5

TOPOGRAPHIC FEATURES WITHIN THE ROUND LAKE TRIBUTARY DRAINAGE AREA

Source: Environmental Horizons, Inc.

Urban density development in the drainage area directly tributary to Round Lake is limited to suburban density residential development in the immediate shoreland area of Round Lake. The direct drainage area of Round Lake is illustrated on Map 6 and comprises approximately 775 acres. The total drainage area to Round Lake encompasses about 55 square miles and is shown on Map 7. Much of the surrounding lands outside of the direct drainage area are occupied by rural land uses. Woodlands, wetlands and agricultural lands occupy the majority of the lands within the tributary drainage area. The existing 2000 land use pattern within the drainage area tributary to Round Lake is quantified in Table 2.

Few changes in land use within either the direct drainage area tributary to Round Lake or the total drainage area are anticipated. Such changes are expected to be limited to infilling of already platted lots and the possible redevelopment of existing properties. Only minor, additional large-lot residential development is envisioned for the drainage area.

Table 2

EXISTING LAND USE WITHIN THE DRAINAGE AREA TRIBUTARY TO ROUND LAKE

Land Use Categories	Total Drainage Area	
	Acres	Percent of Total Drainage Area
Urban		
Residential	1,366	4
Subtotal	1,366	4
Rural		
Agricultural, Rural Residential and Other Open Lands	21,136	59
Wetlands	457	1
Woodlands	11,375	32
Water (Lakes)	1,342	4
Other Water (Streams)	23	< 1
Subtotal	34,333	96
Total	35,699	100

Source: Environmental Horizons, Inc.

Public Recreational Boating Access

Public recreational boating access to the Lake is provided through the Town-owned parkland located along the southern shoreline of the basin, which has an improved public boat landing. This access site, shown on Map 8, provides public recreational boating access opportunities that are consistent with the standards set forth in Chapter NR 1 of the *Wisconsin Administrative Code*.

WATER QUALITY

Round Lake is a eutrophic or enriched waterbody. Eutrophic lakes are fertile, supporting abundant aquatic plant growths and productive fisheries. At times, eutrophic lakes exhibit nuisance growths of algae and plants. At the time of the conduct of the aquatic plant survey of Round Lake, significant growths of algae (phytoplankton) were observed, and these growths potentially so reduced the underwater light climate of the Lake that rooted aquatic plants (macrophytes) were disadvantaged and restricted to the nearshore area where water depths were typically less than 6 feet. In contrast to Round Lake, many of the cleaner lakes in Wisconsin are classified as mesotrophic (or moderately

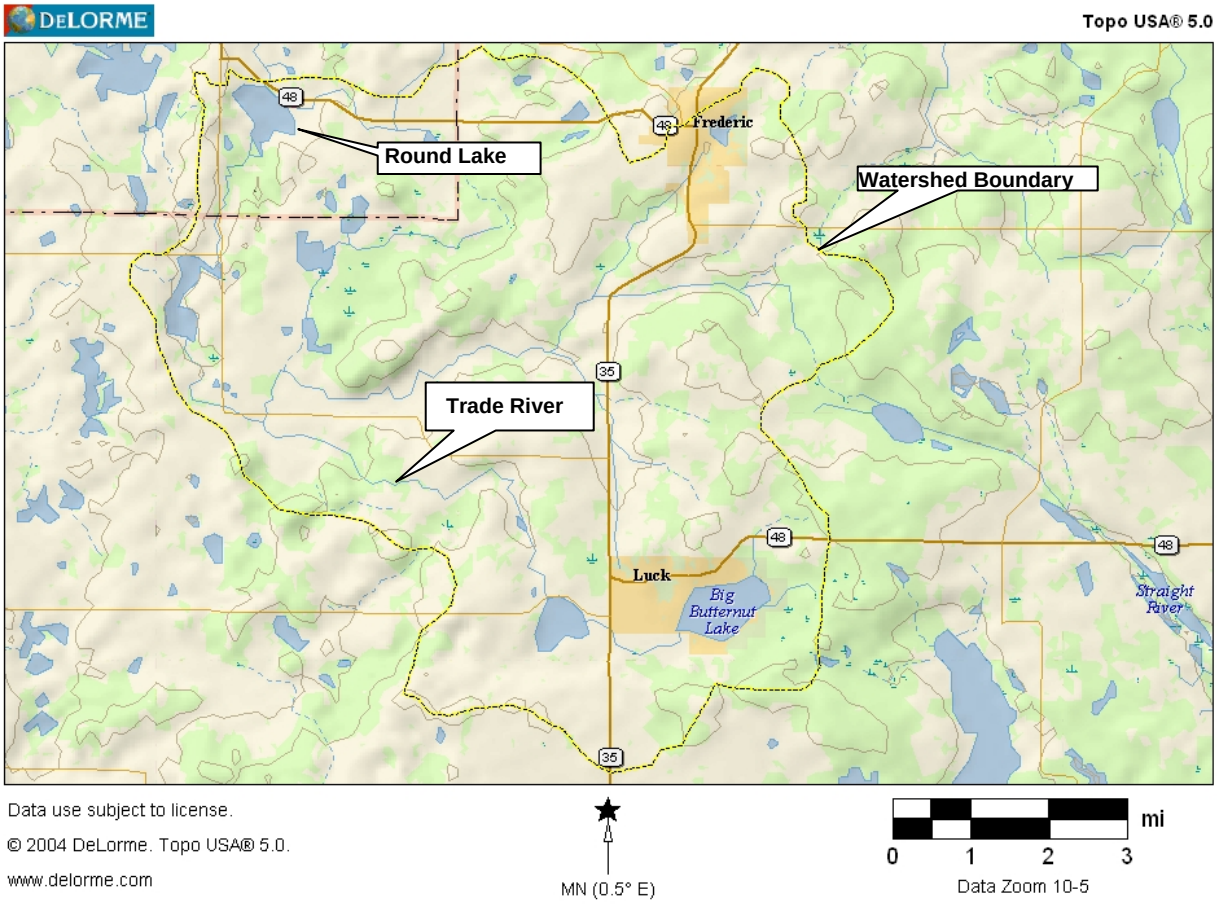
Map 6

ROUND LAKE DIRECT DRAINAGE AREA

Source: Environmental Horizons, Inc.

Map 7

ROUND LAKE TOTAL DRAINAGE AREA



Source: Environmental Horizons, Inc.

Map 8

PUBLIC RECREATIONAL BOATING ACCESS SITE ON ROUND LAKE

Source: Environmental Horizons, Inc.

enriched) with many lakes in northern Wisconsin potentially being considered oligotrophic (or poorly enriched) waterbodies.[4]

Water quality data have been acquired from Round Lake since June 1986 under the WDNR Self-Help Monitoring program. This program is carried out by an enrolled volunteer who reports Secchi-disc transparency values from the Lake at regular intervals during the summer months. Secchi-disc transparency values have ranged from 1.2 feet to 22 feet. The 22 feet value was reported in May 1999; the next highest water clarity observation of about 11 feet was reported in May 1988. These values reflect the greater water clarity likely to be observed during the spring months when cooler water temperatures and higher wind speeds are likely to moderate algal growths in the Lake.

The surface water total phosphorus concentrations in the Lake ranged from 0.06 milligrams per litre (mg/l) in October 1990 to 0.12 mg/l in August 1990. A total phosphorus concentration of 0.08 mg/l was reported in May 2005. These values were well in excess of the 0.02 mg/l level considered to be the level above which algal blooms could be expected to occur. At the time of the July 2005 aquatic plant survey conducted by Environmental Horizons, Inc., an algal bloom was observed with the water being visibly green. The presence of this bloom was consistent with a Secchi-disc transparency value of 0.9 meters, or 2.8 feet, observed during the survey. The observed total phosphorus concentrations are indicative of relatively poor water quality, or eutrophic conditions.

Data obtained by the WDNR Self-Help Monitoring program within Round Lake, in 1990 and 2005 (Table 3), indicated that the Lake stratifies during the summer months, exhibiting both thermal and dissolved oxygen stratification with depth. These data would appear to be typical of dimictic lakes in the temperate zone.

Table 3

SEASONAL WATER QUALITY CONDITIONS IN ROUND LAKE: 1990 AND 2005

Parameter[a]	1990		2005	
	Shallow[b]	Deep[c]	Shallow[b]	Deep[c]
Physical Properties				
Dissolved Oxygen				
Range	2 – 9	0 - 2	8	- -
Mean	6	1	8	- -
Number of Samples	4	7	3	- -
pH (units)				
Range	8 – 10	8 – 9	- -	- -
Mean	10	8	- -	- -
Number of Samples	6	4	- -	- -
Secchi Depth (feet)				
Range	1.25 – 22.0	- -		- -
Mean	4.25	- -	5.23	- -
Number of Samples	126	- -		- -
Temperature (°C)				
Range	54 - 75	54 – 67	59 – 71	54 – 70
Mean	69	65	62	56
Number of Samples	7	9	4	5
Nutrients				
Total Phosphorus				
Range	0.059 – 0.090	0.057 - 1.116	0.077	- -
Mean	0.074	0.608	- -	- -
Number of Samples	3	3	1	- -

[4]*See R.A. Lillie, and J.W. Mason,* Limnological Characteristics of Wisconsin Lakes*, Wisconsin Department of Natural Resources Technical Bulletin No. 138, 1983.*

Parameter[a]	1990		2005	
	Shallow[b]	Deep[c]	Shallow[b]	Deep[c]
Biological				
Chlorophyll-*a* (µg/l)				
Range	- -	- -	- -	- -
Mean	- -	- -	- -	- -
Number of Samples	- -	- -	- -	- -

[a]*Milligrams per liter unless otherwise indicated.*

[b]*Depth of sample approximately 3 feet.*

[c]*Depth of sample greater than 20 feet.*

Source: Wisconsin Department of Natural Resources and Environmental Horizons, Inc.

The depletion of dissolved oxygen in the hypolimnion or bottom waters of a lake is common in mesotrophic and eutrophic waterbodies.[5]

Associated with these periods of hypolimnetic anoxia is the likelihood of increased conductivity levels in the hypolimnion of Round Lake. This phenomenon is indicative of internal loading occurring within the Lake. Internal loading is the result of the release of phosphorus and other elements from the lake sediments as a result of changes in oxidation state of the multivalent cations such as iron, calcium, and aluminum which releases previously-bound elements back into the water column.[6] The impact of this internal loading on lake trophic state is related to the rate at which the Lake mixes from top to bottom during the spring and fall overturn events. In spring and fall, differential warming and cooling of the lake surface waters, respectively, alters the density of the lake waters in such a manner as to promote the mixing of lake water. When the mixing process is relatively slow, on the order of days to weeks, minerals and nutrients released from the lake sediments into the hypolimnion of the lake tend to recombine with the multivalent cations in the lake sediments and precipitate out of the water column. Conversely, if the mixing process is relatively rapid, on the order of hours or days, as may occur due to the passage of an intense storm, the minerals and nutrients may be mixed upward into the epilimnion or surface waters where they are available for plant growth. In Round Lake, the former process seems to be the dominant process. This hypothesis is supported by the fact that the predicted total phosphorus concentrations exceeded the observed total phosphorus concentrations in the Lake, as would be anticipated in a groundwater-fed Lake where phosphorus loads are attenuated by retention of phosphorus within the soil profile prior to discharge of the groundwater into the Lake.[7]

Based on the total phosphorus data, Round Lake has a Wisconsin Trophic State Index (WTSI) value of 51 indicating that the Lake is a eutrophic waterbody.[8] Eutrophic lakes are fertile lakes that support

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[5]*R.G. Wetzel,* Limnology*, Saunders, Philadelphia, 1975.*

[6]*Werner Stumm and James J. Morgan,* Aquatic Chemistry: An Introduction Emphasizing Chemical Equilibria in Natural Waters*, Wiley-Interscience, New York, 1970.*

[7]*Estimates of the long-term annual average total phosphorus concentration Round Lake were derived from the WILMS model, described in Wisconsin Department of Natural Resources Publication No. PUBL-WR-363-96 REV,* Wisconsin Lake Model Spreadsheet, Version 2.00, User's Manual*, June 1994.*

[8]*R.A. Lillie, S. Graham, and P. Rasmussen, "Trophic State Index Equations and Regional Predictive Equations for Wisconsin Lake,"* Research and Management Findings*, Wisconsin Department of Natural Resources Publication No. PUBL-RS-735 93, May 1993.*

abundant aquatic plant growths and may support productive, but limited, fisheries, frequently dominated by rough fish such as carp. Nuisance growths of algae and plants may be exhibited by eutrophic lakes.

POLLUTANT LOADINGS

Pollutant loads to a lake are generated by various natural processes and human activities that take place in the drainage area tributary to a lake. These loads are transported to the lake through the atmosphere, across the land surface, and by way of inflowing streams. Pollutants transported by the atmosphere are deposited onto the surface of the lake as dry fallout and direct precipitation. Pollutants transported by streams enter a lake as surface water inflows. In a drainage lake, like Round Lake, pollutants loadings transported by inflowing streams and across the land surface directly tributary to a lake, in the absence of identifiable or point source discharges from industries or wastewater treatment facilities, comprise the principal routes by which contaminants enter a waterbody.[9] There are no known point sources of water pollutants within the Round Lake tributary drainage area. All of the residential lands within the tributary drainage area are served by onsite sewage disposal systems. For this reason, the discussion that follows is based upon nonpoint source pollutant loadings.

The nonpoint source pollutant loads to Round Lake were estimated on the basis of land use inventory data. Based upon the Wisconsin Lake Model Spreadsheet (WILMS) mathematical model, annual contaminant loads entering Round Lake were calculated to be approximately 30,000 pounds of phosphorus, as shown in Table 4.

Table 4 also shows the relative percentage contributions of the various land uses to the pollutant loads to Round Lake. The data indicate that, based on existing land use conditions in the Round Lake watershed, 92 percent of the phosphorus load to Round Lake is estimated to be contributed from agricultural and open lands within the tributary drainage area, 6 percent from woodlands, and about 2 percent wetlands, direct deposition onto surface waters and urban areas. Residential areas are estimated to have contributed 1 percent of the phosphorus load.[10]

To validate the estimated phosphorus load to Round Lake, Environmental Horizons staff applied the estimated phosphorus load of about 30,000 pounds in the Vollenweider-type OECD phosphorus budget model to estimate an in-lake total phosphorus concentration. This calculation resulted in an estimated annual average phosphorus concentration of 0.05 mg/l. This concentration corresponds well to the observed range in in-lake total phosphorus concentrations reported from the Lake of between 0.06 mg/l to 0.12 mg/l during 1990 and 2005. This agreement would suggest that the estimated phosphorus load is a reasonable representation of the loads entering Round Lake, and that other pollution sources, including internal, atmospheric, groundwater, and onsite sewage disposal system sources, are relatively small compared to the loading from external sources.

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[9] *S.-O. Ryding and W. Rast,* The Control of Eutrophication in Lake and Reservoirs, *Unesco Man and the Biosphere Series Vol. 1, 1989.*

[10] *The contribution of phosphorus to Round Lake from urban sources is likely to increase with increased urbanization in the watershed. Studies within the Southeastern Wisconsin Region indicate that urban residential lands fertilized with a phosphorus-based fertilizer can contribute up to two-times more dissolved phosphorus to a lake than lawns fertilized with a phosphorus-free fertilizer or not fertilized at all. See U.S. Geological Survey Water-Resources Investigations Report No. 02-4130,* Effects of Lawn Fertilizer on Nutrient Concentration in Runoff from Lakeshore Lawns, Lauderdale Lakes, Wisconsin*, July 2002.*

Of the controllable pollutant sources, the most significant sources under existing land use conditions are agricultural lands, which generate the largest percentage of sediment and nutrient loadings. Control of contaminants from these various sources can be effected through a variety of measures, as set forth in Chapter IV.

SOIL TYPES AND CONDITIONS

Soils and their management are one of the most important contributing factors to water quality within a given watershed. In September of 2001, field work was completed for an update to the original soil survey conducted by the USDA, Natural Resources Conservation Service. This information is available on the USDA's website http://websoilsurvey.nrcs.usda.gov/app/, and includes comprehensive information on individual soil types within the county and aerial photographs and interpretations of those soils. Each soil type has it's own unique set of characteristics such as land slope, permeability

Table 4

ESTIMATED EXTERNAL SOURCES OF PHOSPHORUS TO ROUND LAKE

Source	Pounds[a]	Percentage[a]
Urban		
Single-Family and Rural-Density Residential	304	1
Rural		
Agricultural, Pasture and Grasslands	27,673	92
Wetlands	70	< 1
Woodlands	1,828	6
Water	183	1
Subtotal	29,754	99
Total	30,058	100

[a]*Percentages estimated from WILMS model results.*

Source: Environmental Horizons, Inc.

or infiltration rate, chemical properties, vegetation, susceptibility to erosion, among others which all affect the suitability of a soil in terms of onsite sewage system suitability, agricultural productivity, and the volume of runoff generated. The soils within the direct drainage area of Round Lake are illustrated on Map 9, with some of the major properties to include, hydrologic group, onsite sewage system suitability, and agricultural importance presented in Table 5.

As previously noted, the soils in the vicinity of Round Lake were deposited by the glaciers approximately 12,000 to 15,000 years ago and are largely comprised of sandy and gravelly glacial till laid down directly by glaciers from the Wisconsin Age. The overall general topography of the area consists of steep slopes with wetland pockets interspersed.

Soil Slope

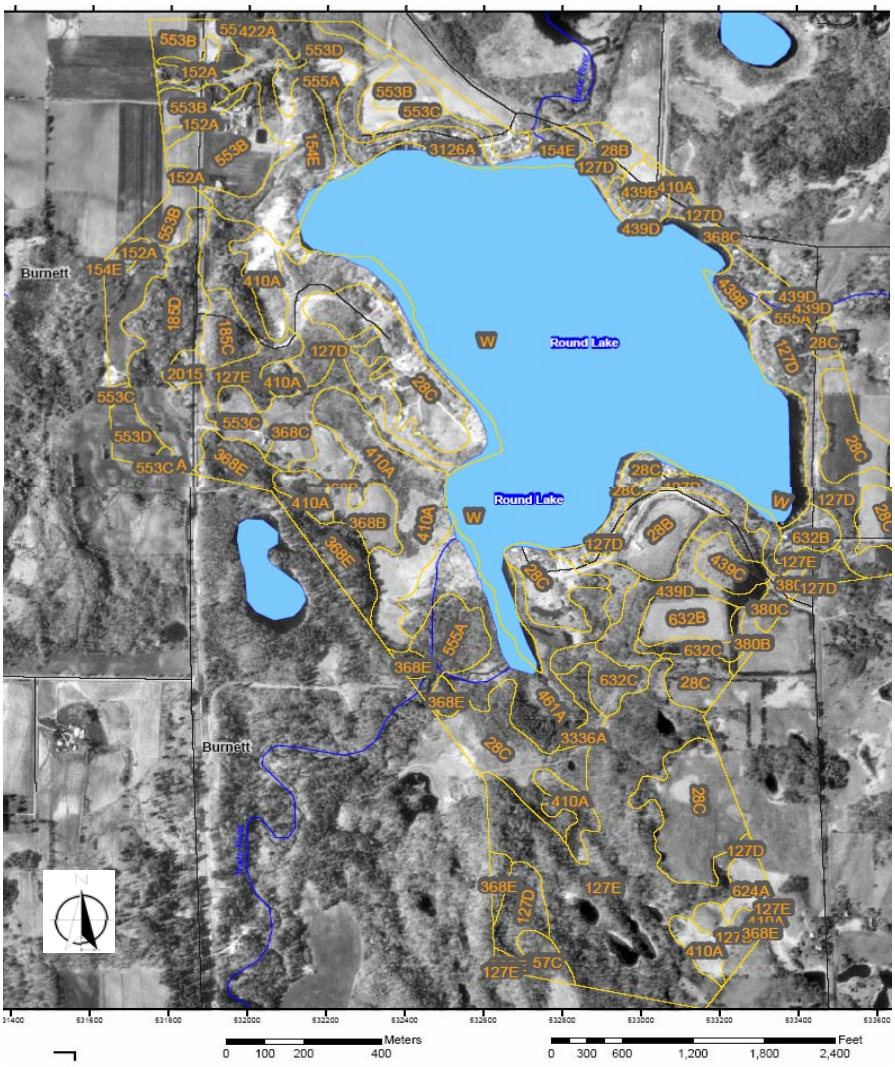
Soil slope is perhaps one of the most important factors governing soil use and management. Within the direct drainage area of Round Lake, approximately 28 percent of soils are equal to or exceed a 12 percent slope gradient, about 21 percent are between 2 and 12 percent slope, and around 14 percent of soils are less than 2 percent. The remainder of the watershed is occupied by water. Within the area immediately adjacent to the lake, approximately 50 percent of soils exceed 12 percent in slope gradient. From a management standpoint, it would be imperative to fertilize with caution and only if necessary, keep the natural vegetation intact, and maintain a buffer with an access corridor as needed immediately adjacent to the lake. Soil slopes classifications are illustrated on Map 10.

Soil Hydrologic Classification

Soils fit into distinct hydrologic groups. The hydrologic classification is driven by a soil's overall permeability or ability to infiltrate water. This characteristic is an indicator of runoff potential of a given soil. There are four basic hydrologic group ratings and three dual ratings in the direct drainage to Round Lake: A, B, C, and D, A/D, C/D, B/D. The hydrologic classifications are depicted on Map 11. Approximately 10 percent of soils in the vicinity of Round Lake fall into the first category or hydrologic group A. These soils are very course textured, consisting of sand and gravel and have very rapid infiltration. While this is desirable in terms of reduced runoff or surface flow, in terms of septic suitability in proximity to a water resource, this is undesirable. In order for soil to attenuate and trap contaminants and properly filter effluent, the rate of infiltration must be slow enough for the effluent to come into contact with the soil particles. Approximately 36 percent of soils in the direct drainage area have a hydrologic group rating of B. These soils have adequate drainage when thoroughly wetted and are not typically subject to large runoff volumes. Approximately 18 percent of soils in the direct drainage area of Round Lake are classified in the hydrologic rating of C and D. These soils are finer textured and have much reduced permeability's compared to the previous two categories. In terms of a management standpoint, these soils will be less suited for septic systems as the downward movement of effluent is retarded, possibly inducing ponding, especially at times of high rainfall.

Map 9

ROUND LAKE SOILS



Source: USDA – Natural Resources Conservation Service.

ROUND LAKE SOILS LEGEND

Map Unit Symbol	Map Unit Name	Acres in Vicinity of Round Lake	Percent
127D	Amery-Rosholt Complex, 12 to 20 percent slopes, very stony	69.0	8.8
127E	Amery-Rosholt Complex, 20 to 45 percent slopes, very stony	83.9	10.7
151A	Bluffton loam, 0 to 2 percent slopes	0.8	0.1
152A	Alstad loam, 0 to 3 percent slopes	6.9	0.9
154E	Cushing find sandy loam, 20 to 35 percent slopes	28.5	3.6
157C	Freeon, very stony-Freeon complex, 6 to 12 percent slopes	3.4	0.4
185C	Tradelake-Taylor complex, 6 to 12 percent slopes	5.5	0.7
185D	Tradelake-Taylor complex, 12 to 25 percent slopes	22.2	2.8
2015	Pits	2.0	0.3
28B	Haugen-Rosholt Complex, 2 to 6 percent slopes, very stony	13.9	1.8
28C	Haugen-Rosholt Complex, 6 to 12 percent slopes, very stony	83.4	10.6
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	5.7	0.7
3336A	Fenander fine sandy loam, 0 to 2 percent slopes	3.1	0.4
368B	Mahtomedi-Cress Complex, 2 to 6 percent slopes	9.3	1.2
368C	Mahtomedi-Cress Complex, 6 to 12 percent slopes	10.0	1.3
368E	Mahtomedi-Cress Complex, 25 to 35 percent slopes	18.4	2.3
380B	Cress-Rosholt Complex, 2 to 6 percent slopes	2.6	0.3
380C	Cress-Rosholt Complex, 6 to 12 percent slopes	2.1	0.3
410A	Seelyeville and Cathro Soils, 0 to 1 percent slopes	43.7	5.6
422A	Seelyeville, Cathro, and Rondeau Soils, 0 to 1 percent slopes	0.3	0.0
439B	Graycalm-Menahga Complex, 0 to 6 percent slopes	11.5	1.5
439C	Graycalm-Menahga Complex, 6 to 12 percent slopes	4.8	0.6
439D	Graycalm-Menahga Complex, 12 to 30 percent slopes	12.4	1.6
461A	Bowstring Muck, 0 to 1 percent slopes, frequently flooded	27.5	3.5
553B	Branstad Fine Sandy Loam, 2 to 6 percent slopes	44.4	5.6
553C	Branstad Fine Sandy Loam, 6 to 12 percent slopes	9.1	1.2
553D	Branstad Fine Sandy Loam, 12 to 20 percent slopes	13.3	1.7
555A	Fordum Silt Loam, 0 to 2 percent slopes, frequently flooded	17.3	2.2
624A	Ossmer silt loam, 0 to 3 percent slopes	3.6	0.5
632B	Aftad Fine Sandy Loam, 2 to 6 percent slopes	10.7	1.4
632C	Aftad Fine Sandy Loam, 6 to 12 percent slopes	9.2	1.2
W	Water	208.1	26.5
Total	- -	786.6[a]	100.0

[a]*The total acreage represented in the soil mapping is a close approximation to the direct drainage area of Round Lake, but not exact.*

Source: USDA – Natural Resources Conservation Service and Environmental Horizons, Inc.

