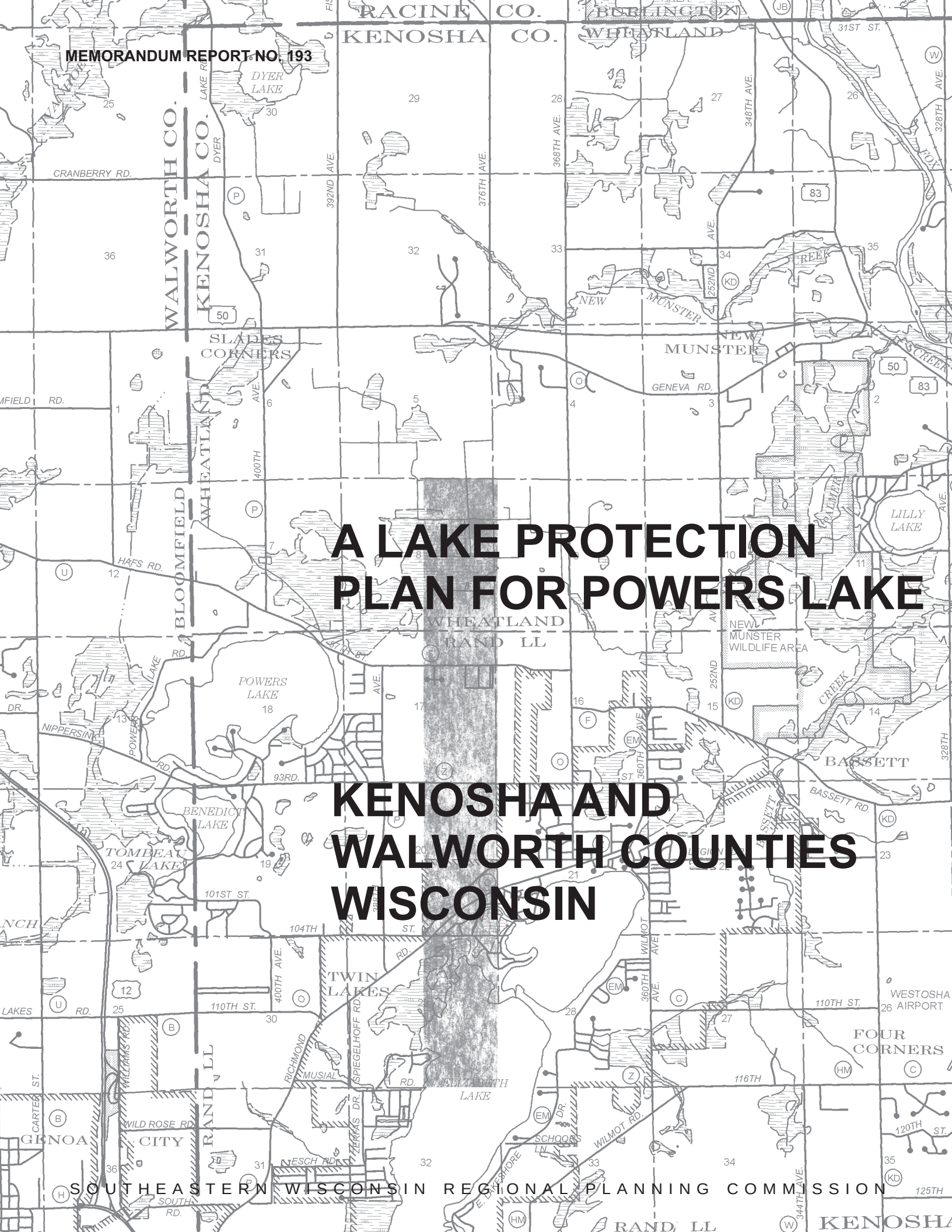
MEMORANDUM REPORT NO. 193



A LAKE PROTECTION PLAN FOR POWERS LAKE

KENOSHA AND WALWORTH COUNTIES WISCONSIN

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MEMORANDUM REPORT
NUMBER 193

A LAKE PROTECTION PLAN FOR POWERS LAKE

KENOSHA AND WALWORTH COUNTIES, WISCONSIN

Prepared by the

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Chapter I

INTRODUCTION

Powers Lake is a 459-acre drained lake, 377 acres of which are located within U.S. Public Land Survey Section 18, Township 1 North, Range 19 East, in the Town of Randall, Kenosha County, and 82 acres of which are located within U.S. Public Land Survey Section 13, Township 1 North, Range 18 East, Town of Bloomfield, Walworth County. The Lake has adequate public recreational boating access pursuant to Chapter NR 1 of the *Wisconsin Administrative Code*.[1]

The location of Powers Lake within the greater Milwaukee and Chicago metropolitan areas may be expected to contribute to a continued demand for more urban development, and particularly residential development, in the vicinity of the Lake with concomitant demands for water-based recreational opportunities. As a consequence, Powers Lake residents have become increasingly concerned about present and future conditions of the Lake and its ecosystem. Because of the widespread nature of these concerns, the District of Powers Lake (DoPL) has conducted a number of community surveys on an approximately decadal basis to determine the issues of concern to the community. These survey results have guided prioritization of interventions, conduct of informational programming, and local ordinance development, among other actions. The initial survey, conducted in 1990, informed the formulation of a comprehensive lake management plan for the Lake.[2] The third, and most recent community survey, conducted during 2009, informed the preparation of this lake protection plan.