Table 5

ROUND LAKE SOILS CHARACTERISTICS

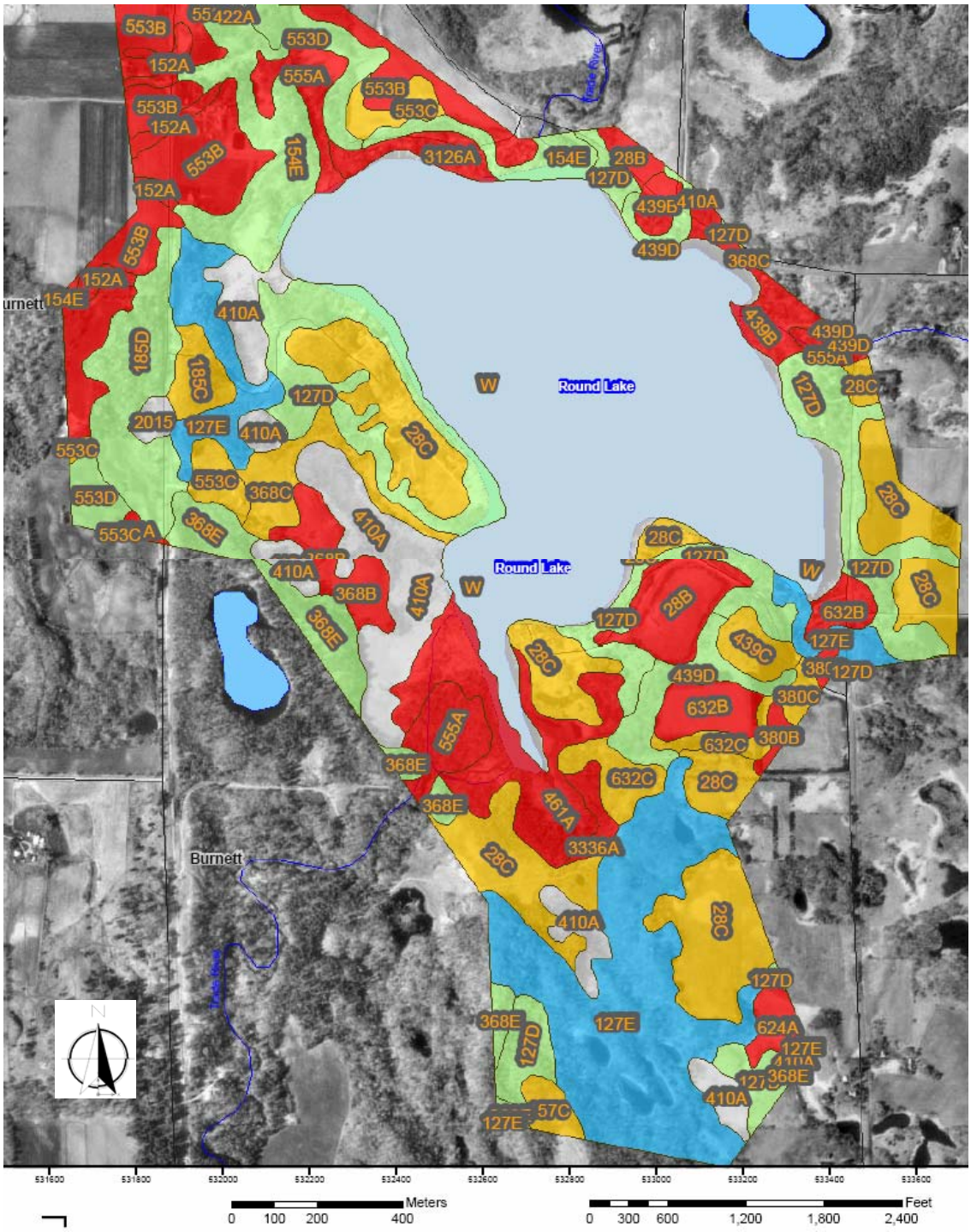
Map Unit Symbol	Map Unit Name	Hydrologic Soil Group	Onsite Sewage System Suitability	Prime Farmland Designation
127D	Amery-Rosholt Complex, 12 to 20 percent slopes, very stony	B	Very Limited	No
127E	Amery-Rosholt Complex, 20 to 45 percent slopes, very stony	B	Very Limited	No
151A	Bluffton loam, 0 to 2 percent slopes	C/D[a]	Very Limited	Yes, if drained
152A	Alstad loam, 0 to 3 percent slopes	C	Very Limited	Yes, if drained
154E	Cushing find sandy loam, 20 to 35 percent slopes	B	Very Limited	No
157C	Freeon, very stony-Freeon complex, 6 to 12 percent slopes	C	Very Limited	
185C	Tradelake-Taylor complex, 6 to 12 percent slopes	C	Very Limited	Farmland of Statewide Importance
185D	Tradelake-Taylor complex, 12 to 25 percent slopes	C	Very Limited	No
2015	Pits	Null	Null	Null
28B	Haugen-Rosholt Complex, 2 to 6 percent slopes, very stony	C	Very Limited	Yes
28C	Haugen-Rosholt Complex, 6 to 12 percent slopes, very stony	B	Very Limited	Farmland of statewide importance
3126A	Wurtsmith loamy sand, 0 to 3 percent slopes	A	Very Limited	No
3336A	Fenander fine sandy loam, 0 to 2 percent slopes	B/D[a]	Very Limited	Yes, if drained
368B	Mahtomedi-Cress Complex, 2 to 6 percent slopes	A	Very Limited	No
368C	Mahtomedi-Cress Complex, 6 to 12 percent slopes	A	Very Limited	No
368D	Mahtomedi-Cress Complex, 12 to 25 percent slopes	A	Very Limited	No
368E	Mahtomedi-Cress Complex, 25 to 35 percent slopes	A	Very Limited	No
380B	Cress-Rosholt Complex, 2 to 6 percent slopes	A	Very Limited	No
380C	Cress-Rosholt Complex, 6 to 12 percent slopes	A	Very Limited	No
410A	Seelyeville and Cathro Soils, 0 to 1 percent slopes	A/D[a]	Very Limited	No
422A	Seelyeville, Cathro, and Rondeau Soils, 0 to 1 percent slopes	A/D[a]	Very Limited	No
439B	Graycalm-Menahga Complex, 0 to 6 percent slopes	A	Very Limited	No
439C	Graycalm-Menahga Complex, 6 to 12 percent slopes	A	Very Limited	No
439D	Graycalm-Menahga Complex, 12 to 30 percent slopes	A	Very Limited	No
461A	Bowstring Muck, 0 to 1 percent slopes, frequently flooded	A/D[a]	Very Limited	No
553B	Branstad Fine Sandy Loam, 2 to 6 percent slopes	C	Very Limited	Yes
553C	Branstad Fine Sandy Loam, 6 to 12 percent slopes	C	Very Limited	Farmland of statewide importance
553D	Branstad Fine Sandy Loam, 12 to 20 percent slopes	C	Very Limited	No
555A	Fordum Silt Loam, 0 to 2 percent slopes, frequently flooded	D	Very Limited	No
624A	Ossmer silt loam, 0 to 3 percent slopes	C	Very Limited	Yes, if drained
632B	Aftad Fine Sandy Loam, 2 to 6 percent slopes	B	Very Limited	Yes
W	Water	Null	Null	Null

[a]A dual hydrologic rating represents, one rate of permeability in the upper portion of the soil and another rate of permeability in the lower portion of the soil.

Source: USDA – Natural Resources Conservation Service and Environmental Horizons, Inc.

Map 10

ROUND LAKE SOIL SLOPE CLASSIFICATIONS

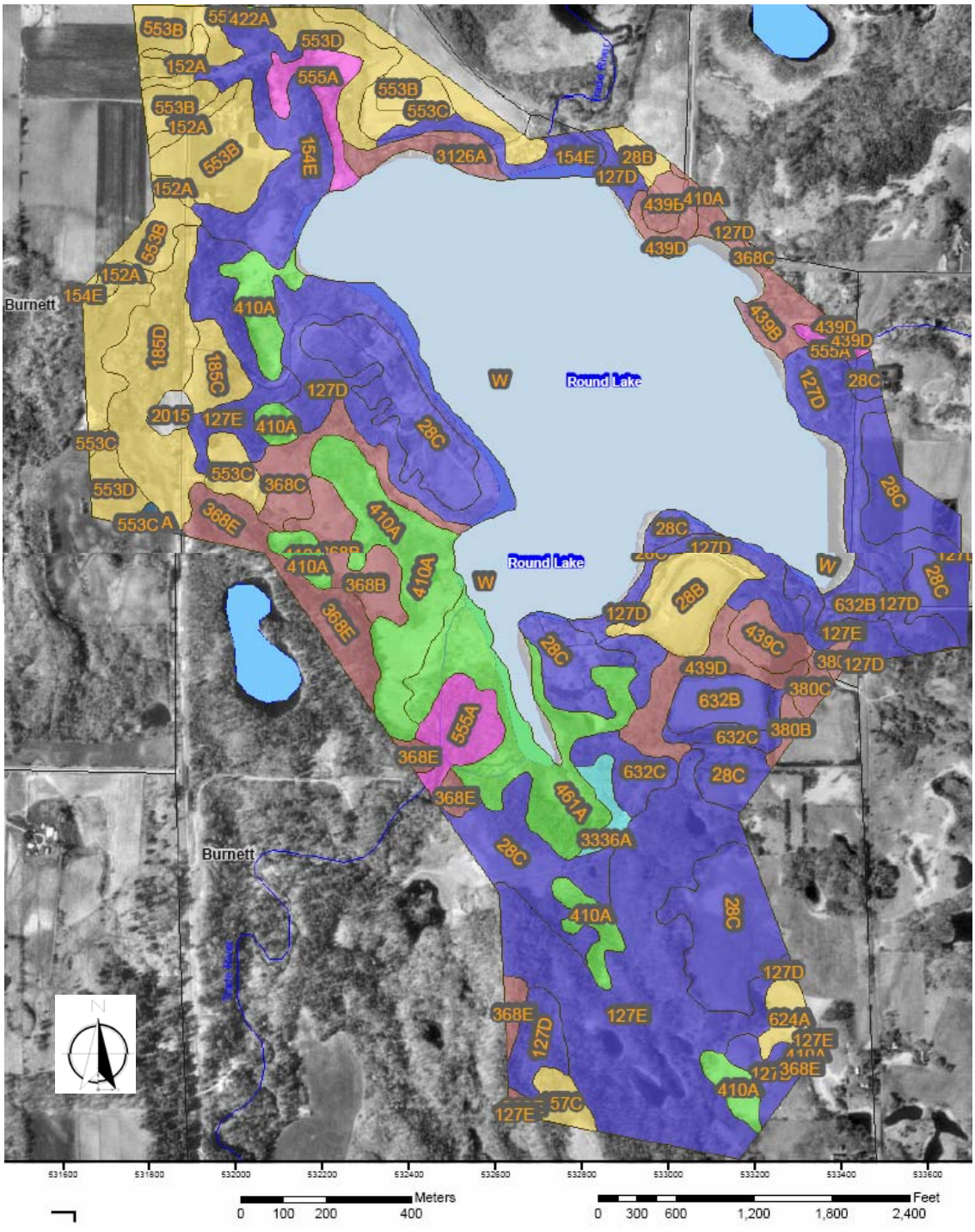


Source: USDA – Natural Resources Conservation Service.

- 0 to 5 percent
- 5 to 15 percent
- 15 to 30 percent
- 30 to 45 percent
- 45 to 60 percent
- Not rated

Map 11

HYDROLOGIC SOIL GROUPS FOR ROUND LAKE[a]



[a]*Due to slight distortion in the mapping base, top half and bottom half of the maps are slightly offset.*

Source: USDA – Natural Resources Conservation Service.

Group A
Group C
Group A/D
Group B/D
Group B
Group D

These soils are also more subject to increased runoff volumes, increasing the risk for erosion, and should therefore be kept be kept well vegetated and protected from erosion. The remaining dual categories represent one level of infiltration in the upper portion of the soil, and another infiltration rate in the subsoil.

Onsite Sewage System Suitability

Virtually all of the soils in the direct drainage area to Round Lake are unsuitable for onsite sewage disposal systems; this is illustrated on Map 12. The U.S. Department of Agriculture, Natural Resources Conservation Service uses a variety of soil characteristics to evaluate whether a soil between the depths of 24 and 60 inches is suitable for effluent attenuation, installation, and functionality and maintenance of the system, and public health. These properties include but are not limited to proximity to groundwater, slope, permeability, presence of gravel and boulders, and depth to bedrock. The soils in the direct drainage area to Round Lake are all rated as very limited for septic tank absorption fields. A significant source of water pollution, has historically been older septic systems in close proximity to a water resource. From a management standpoint, septic systems installed in this area, especially those in close proximity to Round Lake should be evaluated on a frequent and regular basis to ensure that these systems are functioning properly. Also, many of these systems may experience lateral flow due to the higher slopes surrounding the lake or the effluent may drain so rapidly through the absorption field, that there is not enough contact time to attenuate the contaminants before entering the lake.

Chapter Comm 83 of the Wisconsin Administrative Code governs onsite sewage disposal systems During 2000, the Wisconsin Legislature amended Chapter Comm 83 and adopted new rules governing onsite sewage disposal systems. These rules, which had an effective date of July 1, 2000, significantly altered the existing regulatory framework and have effectively increased the area in which onsite sewage disposal systems may be utilized. However, the interpretations associated with the soil survey are such that they continue to provide insights into the potential for land-based sources of pollution to affect the lake water quality either as a consequence of overland flows during storm events or through groundwater interflows in the lake.

Farmland Designation

A soil's suitability for agricultural production is driven by a multitude of factors, chiefly of importance being soil slope, soil fertility, and drainage. The agricultural suitability of soils is illustrated on Map 13. Approximately 50 percent of the soils in the direct drainage area to Round Lake are not significant in terms of agricultural yield and production. However, approximately 11 percent are considered prime farmland, or prime farmland if drained, and approximately 14 percent of soils are classified as farmland of statewide importance. These soils are valuable in terms of agricultural productivity. Soils used for agricultural purposes should have a farm plan designed so that soil erosion is limited to every extent practical, and that soil amendments such as fertilizers and livestock manures are applied according to the needs of the crop.

AQUATIC PLANTS, DISTRIBUTION, AND MANAGEMENT AREAS

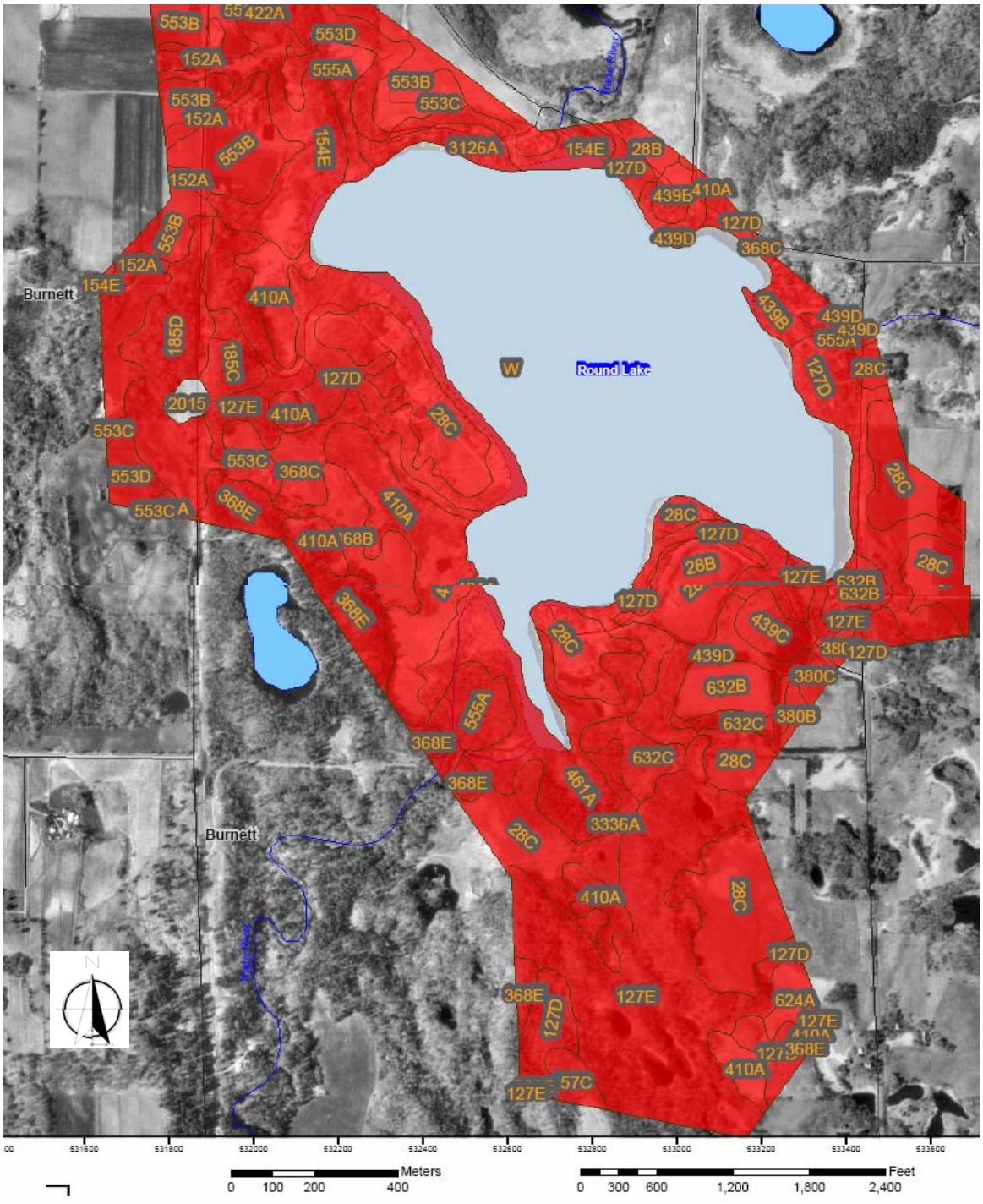
Rooted Aquatic Macrophytes

An aquatic plant survey was conducted in Round Lake by Environmental Horizons staff during July 2005. The results of this survey are presented in Table 6, and graphically depicted on Map 14. Photos of the common aquatic plants found in Round Lake are included in Appendix A.

Eleven submergent, and five species of floating leaved, aquatic plant species were found in Round Lake during the survey. Aquatic plants were not found at depths greater than about 6 feet in this algal dominated waterbody. The Lake had a low floral diversity and an impoverished aquatic macrophyte

Map 12

ROUND LAKE SOIL CHARACTERISTICS FOR ONSITE SEWAGE DISPOSAL[a]



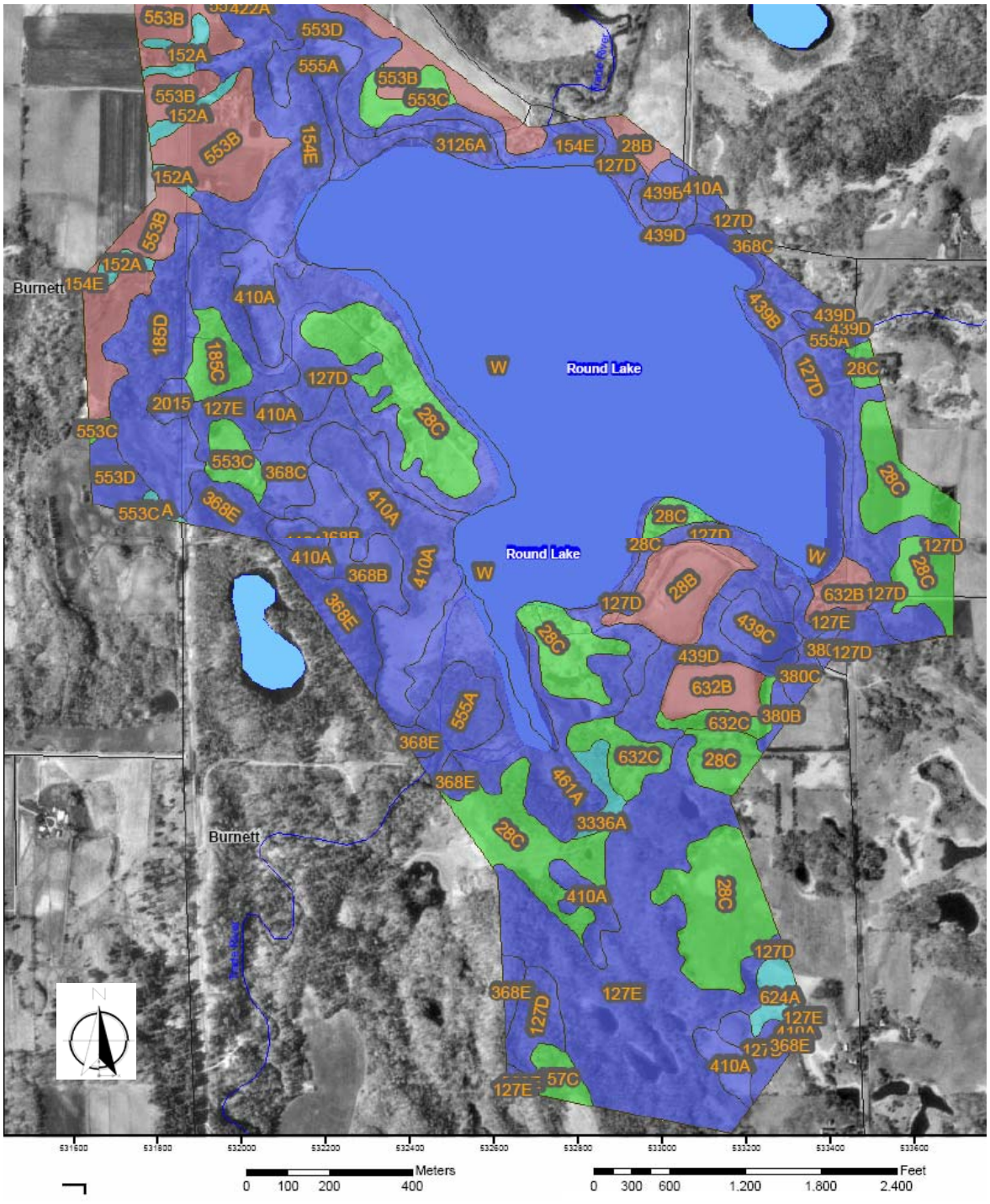
[a]*Due to slight distortion in the mapping base, the top half and bottom half of the maps are slightly offset.*

Source: USDA – Natural Resources Conservation Service.

Very Limited

Map 13

ROUND LAKE SOILS PRIME FARMLAND DESIGNATION



Source: USDA – Natural Resources Conservation Service.

- Prime Farmland
- Farmland of Statewide Importance
- Not Prime Farmland
- Prime Farmland, if Drained

Table 6

AQUATIC PLANT SPECIES PRESENT IN ROUND LAKE AND THEIR ECOLOGICAL SIGNIFICANCE: JULY 2005

Aquatic Plant Species Present	Sites Found	Frequency of Occurrence (percent)[a]	Relative Density at Sites Found[b]	Importance Value[b]	Ecological Significance[c]
Ceratophyllum demersum (coontail)	22	29	1.7	48	Provides good shelter for young fish and supports insects valuable as food for fish and ducklings
Elodea canadensis (waterweed)	10	13	2.0	26	Provides shelter and support for insects which are valuable as fish food
Lemna minor (lesser duckweed)	- -[d]	- -[d]	- -[d]	- -[d]	A nutritious food source for ducks and geese, also provides food for muskrat, beaver, and fish, while rafts of duckweed provide shade and cover for insects; in addition, extensive mats of duckweed can inhibit mosquito breeding
Lemna trisulca (forked duckweed)	- -[d]	- -[d]	- -[d]	- -[d]	Good food for ducks and geese; provides cover for fish and insects
Myriophyllum sp. (native water milfoil)	6	8	1.3	10	Provides valuable food and shelter for fish; fruits eaten by many waterfowl
Myriophyllum spicatum (Eurasian water milfoil)[e]	22	29	2.6	74	None known
Najas guadalupensis (southern naiad)	1	1	1	< 1	Provides good food and shelter for fish and food for waterfowl
Nuphar variegatum (yellow water lily)	- -[d]	- -[d]	- -[d]	- -[d]	Leaves, stems, and flowers are eaten by deer; roots eaten by beaver; seeds eaten by wildfowl; leaves provide harbor to insects, in addition to shade and shelter for fish
Nymphaea odorata (white water lily)	- -[d]	- -[d]	- -[d]	- -[d]	Provides shade and shelter for fish; seeds eaten by wildfowl; rootstocks and stalks eaten by muskrat; roots eaten by beaver, deer, moose, and porcupine
Potamogeton crispus (curly-leaf pondweed)[e]	9	12	1.4	17	Provides food, shelter and shade for some fish and food for wildfowl
Potamogeton gramineus (variable pondweed)	4	5	2.5	13	Provides habitat for fish and food for waterfowl, in addition to muskrat, beaver, deer, and moose
Potamogeton pectinatus (Sago pondweed)[f]	4	5	1.5	8	This plant is the most important pondweed for ducks, in addition to providing food and shelter for young fish
Potamogeton zosteriformis (flat-stemmed pondweed)	2	3	1.0	3	Provides some food for ducks
Spirodella polyrhiza (great duckweed)	- -[d]	- -[d]	- -[d]	- -[d]	Good food for ducks and geese; also eaten by muskrat and some fish; provides cover for fish and insects
Vallisneria americana (water celery/eel grass)[f]	4	5	2.0	10	Provides good shade and shelter, supports insects, and is valuable fish food
Zosterella dubia (water stargrass)	2	3	1.0	3	Provides food and shelter for fish, locally important food for waterfowl

NOTE: There were 77 sites sampled during the July 2005 survey.

[a] *Maximum equals 100 percent*.

[b] *Maximum density equals 4.0.*

[c] *Information obtained from* A Manual of Aquatic Plants *by Norman C. Fassett,* Guide to Wisconsin Aquatic Plants*, Wisconsin Department of Natural Resources and* Through the Looking Glass…A Field Guide to Aquatic Plants*, Wisconsin Lakes Partnership.*

[d]*Emergent and floating-leafed aquatic plants are not included in the analysis of density and frequency of occurrence of submerged macrophytes.*

[e]*Considered an invasive and nonnative aquatic plant species known to cause significant adverse change in specific aquatic ecosystems under Section NR 109.07 (2) of the* Wisconsin Administrative Code*.*

[f]*Considered a high-value aquatic plant species known to offer important values in specific aquatic ecosystems under Section NR 107.08 (4) of the* Wisconsin Administrative Code*.*

Source: Environmental Horizons, Inc.

community, although the aquatic plant community included several aquatic plant species designated as having important ecological value. Notwithstanding, Eurasian water milfoil and curly-leaf pondweed, declared nuisance species in Wisconsin, also were found in the Lake. Eurasian water milfoil was observed primarily along the northeastern shoreline of the Lake, while curly-leaf pond weed was found along the western shoreline. The abundance of Eurasian water milfoil is also cause for much concern in Round Lake, given its recreational usage and shallow depths in the northwest and southeastern portions of the basin, and the location of the Lake in the upper reaches of the Trade River watershed.

In addition to the nonnative Eurasian water milfoil and curly-leaf pondweed, native aquatic plant species occurring in Round Lake included coontail, *Ceratophyllum demersum*; northern water milfoil, *Myriophyllum sibiricum*; water celery, *Vallisneria americana;* waterweed, *Elodea canadensis*; water star grass, *Heteranthera dubia*; southern naiad, *Najas guadalupensis*; flat-stemmed pondweed, *Potamogeton zosteriformis;* Sago pondweed, *Potamogeton pectinatus*; and variable pondweed, *Potamogeton gramineus*. Aquatic plant species dominance is shown in Table 6.

Floating leaved aquatic plants included three species of duckweed—big duckweed, *Spirodela polyrhiza*; star duckweed, *Lemna trisulca*; and, lesser duckweed, *Lemna minor*—and white and yellow water lilies—*Nymphaea odorata* and *Nuphar variegatum*, respectively. Growths of the filamentous alga, *Cladophora* spp., were also observed, notably in the northwestern portion of the Lake adjacent to newly disturbed shorelands.

The occurrence of Eurasian water milfoil in Round Lake especially is cause for concern because this species is an exotic, or nonnative, plant that can exhibit “explosive” growth under suitable conditions, such as in the presence of organic-rich sediments or where lake bottom has been disturbed. It reproduces by the rooting of plant fragments, which can be caused by wind-induced turbulence, fragmentation by boat motor propellers, or action of humans and wildlife, and has been known to cause severe recreational use problems in lakes in Wisconsin. It often outcompetes the native aquatic vegetation of lakes, reducing the biodiversity of the lake and degrading the quality of fish and wildlife habitats.[1] Eurasian water milfoil, together with curly-leaf pondweed, which is also known to occur in Round Lake, is a designated nonnative, invasive species.

Phytoplankton

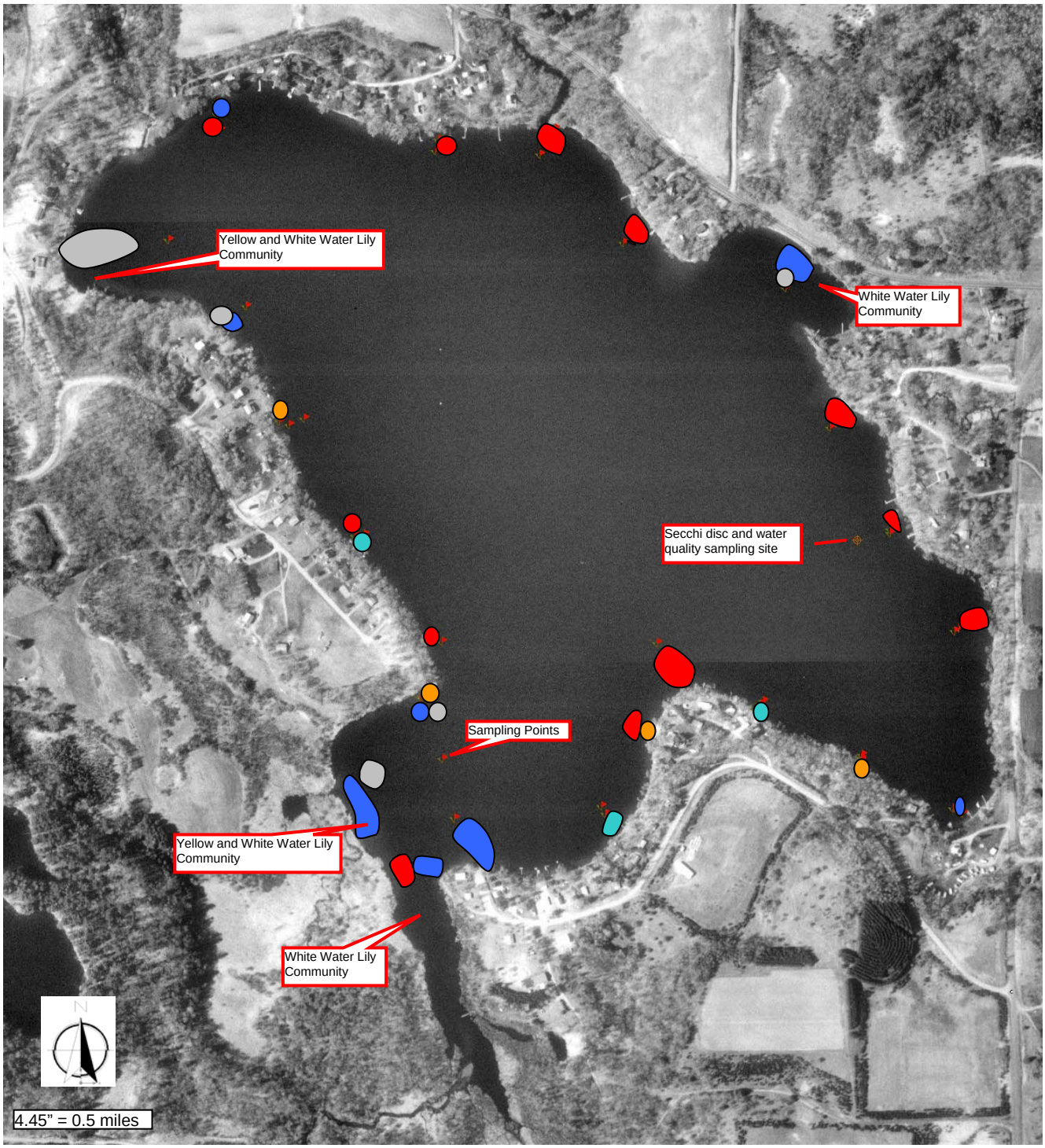
Round Lake, however, is an algae-dominated or phytoplankton-dominated lake, which is illustrated in Photo 1. Four major species of microscopic aquatic plants have been observed; namely, *Microcystis*, *Anabaena, Aphanizomenon*,and *Coeleosphaerum*. Of these, both *Microcystis* and *Anabaena* have the potential to form toxic strains, which are potentially harmful to humans and wildlife.[2] Until recently, toxic

[1]*Wisconsin Department of Natural Resources,* Eurasian Water Milfoil in Wisconsin: A Report to the Legislature*, 1993.*

[2] *W. R. Harding and B. R. Paxton,* Cyanobacteria in South Africa: A Review*, South African Water Research Commission Report No. TT 153/01, Pretoria, 2001.*

Map 14

DISTRIBUTION OF AQUATIC PLANT COMMUNITIES IN ROUND LAKE: 2005



Source: Environmental Horizons, Inc.

Eurasian Water Milfoil Community
Pondweed Community
Coontail Community
Cladophera Community
Curly-Leaf Pondweed Community

strains of these cyanophytes,[13] or blue-green algae, were rare in the temperate zone, being largely confined to the tropics. Given that a recent case of suspected blue-green algae toxicity was reported

from Dane County, Wisconsin,[14] however, Environmental Horizons staff obtained algal samples from Round Lake during July 2005 and requested that PhycoTech, Inc., provide identification and toxilogical evaluation. The results of these detailed examinations suggest *Microcystis* and *Anabaena* are the dominant algae in the Lake. Both species are capable of producing toxic strains. Toxicological analysis indicated that there is a risk of cyanobacterial toxicity in the Lake, with enzyme-based analysis of a sample obtained from the deep hole station indicating a microcystin concentration of 0.8 +/- 0.05 µg/l. Concentrations in excess of 0.5 µg/l are considered to suggest a degree of risk for drinking water sources and for bodily contact recreation. Based upon such a concentration, additional monitoring is indicated and more detailed analysis of the toxin forming substances is warranted, potentially using high pressure liquid chromatograph (HPLC) techniques that will allow more specific identification of the particular toxin(s) involved. Notwithstanding, *Microcystis* is a bloom- or scum-forming alga that can lead to unsightly conditions occurring in the Lake.

The presence of blue-green algal blooms in the Lake is responsible for the elevated pH reported from the Lake. pH values in excess of 9.0 are not uncommon in algal dominated waters. Review of the water quality data set forth in Appendix C also suggest that the presence of the toxic strains of blue-greens may be related to the relatively low nitrogen:phosphorus ratio, which, based upon the nitrate:phosphate concentrations, is between 1 and 2. The total Kjeldahl nitrogen:total phosphorus ratio is higher, about 22, which is more typical of inland lakes. These data are consistent with the dominance of blue-green algae in the system.

Wetlands, which are illustrated on Map 5 and the wetland soils which are illustrated on Map 9, are defined as “areas that have a predominance of hydric soils and that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions.” This definition is used by the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Natural Resource Conservation Service.[15] The Wisconsin Department of Natural Resources, pursuant to Chapter 23 of the *Wisconsin Statutes*, defines a wetland as “an area where water is at or near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation, and which has soils indicative of wet conditions.” This latter definition may

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[13] *Blue green algae are known as cyanophytes or cyanobacteria, and are a primitive form of single cell planktonic plant.*

[14] *Professor W. Carmichael, Department of Biological Sciences, Wright State University, personal communication.*

[15] *Lands designated as prior converted cropland, that is, lands that were cleared, drained, filled, or otherwise manipulated make them capable of supporting a commodity crop prior to December 23, 1985, may meet the criteria of the U.S. Natural Resource Conservation Service wetland definition, but they would not be regulated under Federal wetland programs. If such lands are not cropped, managed, or maintained for agricultural production, for five consecutive years, and in that time the land reverts back to wetland, the land would then be subject to Federal wetland regulations.*

Photo 1

ALGAL BLOOM ON ROUND LAKE, JUNE 25, 2005

Source: Environmental Horizons, Inc.

include some very poorly drained, poorly drained, or somewhat poorly drained soils[16] as wetland soils that meet the Department's "wet condition" criterion. Notwithstanding, as a practical matter, experience has shown that the application of all of these definitions produce reasonably consistent wetland identifications and delineations in a majority of situations. This consistency is due in large part to the provision in the Federal wetland delineation manual which allows for the application of professional judgment in cases where the degree to which the three criteria for wetland identification is satisfied is unclear.

Wetlands affect the quality of water by acting as a filter or a buffer zone allowing silt and sediments to settle out. They also influence the quality of water by providing water during periods of drought and holding it back during periods of floods. When located along shorelines of lake and streams, wetlands help protect those shorelines from erosion. Wetlands may also serve as groundwater discharge and

[16]*Although prior converted cropland is not subject to Federal wetland regulations unless cropping ceases for five consecutive years and the land reverts to a wetland condition, the State may consider prior converted cropland to be subject to State wetland regulations if the land meets the criteria set forth in the State wetland definition before it has been cropped for five consecutive years.*

recharge areas in addition to being important resources for overall ecological health and diversity by providing essential breeding and feeding grounds, shelter, and escape cover for many forms of fish and wildlife. However, wetlands are poorly suited to urban use. This is due to the high soil compressibility and instability, high water table, low load-bearing capacity, and high shrink-swell potential of wetland soils, and, in some cases, to the potential for flooding. In addition, metal conduits placed in some types of wetland soils may be subject to rapid corrosion. These constraints, if ignored, may result in flooding, wet basements and excessive operation of sump pumps, unstable foundations, failing pavements, broken sewer lines, and excessive infiltration of clear water into sanitary sewerage systems. In addition, there are significant onsite preparations and maintenance costs associated with the development of wetlands, particularly as they relate to roads, foundations, and public utilities.

PAST AND PRESENT AQUATIC PLANT MANAGEMENT ACTIONS

The Round Lake Management Association has not previously undertaken an active program of aquatic plant management within the Lake basin. Records of aquatic plant management efforts were first maintained by the Wisconsin Department of Natural Resources during 1950, although previous aquatic plant management interventions may have taken place, but were not recorded. There are no records of the application of sodium arsenite in the Lake during this period. Currently, aquatic plant management activities within Round Lake are limited to individual interventions by landowners around their individual piers and docks.

FISHERIES

The Wisconsin Department of Natural Resources Publication No. PUBL-FH-800 2005, *Wisconsin Lakes*, 2005 indicates that walleyed and northern pike, largemouth bass and panfish are common, and that smallmouth bass are present in Round Lake.[17] In addition, common carp were observed to be present.

WILDLIFE AND WATERFOWL

Given the low- and moderate-density, single-family residential nature of much of the Lake's shoreline, and the surrounding woodlands and wetlands in the vicinity, it is likely that the wildlife community is comprised of small upland game animals, such as rabbit and squirrel; predators, such as fox and raccoon; game birds, such as pheasant; marsh furbearers, such as muskrat; migratory and resident songbirds; marsh birds, such as red-winged blackbirds and great blue herons (Photo 2); and waterfowl. The character of wildlife species, along with the nature of the habitat present in the planning area has undergone significant change since the time of European settlement and the subsequent clearing of forests, plowing of the prairie, and filling or draining of wetlands for agricultural purposes. Modern practices that adversely affect wildlife and wildlife habitat include: the excessive use of fertilizers and pesticides, road salting, heavy traffic, the introduction of domestic animals, and the fragmentation and isolation of remaining habitat areas for urban and agricultural uses.

RECREATIONAL USES AND FACILITIES

Round Lake is a multi-purpose use waterbody serving all forms of water-based and water-related recreation, including swimming, boating, and fishing during the summer months, and ice-skating, cross-country skiing, and ice fishing during the winter months. The Lake is used year-round as a visual amenity, and for a variety of other outdoor activities including bird watching, walking, and grilling out.

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[17] *Wisconsin Department of Natural Resources Publication No. PUBL-FH-800 99 Rev,* Wisconsin Lake*, 1999.*

Photo 2

GREAT BLUE HERON NEAR THE SOUTHWEST QUADRANT OF ROUND LAKE

Source: Environmental Horizons, Inc.

Recreational use surveys were conducted by Environmental Horizons staff on July 27, 2005. Both the morning and afternoon weekday recreational use surveys indicated that the lake was lightly used with only two fishing boats being observed on Round Lake. Similar counts were conducted during the weekends of July 24, 2005, and July 30, 2005 by Mr. Larry Ghimenti of the Round-Trade Lake Improvement Association. This survey indicated that between 5 and 9 watercraft of various types were being operated on Round Lake during weekend mornings and afternoons. These watercraft included fishing boats, personal watercraft, ski boats, and powerboats. Table 7 summarizes both the weekday and weekend boating usage on the Lake.

A survey of recreational watercraft moored on, or trailered near, the Lake also was conducted during July 2005. A total of approximately 158 watercraft were observed. Of these, the majority were powered boats of various types, as shown in Table 8. These included about 17 skiboats, 27 fishing boats, 35 pontoon boats, and 3 personal watercraft. In addition, about 16 canoes, 25 rowboats, and 24 paddleboats were recorded.

Round Lake has adequate public recreational boating access pursuant to the public recreational boating access standards set forth in Chapter NR 1 of the *Wisconsin Administrative Code*. Public recreational boating access is provided at the Lake. The access site on Round Lake is located on the southwestern shore of the Lake, as shown on Map 8. In addition, private boating access and water-

Table 7

RECREATIONAL USE SURVEY ON ROUND LAKE: 2005

Date and Time	Weekday Participants							
	Fishing	Pleasure Boating	Skiing	Sailing	Jetskiing	Swimming	Other	Total
July 27, 2005								
10:00 a.m. to10:15 a.m.	1	0	0	0	0	0	0	1
1:00 p.m. to 1:15 p.m.	1	0	0	0	0	0	0	1
Total	2	0	0	0	0	0	0	2
Percent	100	0	0	0	0	0	0	100

Date and Time	Weekend Participants							
	Fishing	Pleasure Boating	Skiing	Sailing	Jetskiing	Swimming	Other	Total
July 24, 2005								
9:00 a.m. to 11:15 a.m.	5	0	0	0	0	0	0	5
July 30, 2005								
1:00 p.m. to 1:15 p.m.	3	1	1	0	2	2	0	9
Total	8	1	1	0	2	2	0	14
Percent	57	7.5	7.5	0	14	14	0	100

Source: Environmental Horizons, Inc and Mr. Larry Ghimenti.

Table 8

WATERCRAFT ON, AND IN THE VICINITY OF, ROUND LAKE: 2005

Type of Watercraft								
Speed/Ski Boat	Fishing Boat	Pontoon Boat	Canoe	Sailboat	Rowboat	Powerboat[a]	Personal Watercraft	Other[b]
17	27	35	16	0	24	1	3	10

[a]*This boat consisted of a cabin cruiser.*

[b]*Other watercraft consisted of two water trampolines, four water tubes, and four swim rafts.*

Source: Environmental Horizons, Inc.

based recreational opportunities are provided at the resort located on the southeastern shore of the Lake.

SHORELINE PROTECTION STRUCTURES

Shoreline protection structures are designed to minimize shoreland erosion and to protect the structure and functioning of the aquatic ecosystem, especially, in the nearshore areas. Such protection structures also can contribute to preserving and enhancing water quality and habitat for fishes and other aquatic life. Certain shoreland landscaping practices have been shown to be effective deterrents to resident waterfowl populations, as well as attractive means of preserving and providing habitat for desirable aquatic species. Environmental Horizons, Inc. staff conducted a survey of the Round Lake shoreline during July of 2005. This survey identified the shoreline as being comprised of a mixture of riprap, a

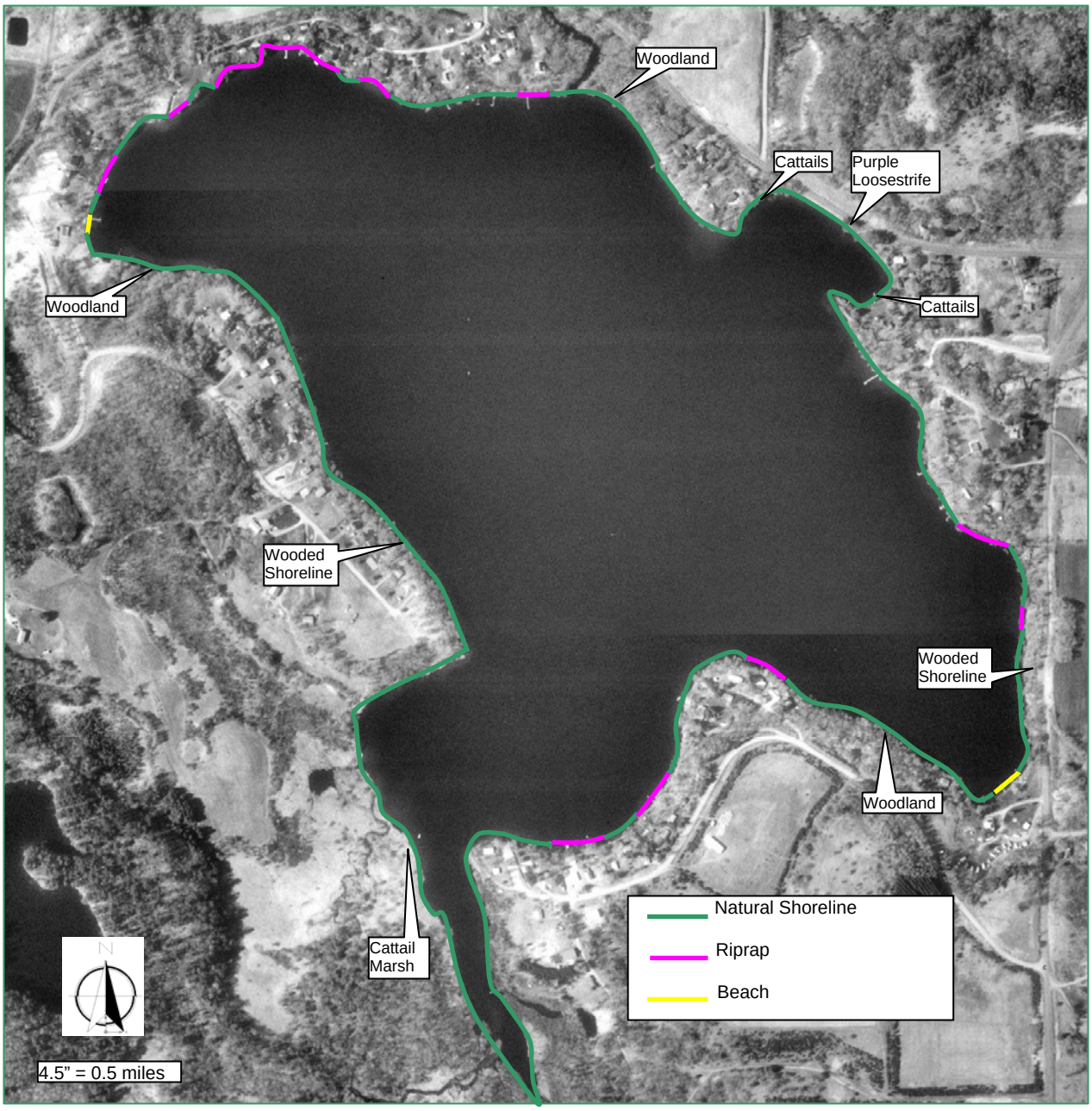
large percentage of natural shoreline, with small, scattered areas of beach, as shown on Map 15. No obvious erosion-related problems were observed, although some areas of natural shoreline, especially those with steep slopes, appeared to be potentially susceptible to minor to moderate erosion events.