BACKGROUND

Recognition of the importance of Powers Lake to the lake-oriented community that has developed around the Lake's shorelands prompted the Powers Lake community to form the DoPL, a public inland lake protection and rehabilitation district, during 1985, as a vehicle created under Chapter 33 of the *Wisconsin Statutes* to undertake, among other activities, lakewide planning and management programs. The Powers Lake community, subsequently, has initiated and conducted actions to protect and improve the lake water quality, including the development and implementation of the recommended management measures set forth in the adopted lake management plan for Powers Lake.[3] These measures have included aquatic plant management, land acquisition

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[1]*Wisconsin Department of Natural Resources Publication No. PUBL-FH-800 2005,* Wisconsin Lakes*, 2005.*

[2]*SEWRPC Community Assistance Planning Report No. 196,* A Management Plan for Powers Lake, Kenosha and Walworth Counties, Wisconsin, *November 1991.*

[3]Ibid.

and management programs, and related public informational programming to promote a harmonious relationship between the community and the Lake. A further recommended lake management action was the periodic updating and refinement of the lake management plan. Consequently, the preparation of this lake protection plan for Powers Lake fulfills that recommendation, and sets forth a refinement of the comprehensive lake management plan in a manner wholly consistent with the recommendations set forth in the comprehensive plan.

This report represents part of the ongoing commitment of the DoPL to sound planning with respect to the Lake. This planning program was designed as part of an ongoing program of lake-related information gathering, evaluation, and management being undertaken by the DoPL in cooperation with other governmental and nongovernmental organizations and agencies, including the Wisconsin Department of Natural Resources (WDNR), Kenosha and Walworth Counties, and the Southeastern Wisconsin Regional Planning Commission (SEWRPC). To this end, the DoPL participates in the University of Wisconsin-Extension (UWEX) Citizen Lake Monitoring Network (CLMN, formerly the WDNR Self-Help Monitoring Program), and maintains an ongoing program of lake management, focusing on aquatic plant management, the control of nonnative aquatic species, water quality improvement, and citizen informational programming. With regard to this latter program element, the DoPL publishes a regular newsletter, and maintains a website: *http://districtofpowerslake.com/.*

LAKE PROTECTION PROGRAM GOALS AND OBJECTIVES

The lake protection goals and objectives for Powers Lake were developed in consultation with the DoPL Board of Commissioners. The agreed goals and objectives are 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 Powers Lake;

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

3. Effectively maintain the water quality of Powers Lake 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; and,

4. Promote a quality, water-based experience for residents and visitors to Powers Lake consistent with the policies and objectives of the WDNR as set forth in the regional water quality management plan.[4]

Specifically, this report sets forth inventories of the aquatic plant communities present within Powers Lake. Those inventories were prepared by SEWRPC in cooperation with the DoPL, and include the results of field surveys conducted by the Commission staff during the summer of 2009. The aquatic plant surveys were conducted by Commission staff using both the modified Jesson and Lound[5] transect method developed by the WDNR, which methodology is identical to that employed in earlier surveys so as to make meaningful comparisons with those

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[4]*SEWRPC Planning Report No. 30,* A Regional Water Quality Management Plan for Southeastern Wisconsin—2000, *June 1979, as amended; see also SEWRPC Memorandum Report No. 93,* A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report, *March 1995.*

[5]*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.*

earlier surveys possible. The Commission staff repeated this survey using the grid-based, point-intercept methodology currently being used by the WDNR for whole lake surveys. In addition, the Commission, in cooperation with the DoPL, conducted a third in a series of decadal community questionnaire surveys, in order to gauge the degree to which the District has been successful in fulfilling the public expectations that led to the formation of the District more than 25 years ago. In addition, as set forth in Chapter II of this plan, land use in the area tributary to the Lake, forecast land use for the year 2035, and related in-lake water quality information that has been collected since the publication of the comprehensive lake management plan are compiled and summarized herein.

This planning program was funded, in part, through a Chapter NR 190 Lake Management Planning Grant awarded to the DoPL and administered by the WDNR.

The inventory and aquatic plant management plan elements presented in this report conform to the requirements and standards set forth in the relevant *Wisconsin Administrative Codes.*[6] Implementation of the recommended actions set forth herein should continue to serve as an important step in achieving the stated lake use objectives over time.

[6]*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 40, "Invasive Species Identification, Classification and Control;" 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."*

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Chapter II

INVENTORY FINDINGS

INTRODUCTION

The physical characteristics of a lake and its watershed are important factors in any evaluation of existing and likely future water quality conditions and lake uses, including recreational uses. Characteristics, such as watershed topography, lake morphometry, and local hydrology, ultimately influence water quality conditions and the composition of plant and fish communities within the lake. Therefore, these characteristics must be considered in the lake management planning process. Accordingly, this chapter provides pertinent information on the physical characteristics of Powers Lake and its tributary area, land use conditions, chemical and biological environments of the Lake, recreational uses and facilities of the Lake, as well as past and present management practices.

WATERBODY CHARACTERISTICS

Powers Lake is located in the Town of Randall in Kenosha County and in the Town of Bloomfield in Walworth County, both in Wisconsin, as shown on Map 1. The Wisconsin Department of Natural Resources (WDNR) has classified the Lake as a drainage lake meaning the Lake has both a defined inflow and a defined outflow, although the inflow appears to be intermittent and poorly defined. Powers Lake receives most of its water from direct precipitation onto the Lake's surface and surface runoff from its surrounding tributary area. Consequently the Lake behaves in a manner similar to a drained or headwater lake. Additionally, as indicated in the comprehensive lake management plan for Powers Lake,[1] a study of water levels in seven shallow groundwater monitoring wells located around the shoreline of the Lake, indicated that, in a normal year, Powers Lake would also receive a significant portion of its water from groundwater. As reported in the aforereferenced comprehensive plan, the Lake typically receives about 35 percent of its water from groundwater, about 40 percent from precipitation onto the lake surface, and about 25 percent from runoff from the surrounding land surface and the intermittent stream flowing into the Lake from the wetland complex northeast of the waterbody.