LOCAL ORDINANCES

Round Lake is subject to land use and shoreline regulations that are under jurisdictional control of Burnett County, as summarized in Appendix D. Recreational boating and winter use of Round Lake is regulated by the State of Wisconsin boating and water safety laws promulgated pursuant to Chapter 30, *Wisconsin Statutes.*

Map 15

SHORELINE PROTECTION STRUCTURES ON ROUND LAKE: 2005



Source: Environmental Horizons, Inc.

Chapter III

ISSUES OF CONCERN

INTRODUCTION

Round Lake is a waterbody that is capable of supporting a variety of recreational water uses. However, there are a number of existing and potential future problems and issues of concern that should be addressed in this plan. These concerns include potential changes in aquatic plant communities and ecologically valuable areas, and changes in land uses and their potential impacts on water quality. Underlying the aquatic plant issues are water quality concerns related to land use with the upstream drainage area tributary to Round Lake. These issues of concern are elaborated below.

AQUATIC PLANT COMMUNITIES

The abundance of aquatic plants in Round Lake has been perceived to be a nuisance by users of Round Lake. These problems depend, in part, on the uses in specific portions of the Lake, but generally involve the abundant growths of aquatic plants such as Eurasian water milfoil. These plants often grow to the surface of the Lake, limiting certain recreational uses in those areas of the Lake, in addition to impairing the aesthetic quality of the Lake and limiting habitat for fish and other aquatic life within and adjacent to the Lake. Of greater consequence in Round Lake, however, is the predominance of blue-green algae, especially the potentially toxin-forming *Microcystis* species. Consequently, this plan targets algal growths for management. Notwithstanding, it should be noted that changes in the density and abundance of algal growths in the Lake may shift the aquatic plant dominance in the lake from algae to rooted aquatic macrophytes. Should this shift occur, alternative aquatic plant management practices, targeting the rooted aquatic plants, may be required in future.

The abundant, though localized, growths of rooted aquatic plants within Round Lake, as well as the abundant algal growths, can interfere with the recreational uses, aesthetic enjoyment, and the ecological health of the waterbody. Recreational boating activities are impaired by rooted aquatic plants in portions of the Lake by clogging of propellers and cooling water intakes, slowing boating activities, and limiting the ability of lake users to navigate in certain areas of the Lake. This is especially true in the southwestern portions of the Lake by the Trade River inlet to Round Lake. Without control measures, these areas could become impassable for recreational navigation.

In addition, fishing and swimming activities on the Lake also may be adversely affected by aquatic plant growths. This is especially of concern in those areas of the Lake where Eurasian water milfoil occurs at swimming depths. Fishing areas may be similarly affected by growths of Eurasian water milfoil in the Lake, while native aquatic plants, generally found at slightly deeper depths, pose less severe potential problems for swimming and provide positive ecological benefit to the Lake, as noted in Table 6. In

contrast, the abundance and virtually exclusive, monospecific stands of Eurasian water milfoil may limit fish habitat, providing few food resources and little shelter, while the density of such stands creates concerns for the safety of swimmers in the Lake. In general, the presence of rooted aquatic plants throughout the lake basin is not perceived as adversely affecting the aesthetic enjoyment of lake residents and visitors to the Lake.

Notwithstanding, the abundant growths of free-floating aquatic plants and algae limit water clarity and have the potential to form unsightly surface scums. As noted, too, the potential for these plants to develop and release toxins into the water may limit recreational use of the Lake and pose a risk to wildlife and domestic pets. The abundance of phytoplankton in the Lake limits light penetration to the point where rooted aquatic plant growth is limited. This in turn creates negative consequences to the in-lake fishery, which is dependent upon the rooted plant to provide food, shelter, and habitat. While the presence of deadfalls and downed trees along portions of the Lake shoreline may supplement available fisheries habitat, aquatic plant management is an important issue to be considered.

ECOLOGICALLY VALUABLE AREAS

Round Lake and its tributary drainage area contains ecologically valuable areas, including significant areas of diverse, native aquatic vegetation suitable for fish spawning and wildlife habitat, which are located within, and immediately adjacent to, the Lake. The Round Lake community has expressed concern over the perceived degradation of these resources. Two potential concerns associated with ecologically valuable areas in and near Round Lake have been identified. These include: the potential loss of wetlands and other ecologically valuable areas due to residential development or other encroachments; and the degradation of wetlands and aquatic habitat due to the presence of invasive species, primarily Eurasian water milfoil and purple loosestrife. Thus, management of ecologically valuable areas in and adjacent to the Lake is an important issue to be considered.

Woodlands and Wetlands

The ecologically valuable areas within the drainage area tributary to Round Lake, as documented in Chapter II, include wetlands and woodlands, and associated wildlife habitat. Riparian wetland areas and native aquatic macrophyte beds include prime fish spawning habitat, containing a diverse native flora within the Lake, as well as within shoreland areas. In Round Lake, these areas generally lie along the eastern and western shorelines of the Lake basin, and on the southwestern shoreline of the Lake. Protection of these areas is an important issue to be considered.

Shorelands

Most of the shoreline of Round Lake is protected and no major areas of erosion, which are likely to require additional protection against wind, wave, and wake erosion, were identified during the planning effort. Much of the lakeshore remained in native shoreland vegetation, with the majority of the steeply sloping western shorelands remaining in a largely undisturbed condition. Notwithstanding, areas with incipient purple loosestrife growth were noted along the eastern and western shorelines. In addition, the encroachment of a residential property into shoreland wetlands at the northwestern extreme of the Lake was noted. Destruction of cattails along the shore, together with the abundant growths of the macro-alga, *Cladophora*, suggested that this area was subject to significant disturbance. Wherever practical, vegetated buffer strips should be used in lakeshore areas in order to maintain habitat value and the natural ambience of the shoreland area.

LAND USE AND WATER QUALITY

Nonpoint Source Pollution

Nonpoint source pollutants in the drainage area tributary to Round Lake represent a potentially significant threat to the Lake's water quality. Based upon recommendations set forth in the county land and water resource management plan,[1] future development of open lands within the drainage area tributary to Round Lake is expected to occur as development of existing platted lots or redevelopment of current sites within the drainage area that could have concomitant impacts on lake water quality.

In addition, such development may influence the quality and quantity of stormwater runoff being conveyed to the Lake or available for infiltration into the groundwater. As impervious surface is added to the drainage area tributary to Round Lake, the ability of rainwater to percolate into the surfacial aquifer is reduced. Greater volumes of rainfall and snowmelt are conveyed through stormwater conveyance systems to the Lake and its tributary streams. While current stormwater management ordinance provisions limit the magnitude of such alterations in runoff volume, increased runoff has the capacity to carry greater loads of potential contaminants to the Lake. Consequently, increased heavy metals, sediment, and nutrient loadings may be expected to occur as land uses change, although these loads may decrease or stabilize once more urban land use conditions stabilize within the drainage area. Nevertheless, construction activities within the watershed have the potential to mobilize significant quantities of soil from the land surface unless mitigation measures are applied and maintained. For these reasons, the control of construction site erosion and of stormwater-borne, nonpoint-sourced pollutants remains an important issue to be considered.

Water Quality

As of 2005, surface water quality in Round Lake was observed to be poor. As described in Chapter II, the Lake was within the eutrophic range, indicating that water quality problems would be expected. Not unexpectedly, the citizens within the Round-Trade Lake Improvement Association have expressed concern regarding surface water quality over the longer term, especially as urban density development occurs within the drainage area and groundwatershed tributary to Round Lake.

Because domestic water supplies to households at Round Lake are drawn from the regional groundwater aquifer system, contamination of this aquifer by pollutants leaching into the groundwater from the land surface, and from onsite sewage disposal systems, is an issue of widespread concern within the drainage area tributary to Round Lake. The soils surrounding the Lake appear to be generally unsuitable for onsite sewage disposal systems, and, hence, expose the Lake to the risk of transfer of contaminants to the Lake from onsite sewage disposal systems. Thus, the management and maintenance of these systems is an issue of concern that relates not only to lake water quality but also to the security of the potable water supply. While the measures taken to minimize water quality degradation in the surface drainage area tributary to Round Lake should also serve to protect the groundwater resources of the watershed from contamination, the potential for groundwater contamination remains an issue of concern.

RECREATIONAL USAGE

Overcrowding and excessive recreational boating use is perceived to create problems in many lakes in Wisconsin, especially those offering high-quality recreational opportunities within a one- to two-hour drive of the Minneapolis-St. Paul and Eau Claire metropolitan areas. Given the surface area of Round Lake, and the nature of the access site, the potential for the occurrence of problems due to increased or inappropriate boating pressure is considered to exist. In addition, local use of the Lake for water-

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[1]*Burnett County,* Burnett County Land and Water Resource Management Plan: 2000-2005*, September 2000.*

based recreation could result in potentially significant boating pressure should the location of the Lake become better known or the nature of watercraft in common use on the Lake change. Thus, recreational water usage is an issue to be considered.

Further, as noted above, the presence of potentially toxic forms of the blue-green algae in the Lake are indicative of an elevated risk of swimmer's itch and related skin complaints among persons engaged in full-body contact recreational activities in the Lake.

Chapter IV

ALTERNATIVE AND RECOMMENDED LAKE PROTECTION MEASURES

INTRODUCTION

Chapter III described four issues of concern to be considered as part of this lake protection plan. These issues are related to: 1) ecologically valuable areas and aquatic plants; 2) nonpoint source pollution and water quality; 3) land use; and 4) recreational use. Following a brief summary of the ongoing lake management program activities, alternatives and recommended measures to address each of these issues and concerns are described in this chapter. The alternatives set forth herein focus on those measures which are applicable to the Round-Trade Lake Improvement Association, and to the Town of Trade Lake, with lesser emphasis given to measures which are applicable to other organizations with jurisdiction within the drainage area tributary to the Round Lake.

PAST AND PRESENT LAKE MANAGEMENT ACTIONS

The residents of Round Lake, in conjunction with the Town of Trade Lake, have long recognized the importance of informed and timely action in the management of Round Lake. The action in this regard resulted in the formation of the Round-Trade Lake Improvement Association, a Chapter 181, *Wisconsin Statutes*, non-stock corporation, which provided the forum for many of the lake management activities undertaken by the residents of Round Lake. The Association has participated in the Wisconsin Department of Natural Resources Self-Help Monitoring Program, periodically since 1986, and has undertaken an aquatic plant management and lake protection planning program, with the support of funds provided under the Chapter NR 190 Lake Management Planning Grant Program. These water quality data, in conjunction with the aquatic plant, fisheries, recreational use, and land use data collected during this planning program and summarized in Chapter II, form the basis for the development of the recommended aquatic plant management and lake protection plan for Round Lake set forth herein.

ECOLOGICALLY VALUABLE AREAS AND AQUATIC PLANTS

Round Lake and its tributary drainage area contain ecologically valuable areas, including diverse aquatic and wetland vegetation and substrates suitable for fish spawning, located within and immediately adjacent to the Lake. As described in Chapter III, the potential problems associated with ecologically valuable areas in and near Round Lake include the potential loss of wetlands and other important ecologically valuable areas due to urbanization or other encroachments; and the degradation of wetlands and aquatic habitat due to the presence of invasive species, including Eurasian water milfoil and purple loosestrife.

Array of Protection Measures
Four measures to protect and maintain the biodiversity of Round Lake and the tributary drainage area have been identified as potentially viable: 1) wetland management measures, 2) shoreland management measures, 3) in-lake management measures, and 4) citizen informational and educational measures.

Wetland Management Alternatives
Wetland plant management refers to a group of management and restoration measures aimed at both removal of nuisance vegetation and manipulation of species composition in order to enhance and provide for the protection and maintenance of the biodiversity of Round Lake and its tributary drainage area. Protection of ecologically valuable areas and wetlands is generally best accomplished through land use control measures, public acquisition, or acquisition of conservation easements. In addition, certain in-lake management measures could be used to moderate deleterious changes in the aquatic plant and animal communities that comprise the lakeward portions of the ecologically valuable areas within the Lake basin. Citizen informational and educational programming also forms an important element of the management of environmentally valuable areas within and riparian to Round Lake by encouraging actions on the part of riparian residents and residents within the drainage area tributary to Round Lake that would benefit the maintenance of ecologically valuable areas within the Lake. Such practices include the protection of existing shoreland vegegation and placement of shoreland buffers strips utilizing native plants where appropriate. Maintenance of existing shoreland vegetation, especially on steeply sloping hillsides, is strongly recommnended.

The recommended future land use condition within the drainage area tributary to Round Lake is set forth in the adopted county land use plan. This plan recommends the preservation of most wetlands and other ecologically valuable lands, including the environmentally valuable lands adjacent to Round Lake and within the drainage area tributary to Round Lake. Recommended protection measures to be considered include the placement of these lands in appropriate zoning districts, depending upon the type and character of the natural resource features to be preserved and protected, and enforcement of existing land use regulations within the drainage area, including the County shoreland and floodland ordinance.

The aforementioned land use plan recommend that all lakes, rivers, streams, wetlands, and associated undeveloped floodlands and shorelands be placed into conservancy or floodplain protection districts. Where wetlands and other environmentally valuable lands are threatened by encroachment or degradation, the adopted land and water resource management plan recommends that these lands be considered for purchase or for acquisition of conservation easements. Land acquisition, as a means of protecting environmentally valuable lands from encroachment or further degradation, or as a means of facilitating their rehabilitation and restoration, is possible with funds provided through the Chapters NR 50/51 Stewardship Grant Program and Chapter NR 191 Lake Protection Grant Program as set forth in the *Wisconsin Administrative Code*. Outright purchase or the purchase of conservation easements are both possible options under these programs. Lands proposed for purchase must be appraised using standard governmental land acquisition procedures as established by the Wisconsin Department of Natural Resources, and must be subject to a land management plan setting forth the processes and procedures for their long-term maintenance and development. The Chapter NR 191 grant program provides State cost-share funding for the purchase up to a maximum State share of $200,000 at up to a 75 percent State cost-share. The Chapter NR 50/51 grant program provides State cost-share funding up to a maximum State share of $100,000 at up to a 50 percent cost-share.

Shoreland and Nearshore Management Alternatives
There is significant overlap between lands designated as wetland under current State definitions and shoreland areas with aquatic plant communities. These areas include shallow nearshore areas within

the shoreland zone of a lake, especially along the western shoreline of Round Lake, including the Trade River inlet and northwestern portion of the drainage area directly tributary to the Lake. While the management of in-lake aquatic plant communities is discussed below, various potential in-lake management actions may be considered complementary to the management of environmentally valuable wetland areas within the shoreland zone. In addition, citizen informational and educational programming should be considered as an essential aspect of the management of environmentally valuable lands within the drainage area tributary to Round Lake.

As has been noted above, much of the shoreline of Round Lake is well-vegetated and no major areas of erosion, which are likely to require additional protection against wind, wave, and wake erosion, were identified in the planning effort. Notwithstanding, the shorelands along the northwestern corner of the Lake basin had been subject to extensive disturbances, and restoration of the shoreland vegetation and shoreland wetland vegetation in this area is recommended. Adoption of the vegetated buffer strip method is recommended to be used in lakeshore areas wherever practical in order to maintain habitat value and the natural ambience of the shoreland area. Continued maintenance of existing revetments and other protection structures also is recommended. Conversion of bulkheads to riprap or naturally vegetated shoreline or combinations thereof, as shown in Figure 1, is recommended to be considered where potentially viable at such time as major repairs are found necessary. Naturally vegetated buffer strips should also be considered for all other shorelines, where practical.

In this regard, it should be noted that deadfalls and other tree falls into the water along portions of the shoreline should not be removed, as these trees provide essential structure and habitat for fishes and other wildlife in this Lake. As noted in Chapter II, the aquatic flora of the Lake is dominated by phytoplankton or algae, with limited aquatic plants communities that provide minimal levels of fish habitat.

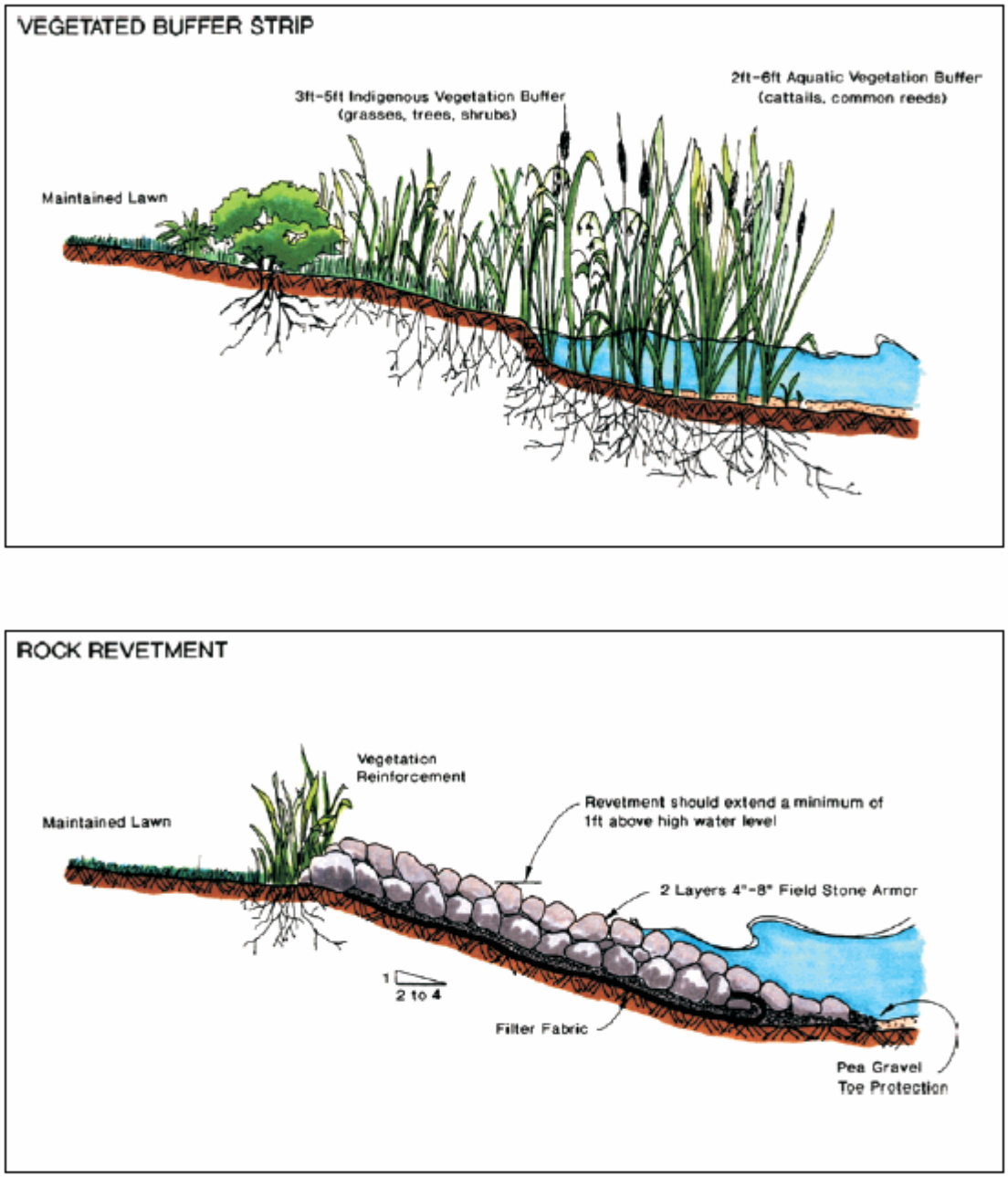
Notwithstanding, potential management measures to control nuisance vegetation or to manage shoreland vegetation include physical, chemical and biological controls. All of these control measures require permits from the Wisconsin Department of Natural Resources if they extend below the Ordinary High Water Mark into the bed of the Lake. In addition, a County permit also may be required for removal of trees and other vegetation from within the shoreland zone.

Manual Harvesting

The physical removal of specific types of vegetation by selective harvesting of plants provides a highly selective means of controlling the growths of nuisance upland and wetland plant species, including purple loosestrife, reed canary grass, buckthorn and other invasive, nonnative plants. Bagging and cutting loosestrife plants, for example, prior to the application of chemical herbicides to the cut stems, can be an effective control measure for small infestations of this plant, limiting shedding of seeds that will promote regrowth in future years. Loosestrife management programs, however, should be followed by an annual monitoring and control program for up to 10 years (or more) following the initial control program to manage the regrowth of the plant from seeds that may have been set prior to the application of the control measures. For other nonnative invasive plant species, selective cutting of shrubs and small trees, as in the case of buckthorn, can likewise remove nuisance species from the midst of native plants without causing significant disruption of the habitat area. This procedure may require the limited application of an herbicide to the remaining plant materials for effective long-term control.

Figure 1

RECOMMENDED ALTERNATIVES FOR SHORELINE EROSION CONTROL FOR ROUND LAKE



NOTE: Design specifications shown herein are for typical structures. The detailed design of shoreline protection structures must be based upon analysis of local conditions.

Source: Southeastern Wisconsin Regional Planning Commission.

In the nearshore area, specially designed rakes are available to assist in the removal of nuisance aquatic plants from the shoreline area. The use of such rakes also provides a safe and convenient method of controlling aquatic plants in deeper nearshore waters around piers and docks. Should the Round-Trade Lake Improvement Association acquire a number of these specially designed rakes, they could be made available for the riparian owners to use on a trial basis to test their operability before purchasing them. The advantage of the rake is that it is easy and quick to use, immediately removing the plants.

In larger areas, repeated mowing or occasional burning can be effective means of managing larger prairie areas, although prairie burns require trained personnel and would be likely to require local permits prior to this measure being used. Manual control of nuisance species in shoreland wetland areas of Round Lake is considered to be a viable management option.

Herbicides

Chemical treatment with herbicides is a short-term method of controlling heavy growths of nuisance plants. The use of herbicides can potentially damage or destroy nontarget plant species that provide habitat for wildlife and other shoreland organisms. Widespread chemical treatments can also provide an advantage to less desirable, invasive, introduced plant species to the extent that they may outcompete the more beneficial, native species. Hence, this is not a feasible management option to be used on a large scale. Notwithstanding, chemical control is often a viable technique for the control of the relatively small-scale infestations of purple loosestrife and certain other plants. Chemicals are generally applied to the growing plants in liquid form. Chemical treatment can be administered at a relatively low cost and is, therefore, considered to be a viable management option. In the control of purple loosestrife and buckthorn, for example, chemical treatments combined with manual control measures can be extremely effective, as noted above. Thus, the use of chemical control measures may be considered a viable alternative in specific situations.

Biological Controls

An alternative approach to controlling nuisance weed conditions, particularly in the case of purple loosestrife, is biological control. Classical biological control has been successfully used to control both weeds and herbivorous insects.[1] Recent evidence shows that the beetles, *Galerucella pucilla* and *Galerucella calmariensis*, and the weevils, *Hylobius transversovittatus* and *Nanophyes brevis*, have potential as biological control agents for purple loosestrife. Extensive field trials conducted by the Wisconsin Department of Natural Resources in the Wisconsin in the later 1990s and early 2000s indicated that these insects can provide effective management of larger-scale infestations of purple loosestrife. Therefore, the use of these insects as a means of wetland plant management is considered to be viable.