Water is lost from the Lake mainly through evaporation and as outflow from the Lake. Outflow from the Lake is regulated through means of a culvert located at the southwestern corner of the Lake. Powers Lake forms the headwaters of the East Branch of Nippersink Creek, which flows from the Lake southerly through Tombeau Lake, thence southwesterly to its confluence with the North Branch of the Nippersink Creek. In this way, too, Powers Lake behaves as a drained lake. The combined flow of the Nippersink Creek eventually flows into the Illinois-Fox River in northern Illinois.

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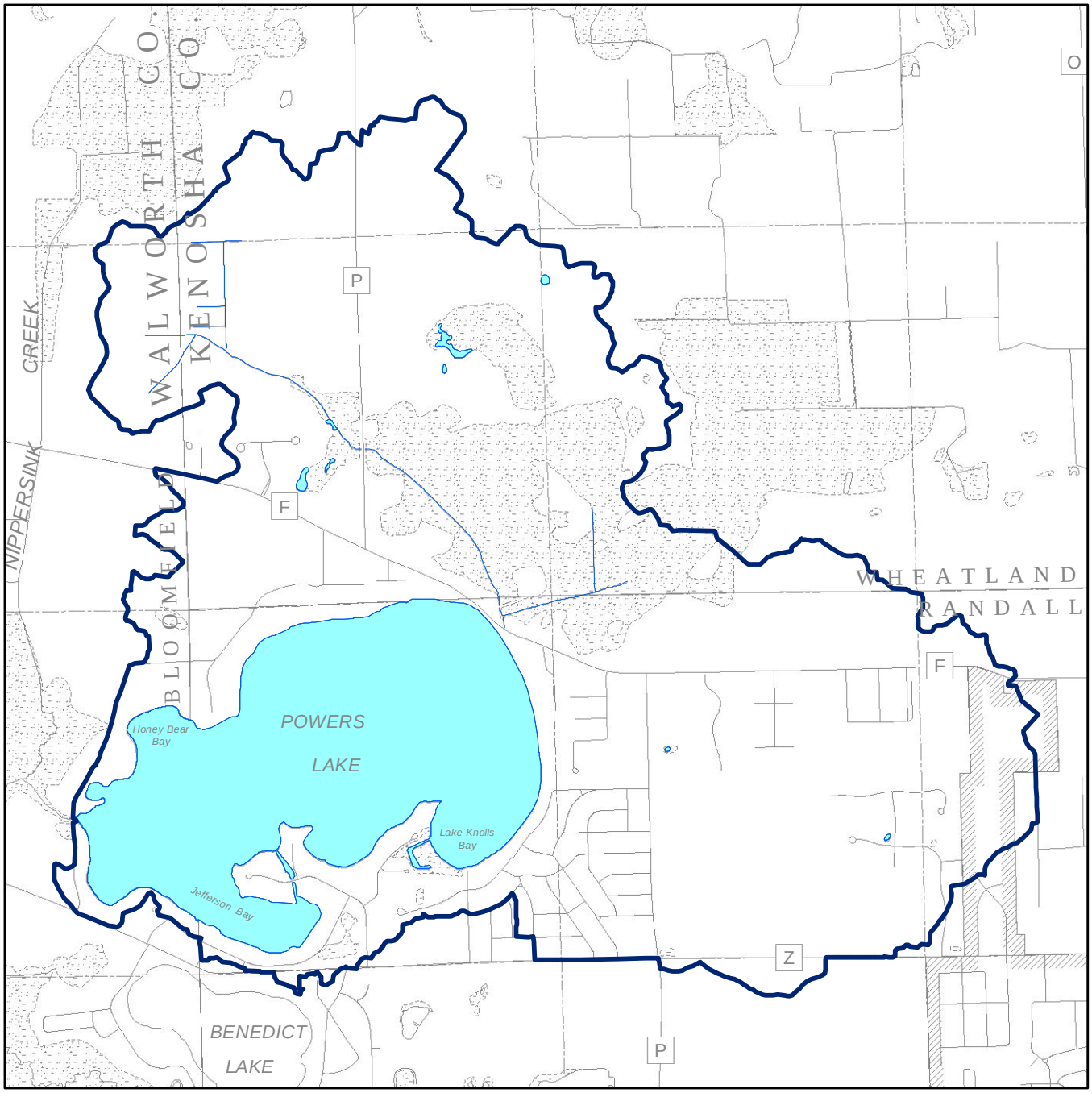
[1]*SEWRPC Community Assistance Planning Report No. 196,* A Management Plan for Powers Lake, Kenosha and Walworth Counties, Wisconsin, *November 1991.*

Map 1

LOCATION OF POWERS LAKE



Total Tributary Area Boundary

Surface Water

Source: SEWRPC.