Shoreline Structures

The shorelines of Round Lake present a largely natural aspect to lake users and residents. As described in Chapter II, the shorelines of Round Lake did not appear to be subject to any significant erosion. Nevertheless, the maintenance of shorelands is important in order to avoid erosion, preserve the nearshore and wetland aquatic vegetation in and around the Lake, and, especially, protect the structure and functioning of the aquatic ecosystem of the Lake. Such protections also contribute to preserving and enhancing water quality as well as providing habitat for fishes and other aquatic life. In addition, certain shoreland landscaping practices have been shown to be effective deterrents to resident waterfowl populations and an attractive means of preserving and providing habitat for desirable aquatic species, while satisfying the aesthetic requirements of shoreland landowners.

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[1] *B. Moorman, "A Battle with Purple Loosestrife: A Beginner's Experience with Biological Control,"* LakeLine*, Volume 17, Number 3, September 1997, pp. 20-21, 34-37.*

Two options are generally recommended for shoreland protection; namely, the use of riprap to protect lands along active shorelines where erosion by wind waves, wakes of watercraft, and ice movement are anticipated; and the use of natural vegetation along less active shorelines. These options also should be considered in the repair or replacement of existing protection structures. It should be noted that structural shoreline protection measures require a Wisconsin Department of Natural Resources Chapter 30, *Wisconsin Statutes*, permit and completion of the NR 326 worksheet to identify appropriate alternatives. Many shoreland protection measures can be constructed or implemented, at least in part, by local residents using readily available construction materials. In addition, these measures would, in most cases, enable the continued use of the immediate shoreline, and create a visually "natural" or "semi-natural" aspect that would enhance the aesthetic qualities of the lake shoreline. The use of taller, native grasses and plants would also discourage waterfowl, while at the same time contributing to the preservation of the shoreland flora.

In addition to the foregoing structural measures, there are also a number of other control measures which can be considered to manage resident waterfowl populations. These measures include limitations on feeding of waterfowl by incorporating a component into the citizen information and education program, or through adoption of appropriate local ordinances. The Wisconsin Department of Natural Resources and the U.S. Department of Agriculture have educational materials which describe these management measures. Other management measures include:

- Modifying landscaping to allow grass to grow longer, so that the waterfowl will feel less safe when accessing shoreland areas, and planting vegetation which is less palatable to birds than grass;

- Installing barriers to limit access from water to adjacent grassy areas;

- Preventing nesting or disturbing nesting sites; and/or,

- Relocating birds, or, in extreme cases, hunting or culling the birds through permitted wildlife management programs.

These latter measures are not generally recommended and should be considered only if the problems associated with resident waterfowl persist and become severe enough to warrant coordinated actions. In such a situation, the Round-Trade Lake Improvement Association should seek assistance in evaluating alternative control measures from the Wisconsin Department of Natural Resources and the U.S. Department of Agriculture Fish and Wildlife Service.

Citizen Information and Education

As part of the overall citizen informational and educational programming to be conducted within the Round Lake community, residents and visitors should be made aware of the value of the ecologically significant areas in the overall structure and functioning of the ecosystems of Round Lake and the Trade River. Specifically, informational programming related to the protection of ecologically valuable areas in and around Round Lake should focus on need to minimize the spread of nuisance aquatic species, such as purple loosestrife in the wetlands and Eurasian water milfoil in the Lake. Other informational programming offered by the Round-Trade Lake Improvement Association, the Wisconsin Department of Natural Resources, Burnett County, and University of Wisconsin-Extension (UWEX), as well as other agencies such as the Wisconsin Association of Lakes, can contribute to an informed public, actively involved in the protection of ecologically valuable areas within the drainage area tributary to Round Lake. As noted above, the information and education program could include a component related to waterfowl and shoreland management.

In-Lake Aquatic Plant Management Alternatives

Aquatic plant management[2] refers to a group of management and restoration measures aimed at both removal of nuisance vegetation and manipulation of species composition in order to enhance and provide for recreational water use. Generally, aquatic plant management measures are classed into five groups; namely, physical measures which include water level management; manual and mechanical measures which include harvesting and removal; chemical measures which include using aquatic herbicides; biological controls which include the use of various organisms, including insects; and, nutrient inactivation, which addresses the cause of the excessive aquatic plant growth. All of these are regulated and require a State permit, chemical aquatic plant controls are regulated under Chapter NR 107 of the *Wisconsin Administrative Code* and all other aquatic plant management practices are regulated under Chapter NR 109 of the *Wisconsin Administrative Code*. Costs range from minimal for manual removal of plants using rakes and hand-pulling to upwards of $100,000 for the purchase of a mechanical plant harvester and associated equipment, the operational costs for which can approach $10,000 to $25,000 per year, depending on staffing and operating policies. Harvesting is probably the measure best applicable to large areas, while chemical controls may be best suited to confined areas and initial control of invasive plants. Planting of native plant species and control of Eurasian water milfoil by the weevil, *Eurhychiopsis lecontei*, are largely experimental in lakes, but can be considered in specialized shoreland areas. In addition, good housekeeping practices implemented in shoreland areas, on riparian properties, and within the drainage area tributary to Round Lake, encouraged through an active public informational and educational program, should be considered essential elements in any aquatic plant management plan. These options are discussed further below.

Aquatic Herbicides

Chemical treatment with aquatic herbicides is a short-term method of controlling heavy growths of aquatic macrophytes and algae. The use of herbicides can contribute to an ongoing aquatic plant problem by increasing the natural rates of accumulation of decaying organic matter, in turn contributing to an increased oxygen demand which may cause anoxia. The use of herbicides can also potentially damage or destroy nontarget plant species that provide needed habitat for fish and other aquatic organisms. As a result, less desirable, invasive, introduced plant species may outcompete the more beneficial, native species. Hence, this is not a feasible management option to be used on a large scale. However, chemical control is often a viable technique for the control of the relatively small-scale infestations of milfoil and certain other plants. Chemicals are applied to the growing plants in either liquid or granular form. Chemical treatment can be administered at a relatively low cost and is, therefore, considered a viable management option for selected areas in Round Lake.

Algicides

Algicides, typically based upon copper sulphate, can be used to control excessive growths of floating microscopic aquatic plants or algae. While this alternative could be considered, the extensive growths of algae in Round Lake make this alternative extremely costly, and wholesale applications of aquatic herbicides are not recommended. Rather, modifications of land use practices to ensure the integrity and maintenance of shoreland vegetation, and appropriate urban good housekeeping practices as described below, are recommended.

Mechanical Harvesting

Mechanical harvesting of aquatic plants is a practical and efficient means of controlling extensive areas of rooted aquatic plant growth. Harvesting has the added advantage of removing the plant biomass and its associated nutrients from Round Lake. Aquatic macrophytes are mechanically harvested with specialized equipment consisting of a cutting apparatus which cuts up to five feet below the water surface and a conveyor system that picks up the cut plants and hauls them to shore. Harvesting leaves

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[2]*U.S. Environmental Protection Agency Report No. EPA-440/4-90-006,* The Lake and Reservoir Restoration Guidance Manual*, August 1990.*

enough plant material in the lake to provide shelter for fish and other aquatic organisms and to stabilize sediments. Mechanical harvesting does have some potentially negative impacts to fish and other aquatic life, may cause fragmentation and spread of some plants, and could disturb loosely consolidated bottom sediments. However, if done correctly and carefully, it has shown to be of benefit in ultimately reducing the regrowth of nuisance plants. Nevertheless, given the limited areas of rooted aquatic plant growth in Round Lake, mechanical harvesting is not recommended.[3]

Manual Harvesting

Within the littoral or nearshore zone, especially adjacent to piers and docks where there is significant potential for damage to property and the lakebed, the use of specially designed rakes to manually remove aquatic plants from the shoreline area should be considered. The rakes could be purchased by the Round-Trade Lake Improvement Association and made available to riparian owners for use on a trial basis to test their operability before the homeowners purchase their own equipment. The advantage of the rake is that it is easy and quick to use, immediately removing the plants from these shallow water areas. While aquatic herbicides are also an option for aquatic plant management within these areas, the advantage of manual control methods is immediate relief; chemical treatment involves a waiting period wherein the plant adsorbs the herbicide and the herbicide induces mortality in the plant. Using this method also removes the plants from the lake, avoiding the accumulation of organic matter on the lake bottom adding to the nutrients that favor more plant growth. This method also gives the harvester more time to cover larger areas of the lake as maneuvering between the piers takes time and skill.

Biological Controls

Biological controls provide another alternative approach to controlling nuisance aquatic plant growths, particularly in the case of Eurasian water milfoil. Classical biological control has been successfully used to control both nuisance plants and herbivorous insects.[4] Recent documentation indicates that *Eurhychiopsis lecontei*, an aquatic weevil species, has potential as a biological control agent for Eurasian water milfoil.[5] However, as the studies that have been completed using *Eurhychiopsis lecontei* as a means of aquatic plant management control suggest that this control measure is extremely sensitive to disturbances such as those created by recreational boating activity, it is not recommended for use on Round Lake at this time. Grass carp, *Ctenopharyngodon idella*, an alternative biological control used elsewhere in the United States, are not permitted in Wisconsin.

Lake Bottom Covering

Lake bottom covers and light screens provide limited control of rooted plants by creating a physical barrier which reduces or eliminates the sunlight available to the plants. They have been used to create swimming beaches on muddy shores, to improve the appearance of lakefront property, and to open channels for motorboating. Sand and gravel are usually readily available and relatively inexpensive to

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[3] *It should be noted that control of the abundant algal growth that currently exists within the Lake may increase water clarity to the point that rooted aquatic macrophyte growths may become more extensive. Should this occur, aquatic plant harvesting could well be considered as a viable alternative in the future. However, current State guidance would suggests that a minimum area of harvestable aquatic plants of about 40 acres be achieved prior to State cost-share assistance being made available pursuant to the Chapter NR 7 Recreational Boating Facilities Grant Program.*

[4] *C.B. Huffacker, D.L. Dahlsen, D.H. Janzen, and G.G. Kennedy,* Insect Influences in the Regulation of Plant Population and Communities*, 1984, pp. 659-696; C.B. Huffacker and R.L. Rabb, editors,* Ecological Entomology*, John Wiley, New York, New York, USA.*

[5] *Sally P. Sheldon, "The Potential for Biological Control of Eurasian Water Milfoil (*Myriophyllum spicatum*) 1990-1995 Final Report," Department of Biology Middlebury College, February 1995.*

use as cover materials, but plants readily recolonize areas so covered in about a year. Synthetic material, such as polyethylene, polypropylene, fiberglass, and nylon can provide relief from rooted plants for several years. Because of the limitations involved, lake bottom covering as a method to control aquatic plant growth are not recommended for Round Lake.

Nutrient Inactivation
Given that the total phosphorus concentration is well into the eutrophic range, consideration should be given to reducing the nutrient availability in the Lake. This would have the benefit of limiting the opportunity for algal growth to occur, and potentially stimulate the growth of rooted aquatic plants in the system. With the steeply sloping lake bottom bathymetry, the additional lake bottom area available for rooted aquatic plant growth is limited. Such an intervention is less likely to result in the release of blue-green algal toxins into the ecosystem, in comparison with treatments based upon copper sulphate which would cause the death and lysis of the algal cells. Use of aluminium sulphate (alum) would cause the flocculation of suspended materials as well as algal cells. Application of alum at an appropriate dosage, in combination with watershed-based nutrient management, could potentially shift the aquatic plant community in the Lake to a rooted aquatic plant community, similar to those reported in the other Lakes within the Trade River chain-of-lakes. However, the lack of ability to drawn down the Lake would add significant cost to this alternative, which is not recommended at this time.

Boating Ordinances
The promulgation of more stringent controls on the use of powered watercraft within Round Lake is one means of regulating the conduct of recreational boating traffic that could be harmful to the most important ecologically valuable areas in the Lake (see also Recreational Use Management, below). Controls on recreational boating traffic, for example, could limit boating activity within these specific areas of the Lake to defined traffic lanes to minimize the disturbance and propagation of nuisance plant species by the operation of watercraft. Boating ordinances enacted in conformity with State law must be clearly posted at public landings in accordance with the requirements of Section 30.77(4) of the *Wisconsin Statutes*. Placement of regulatory markers must conform to Section NR 5.09 of the *Wisconsin Administrative Code*. Only regulatory markers are enforceable; informational buoys are not enforceable. Given the large areas of deep water and limited areas of extensive aquatic plant growths in Round Lake, creation of recreational boating access lanes is not considered to be a viable alternative.

Public Informational and Educational Programming
Aquatic plant management usually centers on the eradication of nuisance aquatic plants for the improvement of recreational lake use. The majority of the public views all aquatic plants as “weeds” and residents often spend considerable time and money removing desirable plant species from a lake without considering their environmental impacts. Thus, public information is an important component of an aquatic plant management program. Posters and pamphlets are available from the University of Wisconsin-Extension and Wisconsin Department of Natural Resources that provide information and illustrations of aquatic plants, their importance in providing habitat and food resources in aquatic environments, and the need to control the spread of undesirable and nuisance plant species.

Recommended Protection Measures
The following actions are recommended for the management of ecologically valuable areas and aquatic plants:

1. The Round-Trade Lake Improvement Association should support the preservation of natural resource features in the Round Lake tributary drainage area. These lands, and especially their associated wetland and woodland areas, are recommended to be protected and preserved to the extent practicable through protective zoning; their incorporation into the stormwater management system and related drainageways; their inclusion within site plans as local parks, recreational trails, or open spaces; and the restoration of their natural

structure and functions within the landscape. Such preservation should be promoted through the existing regulations and programs intended to protect such natural resources.

2. The Round-Trade Lake Improvement Association could consider the application of aluminium sulphate (alum) to the Lake surface as a means of immediately controlling the abundance of phosphorus in the Lake, which spurs the growths of blue-green algae in the system; however, any such application should be combined with the implementation of land management practices to reduce the inputs of phosphorus to the Lake from the land surface. Further, any application of aluminium sulphate to the Lake should be subject to further site-specific planning to determine dosages, application rates, and areas of application.[6]

3. The Round-Trade Lake Improvement Association should monitor the Lake and surrounding wetlands for the presence or spread of nuisance plant species such as Eurasian water milfoil and purple loosestrife. Manual harvesting of plants around piers and docks is the recommended means of controlling milfoil and other nuisance species of plants in those areas given the small size of the Lake. In this regard, the Association could consider purchasing several specialty rakes designed for the removal of vegetation from shoreline property and make these available to riparian owners. This would allow the riparian owners to use the rakes on a trial basis before purchasing their own. The rakes cost approximately $90 each, and do not require a permit for use within a 30-feet-wide portion of the shoreline; permits are required for manual harvesting outside of this area.

4. Should the growth of Eurasian water milfoil be determined to reach nuisance proportions in the Lake, the Round-Trade Lake Improvement Association should consider the use of chemical herbicides, but should limit the use of such herbicides to the control of Eurasian water milfoil within small areas of the Lake. [7] Early spring or late fall treatments to control the growth of Eurasian water milfoil have proven effective in other lakes in Southeastern Wisconsin and are recommended. Early spring herbicide treatments reduce the biomass subject to decomposition and limit the accumulation of organic materials on the Lake bottom. Late fall treatments risk exacerbating problems of decomposing vegetation depleting dissolved oxygen concentrations under the ice, and associated potentials for winterkill of fishes.

5. Management of aquatic plants in shallow water areas, with water depths of less than two to three feet and especially around piers and docks, should be accomplished using manual harvesting or limited chemical herbicide treatments as noted above.[8] Collection of aquatic plant fragments from shorelines is recommended to limit the potential for the spread of nonnative invasive species such as Eurasian water milfoil in the Lake.

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[6] *Note that all applications of aquatic chemicals, including aquatic herbicides such as 2,4-D and/or copper sulphate, as well as applications of aluminium sulphate for in-lake nutrient inactivation, are subject to WDNR permitting, should be conducted by licensed applicators, and are subject to water use restrictions for swimming, watering, and other uses involving both direct and indirect contact with the waterbody.*

[7] Ibid.

[8] Ibid.

6. It is recommended that an aquatic plant survey be conducted every three to five years in order to track the success of the current aquatic plant management program, as well as any other changes in the tributary drainage area that may affect Round Lake.

7. It is recommended that annual or more frequent evaluations of the algal populations and their potential toxicity be conducted by the Round-Trade Lake Improvement Association, with appropriate advice disseminated to the Town, County, and local property owners.

8. The Round-Trade Lake Improvement Association, through an educational and informational program, should promote awareness among Lake residents, visitors, and watershed residents of good urban housekeeping practices, and the invasive nature of such exotic, nonnative species as Eurasian water milfoil and purple loosestrife. Participation in citizen-based control programs coordinated by the Wisconsin Department of Natural Resources and University of Wisconsin-Extension should be encouraged.

NONPOINT SOURCE POLLUTION AND WATER QUALITY

Round Lake is a eutrophic waterbody. As such, it may be considered, by definition, to be in need of rehabilitation to restore and enhance its current aesthetic and recreational uses. As described in Chapter II, the primary sources of pollutant loadings to Round Lake are nonpoint sources generated within the drainage area tributary to the Lake. While the adopted county land use plan envisions only limited development of existing lots within the drainage area tributary to Round Lake, such development still has the potential to result in increased loadings of some pollutants associated with urban development and construction sites. Recent U.S. Geological Survey findings[9] regarding the potential impacts of suburban lawn care practices on stormwater runoff in urbanized watersheds in Wisconsin have heightened concern among lakeshore residents that the water quality of the Lakes may deteriorate, even under relatively stable land use conditions. Thus, consideration is given in this section to those actions that will protect water quality and potentially reduce contaminant loads to the Lake and groundwater systems.

Watershed management measures may be used to reduce nonpoint source pollutant loadings from such rural sources as runoff from cropland and pastureland; from such urban sources as runoff from residential, commercial, transportation, and recreational land uses; and from construction activities. The alternative, nonpoint source pollution control measures considered in this report are based upon recommendations set forth in the Burnett County land and water management plan,[10] the Wisconsin Department of Natural Resources basin plan for the St. Croix River, and information presented by the U.S. Environmental Protection Agency.[11]

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[9]*U.S. Geological Survey Water-Resources Investigations Report,* Sources of Phosphorus in Stormwater from Two Residential Urban Basins in Madison, Wisconsin: 1994-95*, in press.*

[10]*Burnett County,* Burnett County Land & Water Resource Management Plan: 2000-2005, *September 2000*.

[11]*U.S. Environmental Protection Agency, Report No. EPA-440/4-90-006,* The Lake and Reservoir Restoration Guidance Manual*, 2nd Edition, August 1990; and its technical supplement, U.S. Environmental Protection Agency, Report No. EPA-841/ R-93-002,* Fish and Fisheries Management in Lakes and Reservoirs: Technical Supplement to the Lake and Reservoirs Restoration Guidance Manual*, May 1993.*

Array of Control Measures
To control nonpoint source pollution to Round Lake and its tributary drainage area, application of both urban and rural nonpoint source controls is considered a viable option. In addition, options to control nonpoint source pollution loading during land development activities are discussed.

Urban Nonpoint Source Controls
Potentially applicable urban nonpoint source control measures include wet detention basins, stormwater infiltration basins, and grassed swales within the urban areas of the drainage basin, including the Villages of Luck and Frederic, and good urban housekeeping practices throughout the watershed, including rural density residential lands. Generally, the application of low-cost urban housekeeping practices may be expected to reduce nonpoint source loadings from urban lands by about 25 percent.

Public informational programs can be developed to encourage good urban housekeeping practices, to promote the selection of building and construction materials which reduce the runoff contribution of metals and other toxic pollutants, and to promote the acceptance and understanding of the proposed pollution abatement measures and the importance of lake water quality protection. Good urban housekeeping practices and source controls include restricted use of fertilizers and pesticides; improved pet waste and litter control; the substitution of plastic for galvanized steel and copper roofing materials and gutters; proper disposal of motor vehicle fluids; increased leaf collection; street sweeping; and reduced use of street deicing salt.

Proper design and application of urban nonpoint source control measures such as grassed swales, detention basins, and infiltration basins requires the preparation of a detailed stormwater management system plan that addresses stormwater drainage problems and controls nonpoint sources of pollution. Based upon preliminary evaluation, however, it is estimated that few practices would be effective in the areas within the immediate vicinity of Round Lake. Management measures that can be applied within the Town of Trade Lake in the immediate vicinity of Round Lake are limited largely to good urban housekeeping practices and grassed swales.

In addition, developing areas can generate significantly higher pollutant loadings than established areas of similar size. These areas include a wide array of activities, including individual site development within the existing urban area, and new land subdivision development. As previously noted, while limited additional urban development is presently occurring or planned within the drainage area tributary to Round Lake, redevelopment of existing platted lots is anticipated. These construction sites may be expected to produce suspended solids and phosphorus loadings at rates several times higher than established urban lands, and control of sediment loss from construction sites is recommended. Burnett County has adopted a construction site erosion control ordinance which is administered and enforced by the County in shoreland areas and in the unincorporated areas of the Round Lake study area. The provisions of this ordinance apply to all development except single- and two-family residential construction. Single- and two-family construction erosion control measures are to be specified as part of the building permit process. These controls include temporary measures taken to reduce pollutant loadings from construction sites during stormwater runoff events, in a manner consistent with the provisions set forth in the construction site management handbook developed by the Wisconsin Department of Natural Resources.[12]

Construction erosion controls are important pollution control measures that can minimize localized loadings of phosphorus and sediment from the drainage area, and minimize the cumulative impacts of

[12]*Wisconsin Department of Natural Resources,* Wisconsin Construction Site Best Management Practices Handbook*, November 1993.*

such loadings. The control measures include such revegetation practices as temporary seeding, mulching, and sodding; such runoff control measures as placement of filter fabric fences, straw bale barriers, storm sewer inlet protection devices, diversion swales, sediment traps, and sedimentation basins; and such site management practices as placement of tracking pads to limit the movement of soils from work sites. Construction site erosion controls may be expected to reduce pollutant loadings from construction sites by about 75 percent.

Rural Nonpoint Source Controls

Upland erosion from agricultural and other rural lands currently is a contributor of sediment and other contaminants within the tributary drainage area to Round Lake. Estimated phosphorus and sediment loadings from croplands, woodlots, pastures, and grasslands in the drainage area tributary to Round Lake were presented in Chapter II. These loadings are recommended to be reduced to the target tolerable soil loss level (T) identified in the adopted Burnett County land and water resource management plan as the tolerable levels that can be sustained without impairing productivity.[13] As set forth in Chapter II, the agricultural lands within the drainage area tributary to Round Lake may be increasingly subject to replacement, over time, with urban density development, especially around lakes and adjacent to the existing urban settlements of Luck and Frederic. While such development could potentially reduce the agro-chemical loadings to Round Lake, this benefit could be offset by the fact that urban lands contribute a wider range of contaminants to surface waters and generally result in increased rates of surface runoff.

Given that large areas of the drainage area tributary to Round Lake are in agricultural or open land uses, encouragement of the adoption of farm nutrient and pesticide management plans by individual farm operators is recommended. Assistance to farmers in the development of such plans is available from the Natural Resources Conservation Service of the U.S. Department of Agriculture, the University of Wisconsin-Extension, and the Burnett County Land and Water Conservation Department. Provision for winter manure storage, adequate (10-feet minimum width) riparian vegetative buffer strips around streams and lakes, and appropriate applications of agro-chemicals pursuant to soil nutrient tests and crop demands is strongly recommended as a means of minimizing the external nutrient loads to the Lake. As shown in Chapter II, agricultural and open lands contribute more than 90 percent of the phosphorus load to the Lake. Adoption of sound agricultural land management practices may be expected to reduce these loads by a minimum of 25 percent. Such interventions are likely to have a significant beneficial impact on Round Lake.

Nutrient Inactivation

As discussed above, the use of aluminium sulphate (alum) to remove the present in-lake load of phosphorus in Round Lake could be considered in combination with the use of watershed-based nutrient reduction strategies would result in a more immediate benefit to the Lake ecosystem by limiting the time required for the existing mass of phosphorus in the Lake, which stimulates algal and aquatic plant growths, to be decreased. However, given the potential cost of such a treatment and the inability of the Lake to be drawn down to minimize the area/volume of Lake requiring treatment, limits the viability of this alternative.

Public Informational Programming

Additional actions can be undertaken to minimize nutrient and pollutant loadings from source areas within the drainage area tributary to Round Lake. Based upon the aforereferenced findings of the U.S. Geological Survey, residential lawns can form a major source of phosphorus to watercourses in urban areas. In some cases, this phosphorus source is enhanced as a consequence of the lawn care practices employed by householders within the drainage area. For this reason, informational programming directed at alternative and appropriate lawn care practices should be provided to

[13] *Burnett County*, op. cit.

residential landowners in a manner analogous to the preparation and adoption of farm nutrient and pest management plans by rural agricultural landowners. Such programming should be predicated upon a knowledge of the soil chemistry and soil nutrient requirements for urban residential lawns and gardens. These nutrient requirements can be determined through a relatively simple soil testing procedure conducted by the University of Wisconsin-Extension. Soil test results allow householders to apply appropriate levels of fertilization to their gardens, generally saving the householder some level of expense and effort, while providing additional protections to the Lakes. In addition, distribution of lawn care pamphlets within the drainage area, providing information on composting, yard care, and maintenance of the grassed swale stormwater system would apprise householders of alternative means of maintaining their properties.[14]

Programming should also be developed to keep the householders in Round Lake community informed of the current state of their Lake's water quality. To this end, continued participation in the Wisconsin Department of Natural Resources Self-Help Program is recommended as a means of assessing the health of Round Lake on a regular basis. Such programs can provide an early warning of undesirable changes in lake water quality. Additional data compiled from regular, three- to five-yearly interval surveys of the aquatic species composition form an important complementary assessment tool. Review of these data annually by the Round-Trade Lake Improvement Association Board of Directors can permit the Association, and the Town, to initiate appropriate responses in a timely manner. Regular reports on the results of these studies have been featured at the annual meetings of the Round-Trade Lake Improvement Association and should be continued as one means of informing residents of the current state of the Lake.

Recommended Control Measures

The following management actions are recommended for the management of nonpoint source pollution sources and surface water quality:

1. The Round-Trade Lake Improvement Association, in conjunction with the Town of Trade Lake, should assume the lead in the development of a public educational and informational program for the residents around Round Lake and within the drainage area tributary to Lake, which encourages the institution of good urban housekeeping practices including, pesticide and fertilizer use management, improved pet waste and litter control, and yard waste management, as well as other lake management-related topics. The Round-Trade Lake Improvement Association, possibly in cooperation with service clubs and other nongovernmental organizations within the drainage area tributary to Round Lake, should acquire and distribute relevant publications in the University of Wisconsin-Extension "Yard Care and the Environment" series to encourage sound yard care practices within the watershed, and encourage their memberships to participate in the soil testing program offered by the University of Wisconsin-Extension. It is recommended that informational programming related to nonpoint source pollution abatement and other lake management topics be included at the annual meetings of the Round-Trade Lake Improvement Association.

2. The stormwater and construction site erosion control ordinances adopted by Burnett County, and the Town of Trade Lake, should be strictly enforced to reduce sediment and contaminant loadings from the urbanizing areas in the tributary drainage area to Round Lake.

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[14]*University of Wisconsin-Extension Publication No. GWQ007,* Practical Tips for Home and Yard*, 1993, and related publications in the "Yard Care and the Environment" series.*

3. Continuation of the participation of the Round-Trade Lake Improvement Association in the Wisconsin Department of Natural Resources Self-Help monitoring program is recommended. The report of the citizen monitor should be featured at the annual meeting of the Association.

LAND USE MANAGEMENT

As land uses within the drainage tributary to Round Lake change from rural agricultural land uses to more urban land uses, adoption of good urban housekeeping practices as noted above is recommended. Periodic review of the Burnett County land use plan, land and water resources management plan, and related zoning ordinances is recommended to ensure ongoing application of appropriate best land management practices within the drainage area, especially those lands riparian to the Lake. In addition, encouragement of the preparation and implementation of rural land management plans by agricultural landowners within the watershed is strongly recommended. Appropriate density development, location of development sites within the drainage area, and implementation of construction site erosion controls will limit the impact of land use changes on the water resources of Burnett County and the Trade River watershed. Implementation of stormwater management practices within subdivisions and in urban areas, pursuant to Chapter NR 151 of the *Wisconsin Administrative Code*, and ongoing maintenance of such practices is recommended. Where stormwater management basins are utilized as a stormwater management measures pursuant to *Administrative Code* requirements, consideration of the guidance set forth by the University of Wisconsin-Extension relative to shoreland landscaping of these basins is recommended.[15] Adoption, implementation and maintenance of appropriate land use controls and management measures should minimize the future risk of water quality degradation, and provide up to a 25 percent reduction in nonpoint sourced pollution loads from urbanizing lands.

Array of Control Measures

Adoption and implementation of land use zoning and appropriate land use plans by the counties, villages and towns within the Trade Lakes drainage area will allow the evolution of urban and peri-urban development within this drainage area consistent with the water quality goals established for the Round-Trade chain-of-lakes. These ordinances and plans will direct the implementation of urban density land use practices to areas within the drainage basin that can be appropriately served by wastewater treatment practices that minimize the risk of release of nutrients and other contaminants to the river system. Zoning ordinances can regulate shoreland setbacks and shoreland management practices consistent with maintaining a native shoreland buffer surround the Lake and its influent river systems. Such buffers, of a minimum 20-feet in width, will reduce the transport of nutrients, sediments, and other land-based contaminants to the water system. Similar buffers, applied to agricultural lands, will also serve a similar function and aide in the minimization of nutrient inputs to Round Lake. Such actions are an essential add-on to any in-lake management practices that may be considered, including any potential treatment of the Lake with aluminium sulphate as a nutrient management practice.

In addition, land management practices applied to individual properties should be considered, including integrated nutrient and pest management practices for agricultural operations in the watershed, and urban “good housekeeping” practices for residential, urban and peri-urban lands. These latter practices include maintenance of riparian vegetative buffer strips and appropriate fertilization of lands that have been converted to lawns, to ensure a healthy turf.

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[15] *University of Wisconsin-Extension Publication No. GWQ045,* Storm Water Basins: Using natural landscaping for water quality & esthetics*, 2005.*

Recommended Management Measures

1. Adoption and enforcement of appropriate land management ordinances and land use plans is recommended.

2. Because turf grasses demand significant amounts of nitrogen for healthy growth, application of a low-phosphorus/no-phosphorus, nitrogen-based fertilizer at a rate of four pounds of nitrogen per 1,000 square feet per year is recommended. Applications of phosphorus should be predicated upon soil test results and application recommendations. Given the soil characteristics of the watershed, use of fine fescue—as opposed to Kentucky bluegrass—is recommended, with the nitrogen-based fertilizer applications being split into four to eight smaller applications over the course of the growing season, annually.[16]

RECREATIONAL USE MANAGEMENT

Public recreational boating access to Round Lake is provided by through a town park on the southwestern shore of the Lake, and, as noted in Chapter II, provides adequate public recreational boating access as defined by the public recreational boating access standards promulgated in Chapter NR 1 of the *Wisconsin Administrative Code*. Consequently, recreational use management concerns currently center on issues of enforcement of boating ordinances, and protection of the Lake and its environs from disturbances related to recreational boating, angling, and similar activities.

Alternative Protection Measures

Recreational Boating

The promulgation of more stringent controls on the use of powered watercraft within Round Lake is one means of regulating the effects of boating activity that could be harmful to ecologically valuable areas of the Lake. Enforcement of slow-no-wake operation of motorized boats within a specific distance of the shoreline, such as within the "shore zone," which is defined as within 100 feet of pierheads or 200 feet of the shoreline, in the case of personal watercraft, as defined in the Wisconsin Department of Natural Resources boating ordinance guidelines, is recommended. Placement of appropriate signage at the public recreational boating access site advising boaters of current threats to the ecological integrity of the Lake should be continued. Current signage advises boaters of the risk of introduction/spread of Eurasian water milfoil and zebra mussel within Wisconsin lakes.

Placement of regulatory markers, if considered, must conform to Section NR 5.09 of the Wisconsin Administrative Code, and all restrictions placed on the use of the waters of the State must be predicated upon the protection of public health, safety, or welfare. Boating ordinances, enacted in conformity with State law, must be clearly posted at public landings in accordance with the requirements of Section 30.77(4) of the *Wisconsin Statutes*. Buoyage has the advantage of being visible to recreational boaters, and affected areas can be clearly demarcated. However, buoys can be expensive to obtain, install, and maintain. Buoys placed within the waters of the State of Wisconsin also are subject to the requirements set forth in Chapter 30, *Wisconsin Statutes*, and require a Wisconsin Department of Natural Resources permit prior to placement. Two general types of buoyage exist: regulatory buoys, such as those used to demarcate slow-no-wake or exclusionary areas; and informational buoys, those used to enhance public awareness. Buoys must be white in color, cylindrical in shape, seven or more inches in diameter, and extend 36 or more inches above the water line. Regulatory buoys include buoys used to demarcate restricted areas, prohibit boating or types of boating activities in specific areas, and control the movements of watercraft. Regulatory buoys used to demarcate regulated areas display their instructions in black lettering. Some types of regulatory buoys display an orange diamond with an orange cross inside; others display an orange circle. Informational

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[16] *Professor John C. Stier, University of Wisconsin-Extension, personal communication.*

buoys are similar in construction to the regulatory buoys, but contain an orange square on the white background. Whereas regulatory markers are enforceable, informational buoys are not.

Funding for aids to navigation and regulatory markers is available to governmental units and qualified lake associations through the Wisconsin Department of Natural Resources in accordance with NR 7.087 of the Wisconsin Administrative Code.

As noted above, Round Lake has adequate public recreational boating access consistent with the guidelines established pursuant to Chapter NR 1 of the *Wisconsin Administrative Code*. The public launch site, however, lacks basic support facilities that would encourage users to be good lake stewards. As has been observed by adjacent homeowners, the lack of sanitary facilities and refuse disposal facilities has led to inappropriate public behaviors in the vicinity of the launch site. Consequently, the provision, minimally, of a "port-a-potty" and refuse bin at the launch site is strongly recommended, especially since such facilities do not exist in proximity to the Lake. Provision of such facilities should be considered by the Town, or could be undertaken by the Association in cooperation with the Town. In addition, the Town could consider providing a boarding dock at the launch site. In this regard, cost-share funding for rest room facilities and boarding dock may be available to the Town through the Chapter NR 7 Recreational Boating Facilities Grant Program administered by the Wisconsin Department of Natural Resources.

Angling

As noted in Chapter II, Round Lake has a productive fishery, with good diversity. Notwithstanding, the presence of carp in the Lake was a cause for concern, and ongoing, periodic monitoring of fish populations was recommended.

Shoreline Protection

A significant portion of the Round Lake shoreline still remains in a natural state. As described in Chapter III, limited portions of this shoreline are subject to erosion and undercutting banks due to high water levels and wave action. However, the shorelines most at risk seem to be where native shoreline vegetation has been mowed or removed, or where the lakeshore is associated with steep slopes or wetlands. The need for maintenance of the shorelines in order to avoid erosion is important in order to protect the structure and functioning of the aquatic ecosystem of the Lake, and, especially, to preserve the wetland and nearshore aquatic vegetation in and around the Lake. Such protections also contribute to preserving and enhancing water quality and the essential structure and functioning of the waterbody and adjacent areas, and provide habitat for fishes and other aquatic life.

Two alternative shoreline erosion control techniques are considered potentially viable: vegetated buffer strips and rock revetments or riprap. These alternatives, as shown in Figure 1, were considered because they can be constructed, at least partially, by local residents; because most of the construction materials involved are readily available; because the techniques would, in many cases, enable the continued use of the immediate shoreline; and because the measures are visually "natural" or "semi-natural" and should not significantly affect the aesthetic qualities of the lake shoreline. These measures may be combined with selected regrading of the eroded banks and accumulated soils, designed to facilitate navigation and recreational boating access, on a site-by-site basis. These management measures require permits from the WDNR pursuant to Chapter 30 of the *Wisconsin Statutes*. As noted, the retention of deadfalls within areas of the littoral zone provide essential fisheries habitat within Round Lake, and such structure should be allowed to remain to the extent practicable—in all cases except where such deadfalls are a risk to the public health or welfare.

Recommended Protection Measures

It is recommended that the Round-Trade Lake Improvement Association provide the lakeshore residents with information on the methods of proper construction and maintenance of shoreline protection structures. Adoption of the vegetated buffer strip method of shoreline protection, especially

the retention of existing native shoreland vegetation, is recommended as appropriate to the specific locations on the Lake.

In addition, the conduct of periodic fisheries surveys by the Wisconsin Department of Natural Resources is recommended.

ANCILLARY PLAN RECOMMENDATIONS

The conduct of public informational programming by the Round-Trade Lake Improvement Association has been a recurring theme throughout this recommended plan. As such, informational and educational programming is identified as a specific action recommended to be undertaken by the Association. Educational programming is focused primarily on classroom-based teaching opportunities, such as those provided through the Adopt-A-Lake and Project WET programs that the Round-Trade Lake Improvement Association may wish to support through the local school district. Informational programming, in contrast, is focused on a more general program of information dissemination targeting the community. Actions that can be undertaken in terms of informational programming include programming directed at alternative and appropriate lawn care practices within this urbanizing drainage area, promotion of soil testing in cooperation with the University of Wisconsin-Extension, continued participation in the Wisconsin Department of Natural Resources Self-Help Program, and conduct of an annual review of these data by the Lake Management Association Board of Directors, including regular reports on the results of these studies at the annual meeting of the Association. In this way, the Round-Trade Lake Improvement Association will continue to have an active role within the Round Lake community, and fulfill its mandate to protect and rehabilitate Round Lake.

SUMMARY

This plan, which documents the findings and recommendations of a lake management planning study requested by the Round-Trade Lake Improvement Association, examines existing and anticipated conditions and potential management problems of Round Lake and presents a recommended plan for the resolution of these problems.

Round Lake was found to be a eutrophic, moderately deep water lake of limited quality located in close proximity to the Minneapolis-St. Paul and Eau Claire metropolitan areas and adjacent to a progressively urbanizing part of Burnett and Polk Counties in which its tributary drainage area is entirely located. Surveys indicated that the Lake and the tributary drainage area contain significant areas of ecological value, including numerous wetlands and high-quality wildlife habitat.

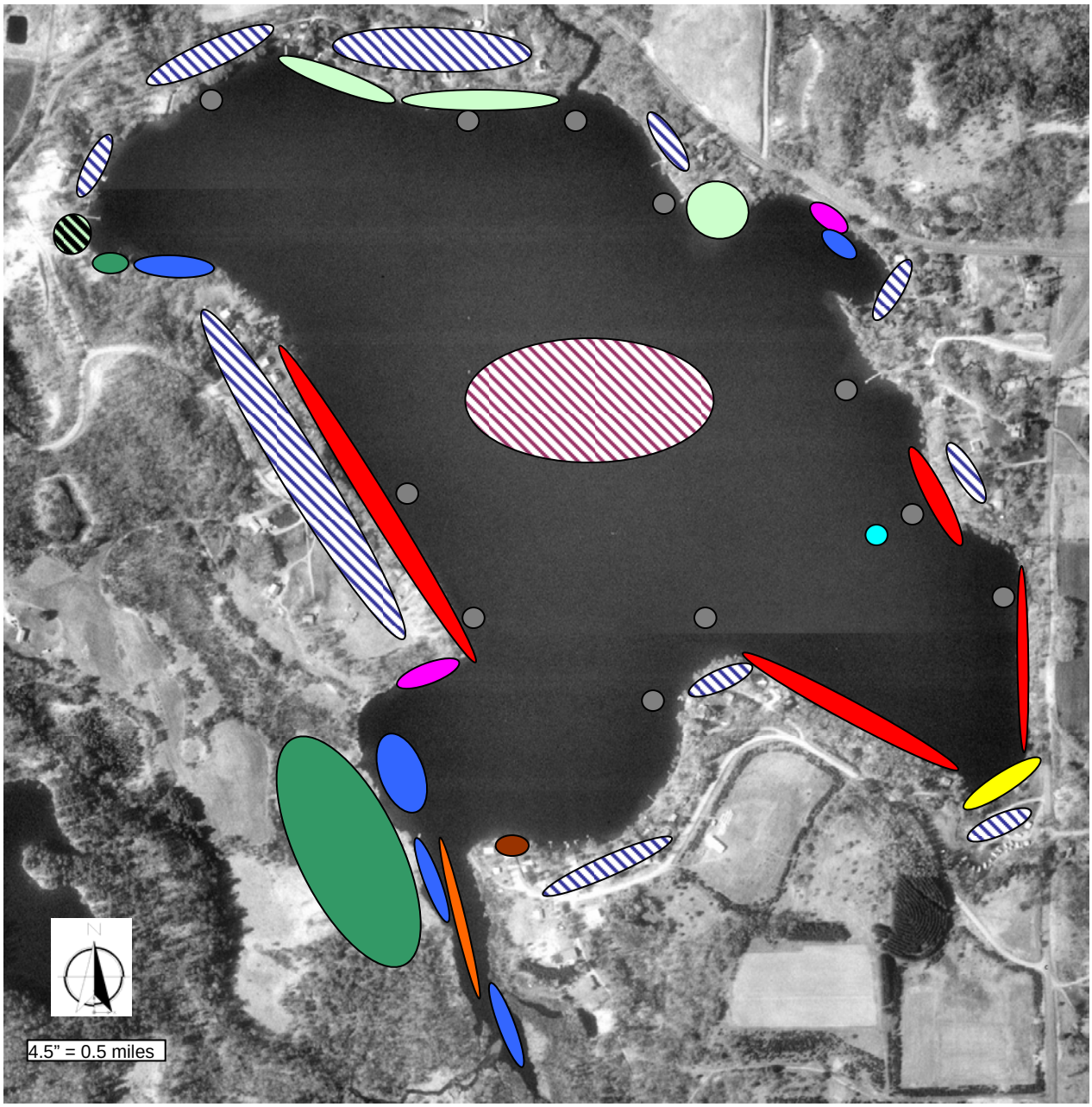
The Round Lake protection and recreational use plan, summarized on Map 16 and in Table 9, recommends actions be taken to limit further human impacts on the Lake water quality and reduce human impacts on the ecologically valuable areas adjacent to the Lake and in its watershed. The plan recommends only limited aquatic plant management action, including selected manual removal and surveillance activities at this time, mainly in the cases where purple loosestrife and Eurasian water milfoil are present, with the limited use of chemical treatment only to treat such species, if needed. Additional and periodic future fishery surveys are also recommended.

The recommended plan includes continuation of an ongoing program of public information and education provided to riparian residents and lake users. For example, additional options regarding household chemical usage, lawn and garden care, shoreland protection and maintenance, and recreational usage of the Lakes should be made available to riparian householders, thereby providing riparian residents with alternatives to traditional alternatives and activities.

This recommended plan seeks to balance the demand for high-quality residential and recreational opportunities at Round Lake with the requirements for environmental protection of the Lake.

Map 16

RECOMMENDED LAKE PROTECTION PLAN FOR ROUND LAKE



Source: Environmental Horizons, Inc.

Legend

Map Unit Identification	Management Strategy
Aquatic Plant Management	Control algal growth by adopting sustainable land use practices and consider application of alum to control phosphorus in the lake.
	Protect high value aquatic habitat, especially water lilies, to every extent practicable.
	Control non-native species as necessary, especially Eurasian water milfoil (chemical control, manual control is recommended).
	Control purple loosestrife (manual removal).

Map Unit Identification	Management Strategy
Shoreland Management 	Protect steeply sloping lands by maintaining native plant communities.
	Maintain native shoreland buffer strips.
	Restore shoreland vegetation in areas of disturbance to the extent practicable.
	Protect shoreland wetlands, especially at the inlet of the Trade River and NW quadrant of the lake
Land Use Management 	• Maintain historic lake front densities (large-lot residential). • Promote alternative onsite sewage treatment systems (mound systems), and regular maintenance and inspection. • Promote sound urban housekeeping practices and nutrient management for areas in turf.
Recreational Use Management 	• Maintain adequate public recreational boating access pursuant to Chapter NR1. • Consider provision of sanitary and solid waste facilities at public recreational boating access site.
	Maintain navigational access at the Trade River inlet.
	Consider better separation of swimming and boating activities at private recreational facilities.
Water Quality Management 	Continue water quality monitoring.

Source: Environmental Horizons, Inc.

Table 9

RECOMMENDED PROTECTION PLAN ELEMENTS FOR ROUND LAKE

Issue	Plan Element	Subelement	Location	Management Measures[a]	Management Responsibility
Land Use	Land use management	Land use plan implementation	Entire watershed	Support implementation of the county land use plan	Town of Trade Lake, and Burnett and Polk Counties
		Environmentally sensitive lands protection	Entire watershed	Support preservation of primary environmental corridor lands and critical species habitat	Round-Trade Lake Improvement Association, Town of Trade Lake, Burnett and Polk Counties
Ecologically Valuable Areas and Aquatic Plants	Shoreland and Nearshore management	Nuisance species monitoring program	Entire watershed	Monitor lakes and surrounding wetlands for the presence or spread of nuisance species, including Eurasian water milfoil, purple loosestrife, and zebra mussel Monitor lakes for the presence or spread of the aquatic weevil (*Eurhychiopsis lecontei*)	Round-Trade Lake Improvement Association
	Aquatic plant management	Manual harvesting	Areas of nuisance growth	Harvest nuisance plants, including Eurasian water milfoil and purple loosestrife, as required around docks and piers	Round-Trade Lake Improvement Association, property owners
		Recreational use zoning	Entire Lake	Enforce slow-no-wake ordinance within 100 feet of shoreline or 200 feet for personal water craft; refine ordinance as appropriate	Town of Trade Lake, and Burnett County

Issue	Plan Element	Subelement	Location	Management Measures[a]	Management Responsibility
Ecologically Valuable Areas and Aquatic Plants (continued)	Aquatic plant management (continued)	Nuisance species management	Entire watershed	Monitor lakes and surrounding wetlands for the presence or spread of nuisance species, including Eurasian water milfoil, purple loosestrife, and zebra mussel Monitor lakes for the presence or spread of the aquatic weevil (*Eurhychiopsis lecontei*)	Round-Trade Lake Improvement Association, and Wisconsin Department of Natural Resources
		Chemical control of nonnative plants	Eurasian water milfoil control zone and areas containing purple loosestrife	Consider limited use of herbicides in spring; obtain appropriate permits from WDNR; conduct management programs as appropriate	Round-Trade Lake Improvement Association, and Wisconsin Department of Natural Resources
Nonpoint Source Pollution and Water Quality	Watershed land management	Urban nonpoint source controls	Entire watershed	Implement and maintain recommended good urban housekeeping practices, and maintenance of grassed swales	Round-Trade Lake Improvement Association, Town of Trade Lake, and Burnett and Polk Counties
		Construction site erosion control	Entire watershed	Continue to enforce existing erosion control and water quality protection ordinances; refine ordinances where necessary	Town of Trade Lake, and Burnett and Polk Counties
		Rural nonpoint source controls	Entire watershed	Implement and maintain rural land best management practices, and integrated nutrient and pest management practices	Town of Trade Lake and Burnett and Polk Counties
	Water quality management	Water quality control	Entire lake	Incorporate specific actions within the stormwater management plan for the protection of the surface water quality of Round Lake	Town of Trade Lake and Burnett and Polk Counties
		Nutrient inactivation	Entire lake	Consider use of alum to remove phosphorus from the water column	Round-Trade Lake Improvement Association, Town of Trade Lake, and Burnett and Polk Counties
		Water quality monitoring	Entire lake	Continue to participate in the DNR Self-Help Monitoring Program	Round-Trade Lake Improvement Association
		Water quality protection	Entire watershed	Implement and maintain recommended good urban housekeeping practices Encourage proper on-site sanitary sewer maintenance	Round-Trade Lake Improvement Association, Town of Trade Lake, and Burnett and Polk Counties
Recreational Use	Recreational boating management	Navigational access provision	Entire Lake	Maintain public recreational boating navigational access to deep water areas of the Lake Promote slow-no-wake speeds in shallow areas of less than five feet of water depth within the Lake	Town of Trade Lake Round-Trade Lake Improvement Association and Town of Trade Lake
		Recreational boating access	Public access site	Provide sanitary and refuse facilities at the public recreational boating access site; consider provision of a boarding dock	Town of Trade Lake
	Angling	Fisheries management	Entire lake	Conduct fisheries survey to determine the current status of the fishery; review survey data and develop fishing regulations and habitat protection measures for improved fisheries as needed; and implement recommendations as necessary	Wisconsin Depart-ment of Natural Resources, and Round-Trade Lake Improvement Association
	Shoreland protection	Shoreline erosion	Entire Lake	Construct, maintain and repair structures where needed; encourage maintaining or reestablishing native shoreline vegetation	Round-Trade Lake Improvement Association, Town of Trade Lake, and Burnett County

Issue	Plan Element	Subelement	Location	Management Measures[a]	Management Responsibility
Informational and Educational Programming	Public informational programming	- -	Entire watershed	Continue public awareness and information programming Encourage householders to adopt environmentally sustainable land management practices Participate in soil testing program offered by UW-Extension	Round-Trade Lake Improvement Association, Town of Trade Lake, Wisconsin Department of Natural Resources; Burnett County, and University of Wisconsin-Extension

[a]*Costs to be determined.*

Source: Environmental Horizons, Inc.