N

0 1,000 2,000 Feet

Table 1

HYDROLOGY AND MORPHOMETRY OF POWERS LAKE

Parameter	Measurement
Size	
Surface Area of Lake	459 acres
Total Tributary Area[a]	2,562 acres
Lake Volume	7,453 acre-feet
Residence Time[b]	4.2 years
Shape	
Length of Lake	1.3 miles
Width of Lake	0.8 mile
Length of Shoreline	5.3 miles
Shoreline Development Factor[c]	1.77
General Lake Orientation	SW-NE
Depth	
Maximum Depth	33 feet
Mean Depth	16 feet
Percentage of Lake Area	
Less than Five Feet	17 percent
Greater than 20 Feet	37 percent

[a]*The total tributary area for Powers Lake was recorded in the earlier SEWRPC report as 2,368 acres. The current measurement is based on elevation refinements made possible through SEWRPC digital terrain modeling analysis.*

[b]*Residence time is estimated as the time period required for a volume of water equivalent to the volume of the lake to enter the lake during years of normal precipitation. In the previous SEWRPC plan, this value was reported as 3.8 years and was based on the hydrologic budget calculated for Powers Lake for water year 1987; a value of 4.2 years was calculated at that time as being representative during a normal year.*

[c]*Shoreline development factor is the ratio of the shoreline length to the circumference of a circular lake of the same area.*

Source: Wisconsin Department of Natural Resources, U.S. Geological Survey, and SEWRPC.

The hydrographical characteristics of Powers Lake are set forth in Table 1. Powers Lake is a natural waterbody with several large bays and two deep basins. The Lake is aligned in approximately a northeast-southwest orientation. The Lake has a surface area of 459 acres, a volume of about 7,453 acre-feet, a maximum depth of 33 feet, and a mean depth of 16 feet. About 17 percent of the Lake is less than five feet in depth and about 37 percent is greater than 20 feet. The bathymetry of the Lake is shown on Map 2.

Powers Lake is about 1.3 miles in length, nearly a mile wide, and has a shoreline length of over five miles. The Lake has a shoreline development factor of about 1.8, indicating that, due to its irregular shape, bays, and points, the shoreline is nearly twice that of a perfectly circular lake of the same area. With a value of 1.8, Powers Lake is about average for lakes in the Region. In contrast, however, nearby Lake Mary has a development factor of only about 1.4, reflecting that Lake's more circular shape. Pell Lake, to the west, has a shoreline development factor of 2.3, while the Lauderdale Lakes, to the northwest, have an overall shoreline development factor of 3.6, reflective of that waterbody's highly irregular shoreline. Shoreline development factor is often related to the level of biological activity in a lake. The greater a lake's shoreline development factor or the more irregular the shoreline, the greater is the likelihood that the lake contains shallow, nearshore areas. These shallow areas, or littoral zone, usually provides habitat suitable for plant and animal life. In other words, lakes with highly irregular shorelines usually have larger shallow-water, nearshore areas which provide for a higher level of biological activity or production.

Biological activity in a lake also can be influenced by other physical factors, such as lake-basin contours and bottom sediment composition. As shown on Map 2, Powers Lake has several shallow water areas with nearly flat bottom contours—locally known as Lake Knolls Bay, Jefferson Bay, and Honey Bear Bay—as well as a large portion of the southeastern end of the Lake. As reported in the comprehensive lake management plan, marl—typically soft, flocculent material—is the dominant bottom sediment type in water deeper than five feet in depth, covering about 88 percent of the lake bottom. Sand and gravel occur in the shallower areas and predominate around the shoreline. Sand covers about 3 percent of the lake bottom and gravel covers about 4 percent. Muck covers less than 1 percent of the lake bottom in these shallow water areas of the Lake.

A preponderance of soft bottom sediments and flat bottom contours form conditions generally consistent with high levels of biological activity. Biological activity in Powers Lake, however, is moderated by the presence of the large deep-water basins and fairly steep bottom contours. Together with significant stretches of firm bottom sediments in the shallow waters areas of the Lake, such as the areas of sand and gravel, these deep basins and hard substrate act to reduce productivity relative to shallower lakes with organic bottom substrates.

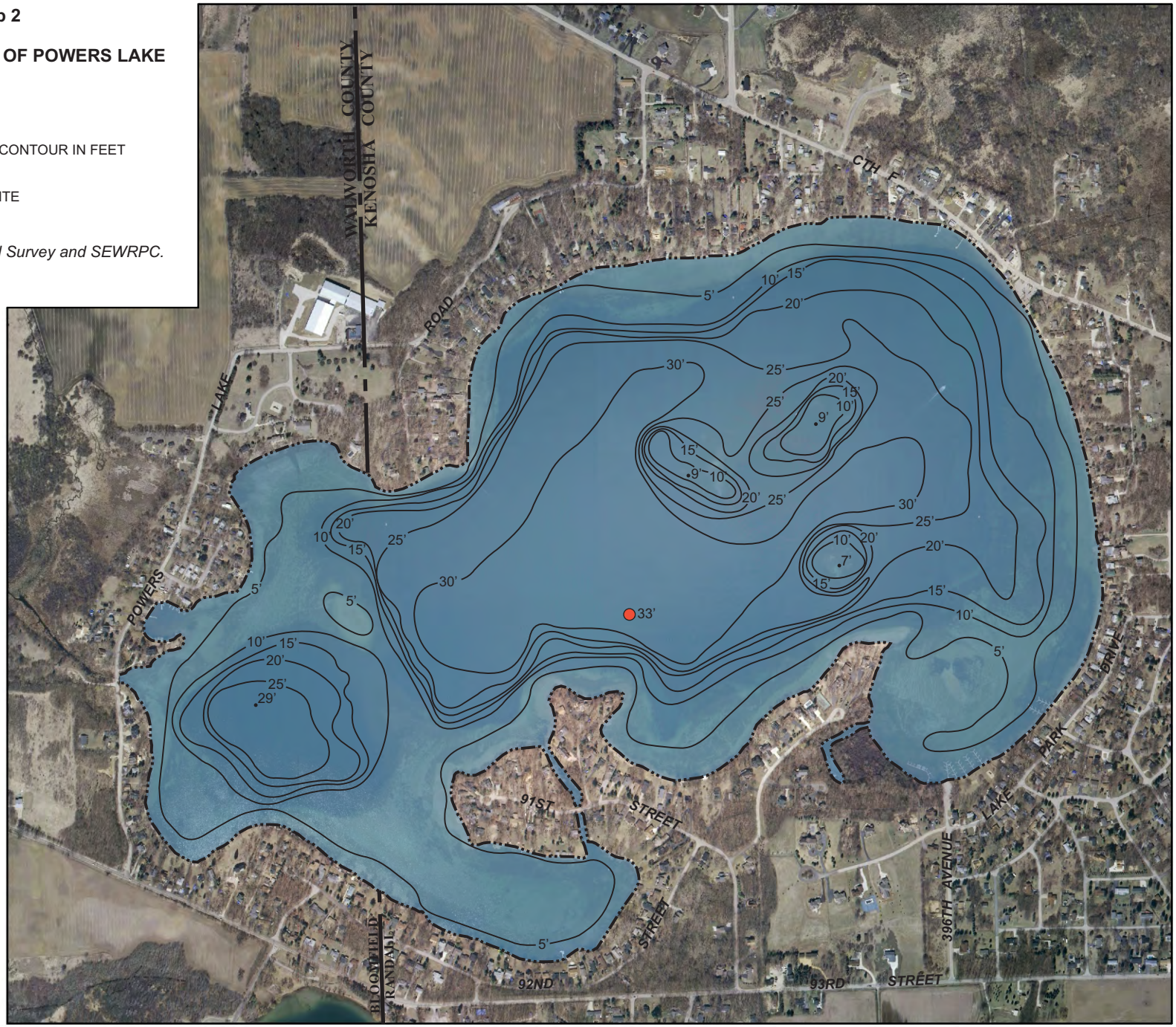
Map 2

BATHYMETRIC MAP OF POWERS LAKE

—20'— WATER DEPTH CONTOUR IN FEET

MONITORING SITE

Source: U.S. Geological Survey and SEWRPC.



GRAPHIC SCALE

0 500 1000 FEET

DATE OF PHOTOGRAPHY: APRIL 2005

TRIBUTARY AREA AND LAND USE CHARACTERISTICS

As shown on Map 3, the area tributary to Powers Lake is situated mostly within the Town of Randall, in Kenosha County, with a small portion located within the Town of Bloomfield, in Walworth County. The total area which drains to Powers Lake is approximately 2,562 acres, or about four square miles, in areal extent and is situated in the southwestern corner of Kenosha County and the southeastern corner of Walworth County.

Population and Households

Population and the number of households within the area tributary to Powers Lake have all generally shown an increase since 1960. As shown in Table 2, population typically increased between 1960 and 2000, except for the period between 1980 and 1990 when there was a slight drop in population of about 3.5 percent. The greatest increase in population occurred between 1960 and 1970 when the number of people increased by more than 43 percent, from 641 persons to 917 persons. The greatest increase in the number of households also occurred during this period between 1960 and 1970. From 1990 to 2000, the total number of housing units, which includes year round residences, as well as seasonal use units, actually decreased by about 10 percent.

Land Uses

The land uses within the area tributary to Powers Lake are primarily rural, with agriculture being the dominant rural land use. The shoreline of the Lake, however, is largely developed for residential uses. An extensive wetland area containing good quality wildlife habitat is located within the Lake's tributary area directly northeast of the Lake. Map 4 shows the existing land uses within the tributary area as of 2000; those uses also are summarized in Table 3.

Future changes in land use within the area tributary to the Lake may include further limited urban development, infilling of already platted lots, and possible redevelopment of existing properties. Under proposed year 2035 conditions,[2] as shown on Map 5 and summarized in Table 3, urban land uses are expected to increase significantly, from about 21 percent of the land coverage in 2000 to about 47 percent of the land coverage in 2035. Agricultural uses are anticipated to decrease proportionately from about 79 percent of the land coverage in the year 2000, to about 53 percent of the land coverage under planned year 2035 conditions. These land use changes have the potential to modify the nature and delivery of nonpoint source contaminants to the Lake, with concomitant impacts on the aquatic plant communities within the waterbody.

SHORELINE PROTECTION STRUCTURES

Erosion of shorelines results in the loss of land, damage to shoreline infrastructure, and interference with lake access and use. Wind-wave erosion, ice movement, and motorized boat traffic usually cause such erosion. A survey of the shoreline protection methods in use on Powers Lake was conducted by Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff during summer of 2009. As shown on Map 6, the shoreline of Powers Lake was comprised of natural shoreline, as well as stretches of shoreline protected utilizing a variety of protection structures, including riprap, beach, bulkhead (vertical wall), and revetment (sloping wall). For a lake as heavily developed as it is, Powers Lake contains a large amount of natural shoreline compared to other lakes in the Region that are similarly developed. Riprap was the most commonly occurring type of protection structure and revetment was the least common type. No obvious serious erosion-related problems were observed on the shoreline of the Lake.