APPENDIX A

PHOTOS OF COMMON AQUATIC PLANTS IN ROUND LAKE

Photo A-1

Eurasian water milfoil – *Myriophyllum spicatum*

Source: Environmental Horizons, Inc.

Photo A-2

Curly leaf pondweed – *Potamogeton crispus*

Source: Environmental Horizons, Inc.

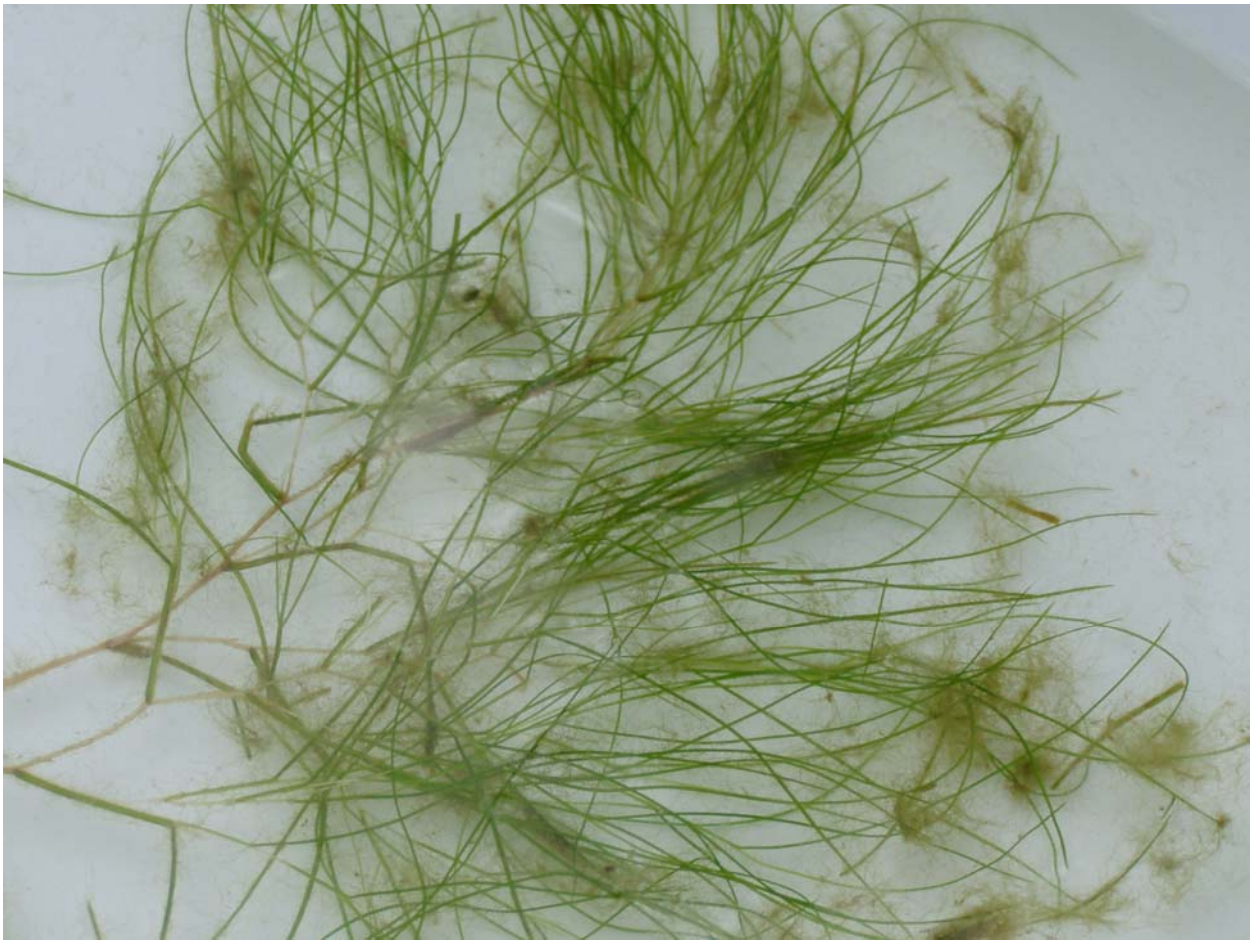
Photo A-3

Flatstem pondweed – *Potamogeton zosteriformis*

Source: Environmental Horizons, Inc.

Photo A-4

Sago pondweed – *Potamogeton pectinatus*



Source: Environmental Horizons, Inc.

Photo A-5

Variable pondweed – *Potamogeton gramineus*

Source: Environmental Horizons, Inc.

Photo A-6

Northern water milfoil – *Myriophyllum sibiricum*

Source: Environmental Horizons, Inc.

Photo A-7

Coontail – *Ceratophyllum demersum*

Source: Environmental Horizons, Inc.

Photo A-8

Common waterweed – *Elodea canadensis*

Source: Environmental Horizons, Inc.

Photo A-9

White water lily – *Nymphaea odorata*

Source: Environmental Horizons, Inc.

Photo A- 10

Yellow water lily – *Nuphar advena*

Source: Environmental Horizons, Inc.

Photo A-11

Water stargrass – *Zosterella dubia*

Source: Environmental Horizons, Inc.

Photo A-12

Wild celery, Eel-grass – *Vallisneria Americana*

Source: Environmental Horizons, Inc.

Photo A-13

Southern naiad – *Najas guadalupensis*

Source: Environmental Horizons, Inc.

APPENDIX B

JESSON AND LOUND TRANSECT METHOD

The inventory data used in developing the refined aquatic plant management plan for Round Lake were gathered using standard aquatic plant survey techniques and protocols. The aquatic plant survey of Round Lake was conducted by Environmental Horizons staff using the modified Jesson and Lound[1] transect method employed by the Wisconsin Department of Natural Resources for aquatic plant surveys throughout the State.

Prior to the initiation of the field survey, Environmental Horizons staff identified a series of transects or sampling line running perpendicular to the shoreline and extended from shallow to deeper water at intervals around the Lake. These transects were located at easily identifiable points, typically adjacent to structures or other landmarks that are likely to be permanent landscape features. These transects allow subsequent sampling of the same sites at future dates, and comparison of the data gathered during the 2005 survey with data gathered at that future date. The current transects, shown on Map B-1, and the sampling sites, shown on Map B-2 are described in Table B-1. Water depth, surface water temperature and substrate data are also shown in the Table. Sampling sites were tabulated using a global positioning system (GPS) Samples were proposed to be obtained from depth intervals of approximately 1.5 feet, 3 feet, 6 feet and 9 feet, where such depths were present.

Aquatic plants at each location were sampled using a modified garden rake. At depths of three feet or less, aquatic plants were sampled using a standard rake; at depths in excess of three feet, aquatic plants were sampled by a modified rake equipped with a throwing line that facilitated sampling at depths that were beyond the reach of the rake handle. Plants obtained during each rake "haul" were identified and recorded. Type specimens of each species of aquatic plant were photographed and are documented in Appendix A. Four samples were obtained at each station, with one sample being obtained from each quarter of the boat. The presence or absence of each species was noted. These data allow for statistical analysis of the data set as described in Chapter II of this report. Species that were present in abundance were recorded as being present in a greater number of rake hauls than species that were less common in the aquatic plant population. These data were recorded in the field.

Analysis of these data was conducted using a spreadsheet. The data are summarized in Table B-2. Based upon the presence of specific species, a number of aquatic plant communities were identified. These communities share similar assemblages of aquatic plants, and, therefore, are

[1] *R. Jesson and R. Lound, Minnesota Department of Conservation Game Investigational Report No. 6,* An Evaluation of a Survey Technique for Submerged Aquatic Plants*, 1962*.

amenable to being managed in a similar manner. As noted in Chapter I, the aquatic plant management objectives are based upon managing the Lake so as to:

1. Protect and maintain public health, and promote public comfort, convenience, necessity and welfare, in concert with the natural resource, through the environmentally sound management of native vegetation, fishes and wildlife populations in and around Round Lake;

2. Effectively control the quantity and density of aquatic plant growths in portions of the Round Lake basin to better facilitate the conduct of water-related recreation, improve the aesthetic value of the resource to the community, and enhance the resource value of the waterbody;

3. Promote a quality, water-based experience for residents and visitors to Round Lake consistent with the policies and objectives of the Wisconsin Department of Natural Resources as set forth in the relevant *Wisconsin Administrative Codes.*[2]

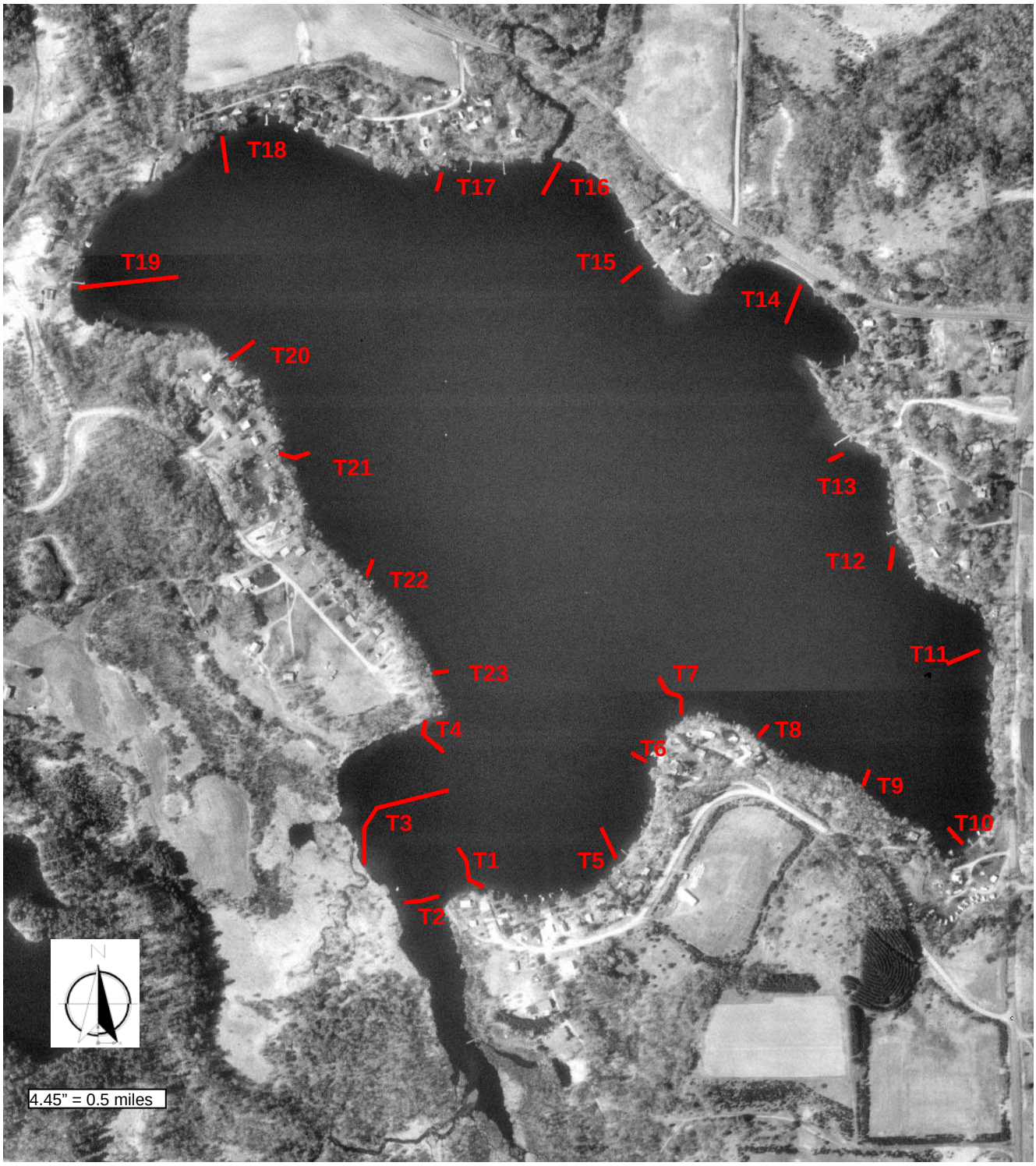
Consequently, while the aquatic plant management program set forth in Chapter III targets nonnative aquatic plant species, especially those designated as nonnative invasive species, it should be noted that these plants occur in assemblages that include the more desirable native plants which may also be affected by specific management measures. Hence, in developing the recommended aquatic plant management plan, it is important to recognize these assemblages so as to avoid damaging the underlying native aquatic plant species and negatively impacting the lake ecosystem by interfering with the essential function of the aquatic plants. Such functions include provision of habitat and foodstocks for fish and wildlife, as summarized in tabular form in Chapter II. These various assemblages were transferred from Table B-2 to the aquatic plant community distribution map included in Chapter II as Map ?, although the totality of the aquatic plant species that contribute to each community were abbreviated on the Map to only those species that were most frequently occurring at each location for purposes of clarity of presentation. By examining these assemblages, it was possible to develop the aquatic plant management program for Round Lake as set forth in Chapter III.

The foregoing methodology is consistent with the guidance provided in the draft publication, *Aquatic Plant Management (APM) in Wisconsin*, currently in preparation by the Wisconsin Lakes Partnership.

[2]*This plan has been prepared pursuant to the standards and requirements set forth in the following chapters of the* Wisconsin Administrative Code*: Chapter NR 1, "Public Access Policy for Waterways;" Chapter NR 103, "Water Quality Standards for Wetlands;" Chapter NR 107, "Aquatic Plant Management;" and Chapter NR 109, "Aquatic Plants Introduction, Manual removal and Mechanical Control Regulations."*

Map B-1

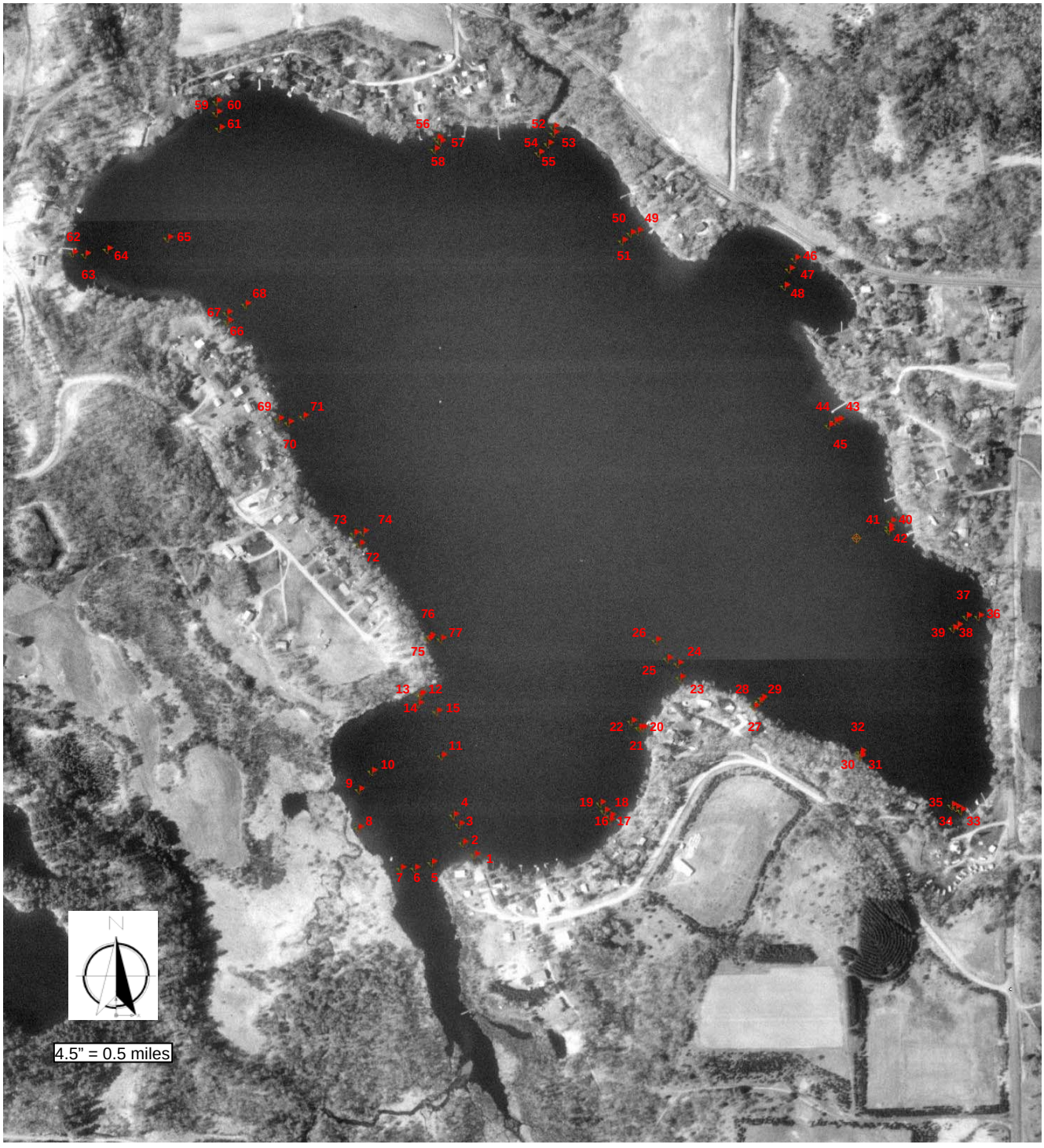
ROUND LAKE TRANSECTS



Source: Environmental Horizons, Inc.

Map B-2

ROUND LAKE AQUATIC VEGETATION SAMPLING POINTS



Source: Environmental Horizons, Inc.

Table B-1

SAMPLING POINT DATA

Sampling Point Identification Number	Location – Latitude and Longitude (degrees/minutes)	Transect Identification Number	Transect Length – Feet	Depth - Feet	Date	Substrate	Water Temperature - Degrees Fahrenheit
WP1	N45 39.410 W92 34.813	1	205.0	2.0	07/25/2005	Sand, Gravel, Rock and Boulder	76.6
WP2	N45 39.419 W92 34.826			3.0	07/25/2005	- -[a]	76.6
WP3	N45 39.433 W92 34.830			9.0	07/25/2005	- -	76.6
WP4	N45 39.440 W92 34,836			11.5	07/25/2005	Silt	77.2
WP5	N45 39.404 W92 34.860	2	144.0	5.0	07/25/2005	Silt	77.1
WP6	N45 39.400 W92 34.879			2.0	07/25/2005	Muck	77.1
WP7	N45 39.400 W92 34.894			3.3	07/25/2005	Muck	77.1
WP8	N45 39.431 W92 34.940	3	497.0	3.3	07/25/2005	- -	77.2
WP9	N45 39.460 W92 34.939			6.1	07/25/2005	- -	77.0
WP10	N45 39.474 W92 34.925			7.6	07/25/2005	- -	77.2
WP11	N45 39.486 W92 34.849			11.7	07/25/2005	Silt	77.3
WP12	N45 39.534 W92 34.871	4	156.0	1.5	07/25/2005	Silt and Sand	77.6
WP13	N45 39.533 W92 34.872			3.1	07/25/2005	- -	77.7
WP14	N45 39.526 W92 34.874			4.6	07/25/2005	- -	77.7
WP15	N45 39.520 W92 34.854			9.9	07/25/2005	Silt	77.6
WP16	N45 39.436 W92 34.666	5	99.0	2.3	07/25/2005	- -	78.2
WP17	N45 39.439 W92 34.665			2.9	07/25/2005	- -	78.5
WP18	N45 39.443 W92 34.671			6.5	07/25/2005	- -	78.4
WP19	N45 39.449 W92 34.676			11.3	07/25/2005	- -	78.3
WP20	N45 39.507 W92 34.629	6	64.0	1.5	07/25/2005	Sand and Gravel	78.5
WP21	N45 39.507 W92 34.633			2.5	07/25/2005	Sand and Gravel	78.5
WP22	N45 39.512 W92 34.641			6.0	07/25/2005	Sand, Gravel, and Cobbles	78.5
WP23	N45 39.545 W92 34.588	7	227.0	2.0	07/25/2005	Sand and Gravel	78.5

Sampling Point Identification Number	Location – Latitude and Longitude (degrees/minutes)	Transect Identification Number	Transect Length – Feet	Depth - Feet	Date	Substrate	Water Temperature - Degrees Fahrenheit
WP24	N45 39.556 W92 34.590	7	227.0	3.0	07/25/2005	Sand and Gravel	78.4
WP25	N45 39.560 W92 34.602			5.7	07/25/2005	- -	78.3
WP26	N45 39.574 W92 34.614			12.0	07/25/2005	- -	78.3
WP27	N45 39.523 W92 34.507	8	80.0	1.5	07/26/2005	Sand and Gravel	74.4
WP28	N45 39.527 W92 34.502			5.1	07/26/2005	Sand and Gravel	74.4
WP29	N45 39.529 W92 34.499			8.0	07/26/2005	- -	74.4
WP30	N45 39.484 W92 34.392	9	23.0	1.5	07/26/2005	Sand	75.0
WP31	N45 39.485 W92 34.392			2.4	07/26/2005	Sand and Gravel	75.0
WP32	N45 39.488 W92 34.391			5.0	07/26/2005	Sand and Gravel	75.0
WP33	N45 39.442 W92 34.282	10	54.0	1.5	07/26/2005	Sand	75.0
WP34	N45 39.444 W92 34.288			7.8	07/26/2005	- -	75.0
WP35	N45 39.446 W92 34.292			9.0	07/26/2005	- -	75.1
WP36	N45 39.591 W92 34.262	11	143.0	2.5	07/26/2005	Sand, Gravel and Cobbles	75.0
WP37	N45 39.591 W92 34.275			3.0	07/26/2005	Sand and Gravel	75.1
WP38	N45 39.584 W92 34.285			9.0	07/26/2005	Sand and Gravel	75.2
WP39	N45 39.582 W92 34.290			16.4	07/26/2005	- -	75.2
WP40	N45 39.664 W92 34.357	12	93.0	2.0	07/26/2005	Gravel	75.1
WP41	N45 39.660 W92 34.359			5.2	07/26/2005	Gravel	75.1
WP42	N45 39.657 W92 34.359			11	07/26/2005	Gravel	75.1
WP43	N45 39.742 W92 34.413	13	67.0	2	07/26/2005	- -	75.0
WP44	N45 39.741 W92 34.418			5.0	07/26/2005	- -	75.0
WP45	N45 39.738 W92 34.424			10.0	07/26/2005	- -	75.0
WP46	N45 39.866 W92 34.460	14	137.0	2.3	07/26/2005	Sand and Gravel	75.2
WP47	N45 39.858 W92 34.466			6.0	07/26/2005	Sand and Gravel	75.2
WP48	N45 39.845 W92 34.472			8.7	07/26/2005	Silt, Sand, and Gravel	75.2
WP49	N45 39.888 W92 34.632	15	105.0	1.5	07/26/2005	Sand and Gravel	75.0

Sampling Point Identification Number	Location – Latitude and Longitude (degrees/minutes)	Transect Identification Number	Transect Length – Feet	Depth - Feet	Date	Substrate	Water Temperature - Degrees Fahrenheit
WP50	N45 39.886 W92 34.639	15	105.0	4.4	07/26/2005	Sand and Gravel	75.1
WP51	N45 39.880 W92 34.649			9.0	07/26/2005	Sand and Gravel	75.1
WP52	N45 39.968 W92 34.723	16	147.0	2.0	07/26/2005	Gravel and Cobbles	75.2
WP53	N45 39.963 W92 34.723			4.8	07/26/2005	Gravel	75.2
WP54	N45 39.955 W92 34.729			10.0	07/26/2005	Gravel	75.2
WP55	N45 39.948 W92 34.739			12.0	07/26/2005	- -	75.1
WP56	N45 39.960 W92 34.850	17	68.0	2.0	07/26/2005	Sand	75.1
WP57	N45 39.957 W92 34.847			4.5	07/26/2005	- -	75.1
WP58	N45 39.951 W92 34.853			9.0	07/26/2005	- -	75.1
WP59	N45 39.989 W92 35.091	18	135.0	2.0	07/26/2005	Sand and Gravel	75.1
WP60	N45 39.980 W92 35.091			5.4	07/26/2005	- -	75.3
WP61	N45 39.968 W92 35.088			10.3	07/26/2005	- -	75.3
WP62	N45 39.873 W92 35.249	19	450.0	2.0	07/26/2005	Muck	75.2
WP63	N45 39.872 W92 35.235			3.7	07/26/2005	Muck	75.3
WP64	N45 39.876 W92 35.211			6.8	07/26/2005	Silt	75.3
WP65	N45 39.884 W92 35.145			10.6	07/26/2005	Silt	75.3
WP66	N45 39.820 W92 35.080	20	134.0	2.0	07/26/2005	Sand	75.1
WP67	N45 39.827 W92 35.080			5.8	07/26/2005	Sand and Gravel	75.1
WP68	N45 39.833 W92 35.060			10.2	07/26/2005	- -	75.1
WP69	N45 39.745 W92 35.025	21	127.0	2.0	07/26/2005	Sand	74.9
WP70	N45 39.742 W92 35.014			5.1	07/26/2005	- -	74.9
WP71	N45 39.747 W92 34.998			10.0	07/26/2005	- -	74.9
WP72	N45 39.649 W92 34.937	22	100.0	1.9	07/26/2005	Sand, Gravel, and Cobbles	74.8
WP73	N45 39.657 W92 34.943			3.3	07/26/2005	Sand and Gravel	74.8
WP74	N45 39.658 W92 34.933			8.0	07/26/2005	Sand and Gravel	74.8

Sampling Point Identification Number	Location – Latitude and Longitude (degrees/minutes)	Transect Identification Number	Transect Length – Feet	Depth - Feet	Date	Substrate	Water Temperature - Degrees Fahrenheit
WP75	N45 39.576 W92 34.863	23	68.0	2.0	07/26/2005	Sand and Gravel	74.7
WP76	N45 39.578 W92 34.860			5.5	07/26/2005	Sand and Gravel	74.7
WP77	N45 39.576 W92 34.849			11.0	07/26/2005	Sand and Gravel	74.7
WP78	N45 39.653 W92 34.395	- -[b]	- -[b]	24.3	07/27/2005	- -	74.2

[a] *Data not available.*

[b] *Secchi disc and water quality sampling site.*

Source: Environmental Horizons, Inc.