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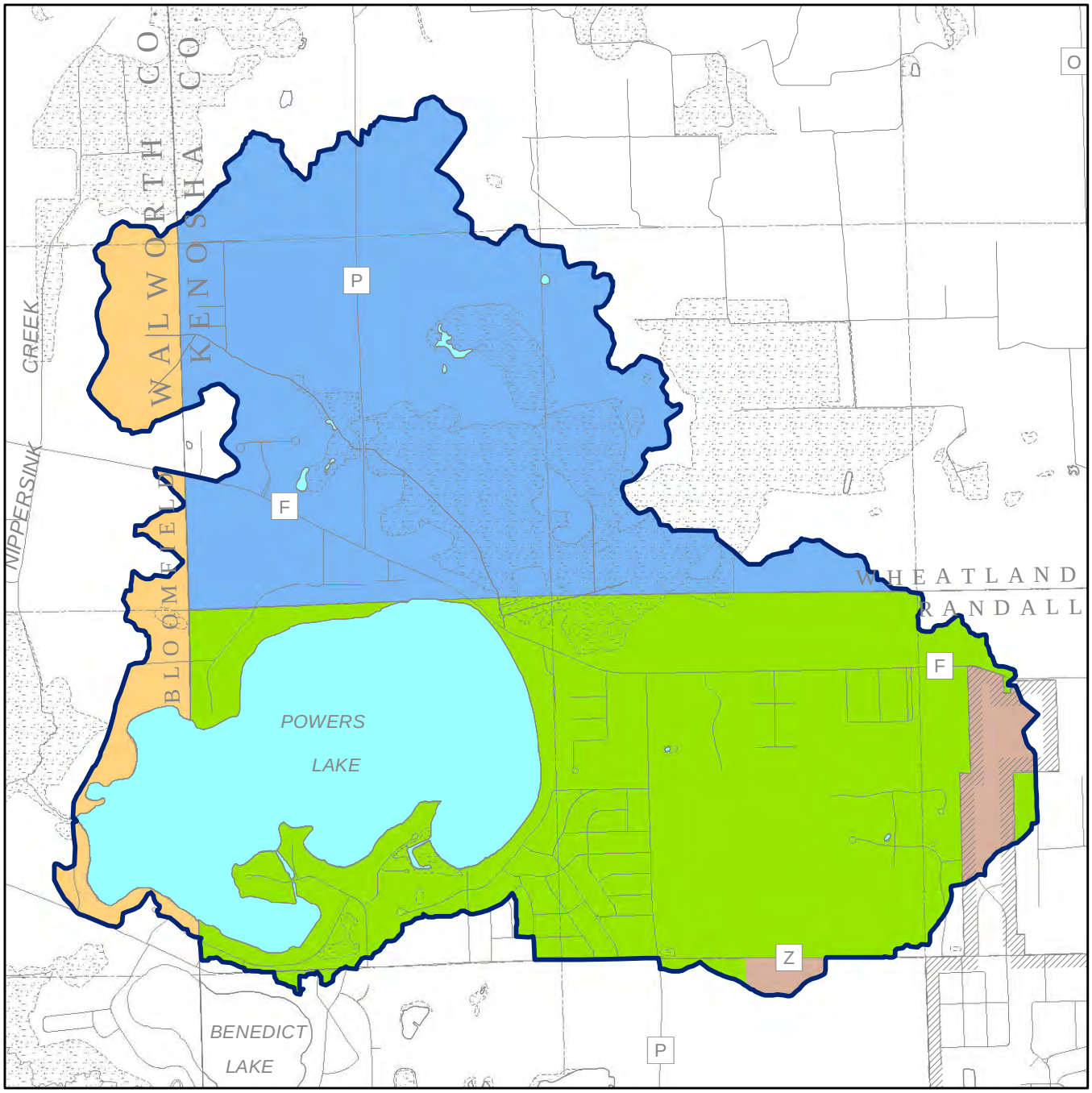
[2]*See SEWRPC Planning Report No. 48,* A Regional Land Use Plan for Southeastern Wisconsin: 2035, *June 2006; see also SEWRPC Community Assistance Planning Report No. 288,* A Multi-Jurisdictional Comprehensive Plan for Walworth County: 2035, *November 2009; and, SEWRPC Community Assistance Planning Report No. 299,* A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, *April 2010.*

Map 3

CIVIL DIVISION BOUNDARIES WITHIN THE POWERS LAKE TOTAL TRIBUTARY AREA



Village of Twin Lakes
Town of Bloomfield
Town of Randall
Town of Wheatland
Surface Water

N

0 1,000 2,000 Feet

Source: SEWRPC.

Table 2

POPULATION, HOUSEHOLDS AND TOTAL HOUSING UNITS IN THE POWERS LAKE AREA: 1960-2000

Year	Population	Change from Previous Decade		Households -occupied housing units	Change from Previous Decade		Total Housing Units	Change from Previous Decade	
		Number	Percent		Number	Percent		Number	Percent
1960	641	- -	- -	153	- -	- -	452	- -	- -
1970	917	276	43.1	260	107	69.9	573	121	26.8
1980	1,126	209	22.8	398	138	53.1	730	157	27.4
1990	1,087	-39	-3.5	385	-13	-3.3	798	68	9.3
2000	1,225	138	12.7	463	78	20.3	717	-81	-10.2

NOTE: In 2000, 93 percent of the vacant housing units were for seasonal use.

Source: U.S. Bureau of the Census and SEWRPC.

WATER QUALITY

Water quality data for Powers Lake during the current study period were to be collected by volunteers enrolled in the University of Wisconsin-Extension (UWEX) Citizen Lake Monitoring Network (CLMN), formerly known as the WDNR Self-Help Monitoring Program. In addition, U.S. Geological Survey (USGS) Trophic State Index (TSI) monitoring has been continued. The sampling location used for data collection on Powers Lake is shown on Map 2. Water quality data for this report are summarized in Table 4, with the TSI values summarized in Figures 1 and 2. Figure 1 summarizes the USGS data and includes data on the Secchi-disk transparency, and on total phosphorus and chlorophyll-*a* concentrations. Figure 2 summarizes the CLMN TSI data. These data are consistent with the mesotrophic status of Powers Lake.