Table B-2

ROUND LAKE SPECIFIC AQUATIC PLANT DISTRIBUTION BY TRANSECT AND WAYPOINT LOCATIONS

Transect	Sampling Point	Water Depth	Eurasian Water Milfoil	Northern Water Milfoil	Elodea	Water Star Grass	Eel Grass	Flatstem Pondweed	Curly Leaf Pondweed	Southern Naiad	Coon-tail	Sago Pondweed	Variable Pondweed	White Water Lily	Cladaphora
1	WP1	2.0			1						1	1			
	WP2	3.0									1				
	WP3	9.0		1							1				
	WP4	11.5													
2	WP5	5.0			1						3				3
	WP6	2.0			2						3			1	
	WP7	3.3	2	1	1						3				
3	WP8	3.3									1				
	WP9	6.1									1				
	WP10	7.6													1
	WP11	11.7													
4	WP12	1.5							1		2				3
	WP13	3.1									3				3
	WP14	4.6													3
	WP15	9.9													
5	WP16	2.3				1	1								2
	WP17	2.9				1									
	WP18	6.5													
	WP19	11.3													
6	WP20	1.5							1		1		4		
	WP21	2.5	2												1
	WP22	6.0													
7	WP23	2.0	1								1		3		1
	WP24	3.0	3												
	WP25	5.7	2												
	WP26	12.0													
8	WP27	1.5											2		
	WP28	5.1													
	WP29	8.0													
9	WP30	1.5							4						
	WP31	2.4													
	WP32	5.0													
10	WP33	1.5													
	WP34	7.8							1		2				
	WP35	9.0													
11	WP36	2.5	4		3										1
	WP37	3.0	4									1			
	WP38	9.0	2												
	WP39	16.4													
12	WP40	2.0	4		4		3				2				
12	WP41	5.2	2	1							1				
	WP42	11.0													
13	WP43	2.0	3	2											
	WP44	5.0	4	2											
	WP45	10.0													
14	WP46	2.3									2				2
	WP47	6.0									2				3
	WP48	8.7													2
15	WP49	1.5	1		2										
	WP50	4.4	4		4										
	WP51	9.0													
16	WP52	2.0	2	1											
	WP53	4.8	4						1						
	WP54	10.0	1												
	WP55	12.0													
17	WP56	2.0	3				1		2				1	1	
	WP57	4.5	3		1						1				
	WP58	9.0													
18	WP59	2.0									1				4
	WP60	5.4	1		1						3				
	WP61	10.3													
19	WP62	2.0													4
	WP63	3.7													4
	WP64	6.8													4
	WP65	10.6													
20	WP66	2.0									1				
	WP67	5.8													2
	WP68	10.2													
21	WP69	2.0					3		1					1	
	WP70	5.1													
	WP71	10.0													
22	WP72	1.9						1	2						
	WP73	3.3	1					1	2		1				
	WP74	8.0													
23	WP75	2.0												3	
	WP76	5.5	1												
	WP77	11.0													
Total			53	8	20	2	8	2	15	0	35	2	10	5	48

Source: Environmental Horizons, Inc.

APPENDIX C

LABORATORY RESULTS

Table C1

WATER QUALITY DATA FROM THE UNIVERSITY OF WISCONSIN - STEVENS POINT, WATER & ENVIRONMENTAL ANALYSES LABORATORY[a]

Parameter	Results, mg/l	Regional Mean, mg/l[b]
Conductivity	235	- -[b]
Reactive Phosphorus	0.011	0.011
Total Phosphorus	0.063	0.028
Ammonium Nitrogen	0.01	- -
Nitrate + Nitrite	<0.02	- -
Total Kjeldahl Nitrogen	1.41	0.62
Chloride	8.5	2.0
Alkalinity	84	27
pH [d]	9.50	7.0

[a] *Sample taken from the Deep Hole.*

[b] *No data available.*

[c] *Mean value for constituent in northwestern Wisconsin reported by Lillie, Richard A.; Mason, John W. 1983.* Limnological Characteristics of Wisconsin Lakes*, Wisconsin Department of Natural Resources Technical Bulletin No. 138, 116 pp.*

[d] *Units of pH are reported in Standard Units (S.U.).*

Source: University of Wisconsin – Stevens Point, Wisconsin Department of Natural Resources, and Environmental Horizons, Inc.

Table C2

ALGOLOGICAL DATA FROM PHYCOTECH, INC.[a]

Division	Species	No./ml	Percentage
Bacillariophyceae	*Fragilaria* spp.	1,207	1
	Synedra spp.	44	< 1
	Aulacoseira spp.	293	<1
Chlorophyceae	*Chlorococcus* spp.	272	< 1
	Ankistrodesmus falcatus	136	< 1
	Chlamydomonas spp.	681	< 1
	Monoraphidium spp.	136	< 1
	Staurastrum spp.	11	< 1
	Erkenia spp.	272	< 1
Cryptophyceae	*Rhodomonas minuta*	272	< 1
	Cryptomonas spp.	109	< 1
Cyanophyceae	*Aphanocapsa inceria*	5,316	3
	Aphanizomenon spp.	43,440	28
	Chroococcus spp.	153	< 1
	Coelosphaerium spp.	14,220	9
	Cyanogranis spp.	20,492	13
	Gomphosphaeria spp.	4.362	3
	Lyngbya spp.	12,709	8
	Microcystis spp.	26,528	17
	Phormidium mucioloa	2,385	1
	Synechoccus spp.	681	< 1
	Synechocystis spp.	1,363	< 1
	Anabaena spp.	16,641	11
Pyrrhophyceae	*Gymnodinium* spp.	136	< 1
	Ceratium spp.	22	< 1

[a]*Sample taken from the Deep Hole.*

Source: PhycoTech, Inc. and Environmental Horizons, Inc.

APPENDIX D

BURNETT COUNTY REGULATORY GUIDANCE FOR LAKES AND LAKESHORE PROPERTIES: EXTRACT FROM BURNETT COUNTY CODE OF ORDINANCES

SHORELAND REGULATIONS

Those provisions of the text of this ordinance and the zoning maps and district boundaries that pertain to shorelands as defined in Wisconsin Statutes Section **59.692** and **59.694** shall be effective immediately upon adoption of this ordinance and shall not be subject to the approval or disapproval of any town board.

(1) Setbacks

For setbacks from the ordinary high water mark of navigable waters, the following setback regulations shall apply:

(a) **LOTS THAT ABUT ON NAVIGABLE WATERS:** All buildings and structures, except stairways, walkways, piers, and boat hoists, satellite dishes under 24" in diameter, and open fences shall be set back at least 75 feet from the ordinary high water mark of navigable waters or as designated in the lake classification development standards.

(b) **SETBACK AVERAGING:** Setback averaging may be allowed when existing principal buildings within 100 feet either side of a proposed building site (to include additions) do not conform to required setbacks. In no such case will a setback less than 75' from the ordinary high water mark be allowed.

(c) **DECKS, BUILDINGS AND STRUCTURES PROHIBITED:** Decks, observation platforms, satellite dishes over 24" in diameter, retaining walls and buildings are expressly prohibited in the shoreline setback area. Retaining walls may be allowed only after review and approval by the County Zoning Administrator and the County Conservationist.

(d) **STAIRWAYS, AND WALKWAYS :**Stairways and elevated walkways are a permitted use exempt from the shoreline setback requirements provided:

1. The structure is necessary to access the shoreline because of steep slopes or wet, unstable soils.
2. The structure shall be located so as to minimize earth disturbing activities and shoreline vegetation removal during construction and to be visually inconspicuous as viewed from the adjacent waterway and public thoroughfares.
3. The structure shall be no more than four (4) feet wide.
4. Structures shall be inconspicuously colored.

5. Railings are permitted only where required by safety concerns.
6. Canopies and roofs on such structures are prohibited.
7. Stairways shall be supported on piles or footings. Other construction methods such as steps excavated into the slope may be permitted and will require plan and site review.
8. One landing for stairways or docks are permitted only where required by safety concerns and shall not exceed 40 square feet in area.
9. **All structures, stairways and landings will be reviewed and approved by the county zoning administrator and reviewed by the county land conservationist and will meet approved best management practices.**

(e) FENCES All fences shall meet the shoreland setbacks as required in the Lake Class Development Standards. 4.4(7)c.

1. Open fences may be allowed to within 40 feet of the O.H.W.M. and may not exceed 6 feet in height.
2. Agricultural/livestock fences shall be exempt from the 40' setback.
3. An open fence is considered to be a chainlink, wood rail or barbed wire and will not obstruct the adjoining property owners view of the water.
4. No permit will be required, but must comply with the above criteria.

(e) WETLAND SETBACKS

All buildings and structures, except stariways, walkways, pies, boat hoists, satellite dishes under 24" in diameter, and open fences shall be setback 40 feet from any wetland boundary.

(2) Removal of Shoreline Cover

There shall be a shoreline vegetation protection area on each parcel which shall extend from the ordinary high water mark to a line 25 feet less than the required setback for structures but, in no case, less than 35 feet landward from the ordinary high water mark. Within this area, vegetation removal (including trees, shrubs and ground cover) and land disturbing activities are prohibited with the following exceptions:

(a) One viewing/access corridor more or less perpendicular to the shore and no more than 30 feet wide may be established. Limited tree removal, pruning and mowing will be permitted. Clearcutting, filling, grading and other land disturbing activities are not permitted in this area. On contiguous frontage, there shall be a 30 foot separation of uncut area between adjoining view corridors.

(b) Limited pruning and mowing will be allowed in the area greater than 35 feet from the ordinary high water mark.

(c) Pedestrian access, walkways, pathways, and stairways must be located in the access/viewing corridor and also subject to section 4.4(1)d, unless such location is not feasible due to steep slopes, wet soils, or similar limiting conditions.

(d) Pier, wharf and lift placement must also be confined to waters immediately adjacent to viewing/access corridor unless such location is not feasible due to steep slopes, wet soils, or similar limiting conditions.

(e) Normal maintenance of existing vegetative buffer strips.

(3) Forest Management Programs

From the inland edge of the thirty-five (35) foot strip to the outer limits of the shoreland, the harvesting and management of trees shall be allowed when accomplished under forestry best management practices. The maintenance and improvement of water quality shall be emphasized in all their timber harvesting operations. The purpose of this order will favor long-lived species adapted to the site and will prescribe slash disposal methods necessary for aesthetic value.

(4) Filling, Grading, Lagooning, Ditching, Excavating and Dredging

Filling, grading, lagooning, ditching, excavating and dredging may be permitted in accord with state and federal law where protection against erosion, sedimentation, and impairment of fish and aquatic life has been assured. A land use permit shall be required for any filling or grading:

(a) On the bed of a navigable body of water. In addition a permit shall be obtained from the Department of Natural Resources under the provisions of Section 30.11 and 30.12, Wisconsin Statutes.

(b) Of any area which is 300 feet, horizontal distance of the ordinary high water mark of navigable water where there is:

1. Filling or more than 500 square feet of any wetland which is not in a SW-1 or W-1 District.

   a. Filling, grading, lagooning, excavating or ditching in a SW-1 District may be permitted only as provided under Section 3.3(13)(a)(2) and (3).

2. Any filling or grading on slopes of 20% or more.
3. Filling or grading or more than 1,000 square feet on slopes of 12-20%. Sanitary systems are exempt.
4. Filling or grading of more than 2,000 square feet on slopes of 12% or less.

In addition, a permit shall be obtained from the Department of Natural Resources where more than 10,000 square feet of the bank of a navigable body of water is exposed by grading or otherwise removing top soil as provided in Section 30.19, Wisconsin Statutes. A land use permit is not required for soil conservation practices such as terraces, diversions and grassed waterways which are used for sediment retardation.

(c) Lagooning, ditching, excavating or dredging: A land use permit shall be required before constructing, dredging or commencing work on any artificial waterway, canal, ditch, lagoon, pond, lake or similar waterway which is within 300 feet of the ordinary high water mark on a navigable body of water or where the purpose is ultimate connections with a navigable body of

water. A land use permit is not required for soil conservation practices as terraces, diversions and grassed waterways which are used for sediment retardation. In addition, a permit shall be obtained from the Department of Natural Resources or any other state agency having jurisdiction under the provisions of Section 30.19, Wisconsin Statutes.

(d) Provisions for acquiring land use permits for such activities stated in Section 4.4(4):

1. Applications for land use permits shall describe the dimensions of the area involved, the existing and proposed slopes and contours, the depth of land cutting and/or filling, the measures to be taken to prevent any erosion of soil or similar material from the project site or into waters, during construction and beyond, the date of commencement of work and the expected date of completion.
2. Land use permits shall be issued by the Zoning Administrator who shall consult with and seek advice from the Land Conservation Department and from those state and federal agencies which are assisting said department under a memorandum of understanding. Decisions of the Zoning Administrator shall be in accord with the following standards:

a. Any permits or approvals required by the Wisconsin Department of Natural Resources, the Public Service Commission or other agencies for such activities shall be obtained before being granted a county permit.

b. Any such activity which is proposed to be performed in contemplation of a subdivision or other development or land use change which requires zoning, subdivision or sanitary code approvals shall obtain such approvals before being granted a county permit for the filling, grading, lagooning, dredging or relocation of waterway.

c. Any such activity which involves a wetland that is not within the SW-1 or W-1 District shall be granted a permit only upon a finding that the proposed activity will not result in a significant impairment of the natural functions performed by the wetlands.

d. The Zoning Administrator shall take into consideration the environmental impact as pertains to the following: natural setting, scenic view aesthetic value, effect on wildlife and aquatic habitat, natural vegetation, etc.

3. Conditions attached to approved county grading permits: The Zoning Administrator shall attach conditions to each approved permit to assure compliance of the activity with the standards of paragraphs a. through d. above. These conditions may include the following, without limitation because of enumeration:

a. Time limits on the exposure of bare grounds.

b. Required use of temporary or permanent ground cover.

c. Required use of diversions, silting basins, terraces and other measures to trap sediments.

d. Required stabilization of fills and of sides of channels and other natural, artificial or relocated waterways and use of bulkheads or riprapping on any slopes in excess of two (2) units horizontal distance to one (1) unit vertical.

e. Required design characteristics to prevent undue restriction of floodways or diminution of the storage capacity of floodplains.

(5) PIERS AND BOAT SHELTERS:

(a) Piers may only be placed by the riparian property owner in the riparian zone. No permits will be required for piers meeting the following criteria and state guidelines:

(b) Piers may be placed to the line of navigation which generally means the three foot depth contour, an established pierhead line or depth required by boat to be berthed. A pier may not unreasonably obstruct navigable waters.

(c) Piers shall be a maximum width of 6 feet, shall not enclose any portion of water and shall not have decks, platforms, or other construction not essential for berthing of boats.

(d) The number of berths or moorings shall be limited to two for the first 50 feet of shoreline and one for each additional 50 feet.

(e) Only one pier shall be permitted for each minimum lakeshore frontage as required by the Lake Classification.

(f) Piers shall meet all state guidelines.

"Pier" means any structure extending into navigable waters from the shore with water on both sides, built or maintained for the purpose of providing a berthing or mooring place for watercraft or for loading or unloading cargo or passengers onto or from watercraft and may include a temporary boat hoist and a boat shelter which is removed seasonally. [s.30.01, Stats.] Mooring (noun) means a mooring anchor and mooring buoy together with attached chains, cables, ropes and pennants and related equipment and is considered to be a storage space for a single watercraft.

(g) Permanent boat shelters are not allowed.

(6) Lake Class Development Standards for Waterfront Property on Navigable Waters:

(a) After adoption of this section, or an amendment thereto, no lot area shall be so reduced that the dimensional and yard requirements required by this ordinance cannot be met. Parcels of land existing and of record shall meet the minimum requirements of Section 3.4 and lots existing and of records, i.e., documented by recording of a metes and bounds description; or a Certified Survey Map; or a recorded platted subdivision, but of substandard size to the Lake Class Development Standards are hereby not nonconforming to the parcel size. The construction of new dwellings or replacement dwellings; additions to existing structures and the construction of accessory buildings when a principal structure exists on the premises may be allowed by permit provided all other requirements, regulations and setbacks can be met.

(b) The following classification lists identify lakes named in "Surface Water Resources of Burnett County", published by Wisconsin Department of Natural Resources and appearing by name on the 1:24000 scale topographic maps published by the U.S. Geological Survey, commonly referred to as the U.S.G.S. Quadrangle Maps.

All unnamed lakes listed in the "Surface Water Resources of Burnett County", Wisconsin Department of Natural Resources and all named lakes 50 acres in size or less are considered Class 3 protection lakes.

In addition, any lake inadvertently omitted from the "Surface Water Resources of Burnett County" over 50 acres in size will be classified according to available information and non-listed lakes 50 acres or less in size will be considered Class 3 protection lakes.

It should be noted that Burnett County's shoreline regulation jurisdiction extends only to those portions of shoreline outside the boundaries of any incorporated municipality.

Development standards for rivers and streams refer to all rivers and streams in the Burnett County deemed by the Wisconsin Department of Natural Resources to be navigable.

There are un-named lakes that have "local" names and for the purpose of this classification are considered Class 3 lakes.

The RR-2 (Residential-Recreation District), RR-3 (Residential-Recreation District), A (Exclusive Agricultural District), A-1 (Agricultural-Transition District), A-2 (Agricultural-Residential District) and F-1 (Forestry District) zone districts supersede the lake classification development standards.

(c) Dimensional Requirements

DIMENSIONAL REQUIREMENT
BURNETT COUNTY
SHORELANDS CLASS DEVELOPMENT STANDARDS
TO APPLY TO LAKE AND RIVER PROPERTIES

Lake Classification	Lot Size	Lot Width	Shoreline Setback	Lot Depth	Vegetation Removal	Side Yard Setback for all Structures
Class 1	20,000 s.f.	150 ft. *200 ft.	75 ft.	200 ft.	Restricted within 35' of shore	10' min. 30' min. total
Class 2	40,000 s.f.	200 ft. *400 ft.	75 ft.	200 ft.	Restricted within 35' of shore	20' min. 50' min. total
Class 3	75,000 s.f.	300 ft. *400 ft.	100 ft.	250 ft.	Restricted within 75' of shore	30' min. 60' min. total
Rivers & Streams	75,000 s.f.	300 ft.	100 ft.	250 ft.	Restricted within 75' of shore	30' min. 60' min. total

*NOTE: Two-Family Dwelling/Lot.

**NOTE: Existing lots with less than 150' lot width will utilize 10' side yard setbacks.

(d) List of Lakes [Abbreviated for Round Lake only—see county website for full listing]

Burnett County Lakes Classification

Class 1

- Round (27-37-18)
- Spirit
- Trade (Big & Little)

(7) Lake Access: All private lake accesses; lake access easements; or outlots; deeded or contractual accesses for the purpose of lake access shall meet the following requirements:

(a) The access to a navigable waterway for backlot or off-lake development shall meet the minimum lot and parcel size requirements of the Lake Class Development Standards. The lot width shall be measured at right angles at all points along its side lot lines and the minimum required lot area shall exclude any wetlands. A contiguous buffer area of 25 feet along each side lot line running the full depth of the lot shall remain in its natural state. The cutting of vegetation or trees or the construction/placement of buildings within the buffer zone is prohibited.

(b) The number of single-family lots, building sites, single-family units or single-family condominium units utilizing said access shall be limited to four (4).

(c) Only one (1) accessory building will be allowed on the lake access parcel meeting the requirements of Section 4.42 (5); except that actual boat storage and/or the connection of any pressurized water system is prohibited.

(d) The creation or use of land for a lake access shall be by conditional use only. The Zoning Committee shall consider the size, shape, depth, present and potential use of the lake, and the effect of the private access on public rights in navigable waters.

(8) Resorts and Condominiums:

(a) The construction of additional rental cabins/dwellings within an existing resort or the construction of additional dwelling units within a recorded condominium shall meet the minimum lot width and parcel size requirements of the Lake Class Development Standards.

To determine the number of total cabins/dwelling units allowed, take the total lot or parcel size and divide by the lake class size requirement. No principal structure shall be located less than 20 feet from an existing principal structure and shall meet all water line, road, lot line, and septic setbacks.

4.9 SHORELINE SETBACK NONCONFORMITIES

1. A nonconforming structure of which any part is located within 40 feet of the ordinary high water mark may be maintained but it may not be expanded.
2. A nonconforming principal structure located between 40 and 75' from the ordinary high water mark which includes at least 500 square feet (footprint) of enclosed area may be expanded providing:

(a) The total area of the existing structure and the proposed addition does not exceed 1,500 square feet of enclosed living area including any walkout basement:

(b) All expansion is no closer to the water than the landward facade of the existing principal structure (placement of standard or walkout basements under existing structures is prohibited); except for a one time maximum 144 square foot expansion (including open patios and decks) which is no closer to the ordinary high water mark than the closest setback of the structure provided further that such addition does not extend toward the ordinary high water mark beyond the shoreline facade than existing structure;

(c) Existing nonconforming accessory structures are removed from the property; and

(d) The property owner implements a plan approved by the County Land Conservationist which restores the shoreline cover buffer zone as per Section 4.4(2).

(3) Expansion of nonconforming principal structures between 75' and the required set back from the O.H.W.M. is allowed provided expansion is at least 75' from the O.H.W.M.