Water Clarity

Water clarity, or transparency, is often used as an indication of water quality. Transparency can be affected by physical factors, such as water color and suspended particles, and by various biologic factors, including seasonal variations in planktonic algal populations living in the lake. Water clarity is measured typically with a Secchi disk, a black-and-white, eight-inch-diameter disk, which is lowered into the water until a depth is reached at which the disk is no longer visible. This depth is known as the "Secchi-disk reading." Such measurements provide a ready means of assessing water quality, and, hence, comprise an important part of the aforementioned CLMN program, in which citizen volunteers assist in lake water quality monitoring efforts, as well as the USGS TSI monitoring program.

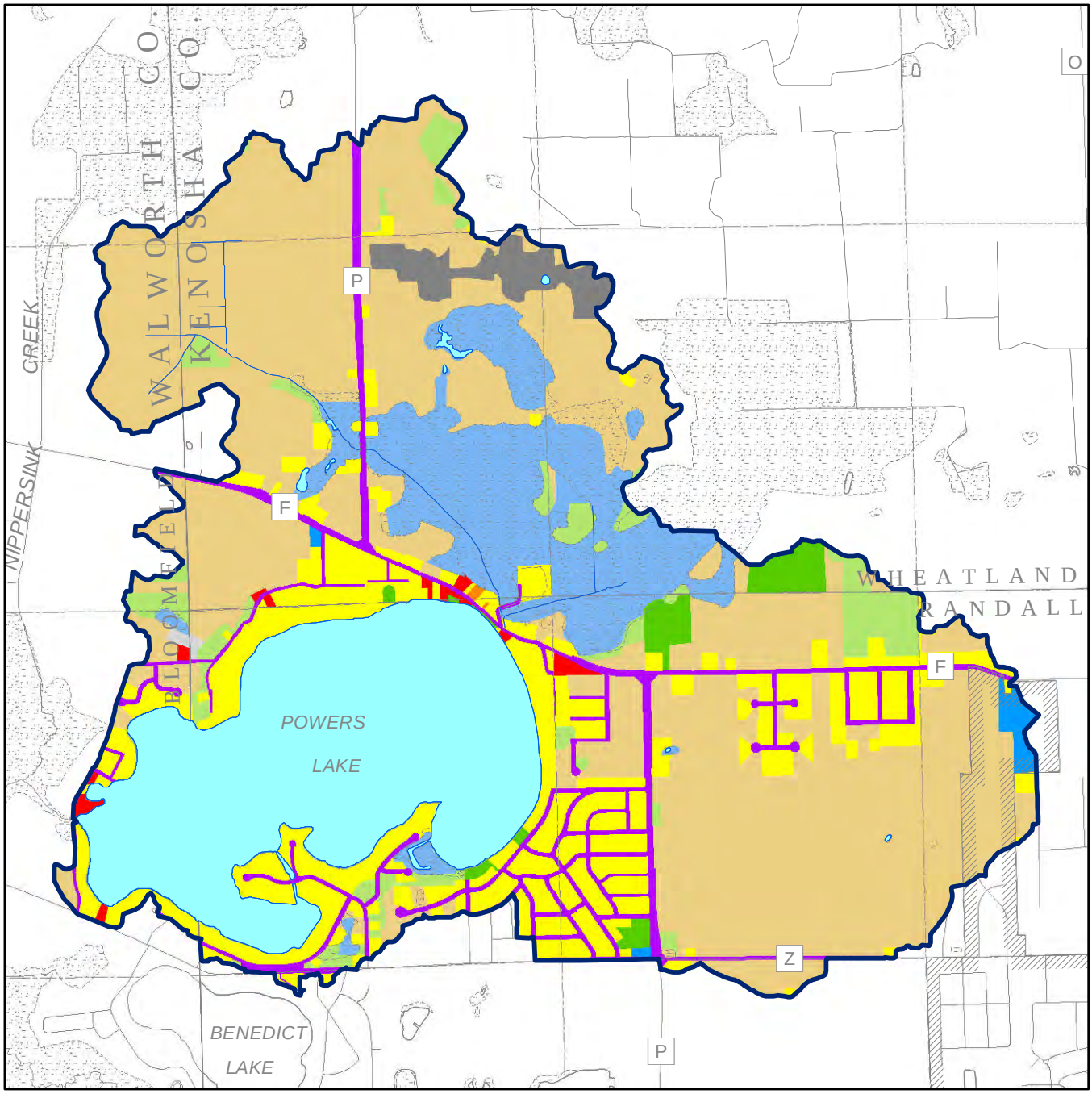
In the comprehensive lake management plan,[3] Secchi-disk readings for Powers Lake ranged from 6.6 feet in August of 1986 and July of 1987, to 19.7 feet in April of 1987; the average Secchi-disk reading for the 1986 through 1989 study period was 10.9 feet, as shown in Figure 1. These values indicated good- to very-good water quality compared to other lakes in southeastern Wisconsin.[4] During the period subsequent to 1989, Secchi-disk transparency ranged from about 4.4 feet in the fall of 2004 to about 25.6 feet in the spring of 2005, with the mean transparency for the period from 1990 to 2010 being 11.0 feet.

[3] *SEWRPC Community Assistance Planning Report No. 196,* op. cit.

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

Map 4

EXISTING LAND USE WITHIN THE POWERS LAKE TOTAL TRIBUTARY AREA: 2000



- SINGLE-FAMILY RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- TRANSPORTATION, COMMUNICATIONS, AND UTILITIES
- GOVERNMENTAL AND INSTITUTIONAL
- RECREATIONAL
- WETLANDS
- WOODLANDS
- SURFACE WATER
- AGRICULTURAL, UNUSED, AND OTHER OPEN LANDS
- EXTRACTIVE AND LANDFILL

N

0 1,000 2,000 Feet

Source: SEWRPC.

Table 3

EXISTING AND PLANNED LAND USE WITHIN THE AREA TRIBUTARY TO POWERS LAKE: 2000 AND 2035

Land Use Categories[a]	2000		2035	
	Acres	Percent of Total	Acres	Percent of Total
Urban				
Residential	358	14.0	855	33.4
Commercial	11	0.4	10	0.4
Industrial	2	0.1	7	0.3
Governmental and Institutional	12	0.5	51	2.0
Transportation, Communication, and Utilities	125	4.9	197	7.7
Recreational	35	1.3	88	3.4
Subtotal	543	21.2	1,208	47.2
Rural				
Agricultural and Other Open Lands	1,148	44.8	524	20.4
Wetlands	279	10.9	279	10.9
Woodlands	94	3.7	94	3.7
Water	457	17.8	457	17.8
Extractive	41	1.6	- -	- -
Landfill	- -	- -	- -	- -
Subtotal	2,019	78.8	1,354	52.8
Total	2,562	100.0	2,562	100.0

[a]*Parking included in associated use.*

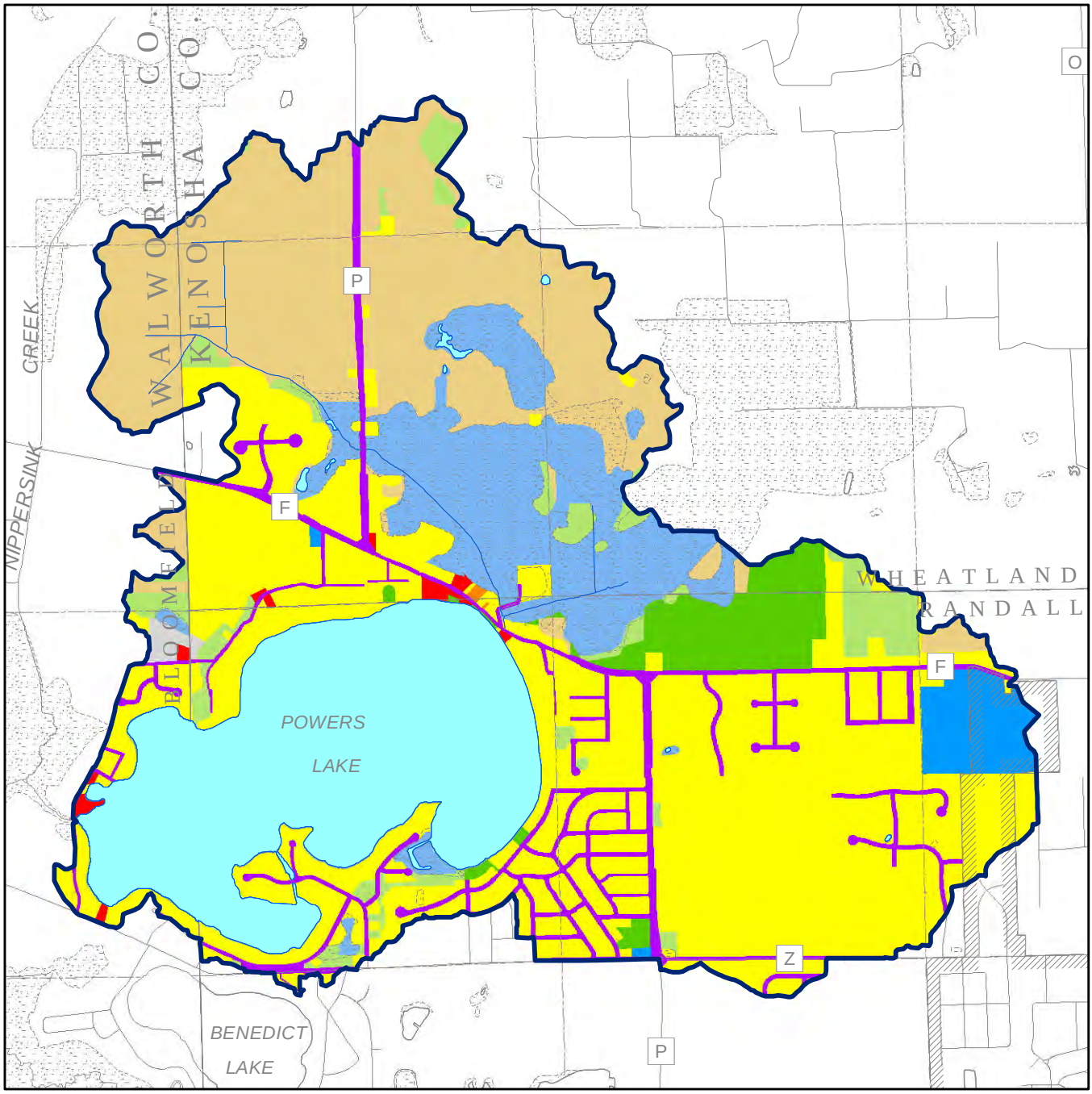
Source: SEWRPC.

Powers Lake is listed by the WDNR as having an established population of zebra mussels (*Dreissena polymorpha*) since 2003. Zebra mussels, a nonnative species of shellfish with known negative impacts on native benthic organism populations, are having a varied impact on the inland lakes of the Upper Midwest, disrupting the food chain by removing significant amounts of bacteria and smaller phytoplankton which serve as food for a variety of other aquatic organisms, including larval and juvenile fishes and many forms of zooplankton. As a result of the filter feeding proclivities of these animals, many lakes have experienced improved water clarity. This improved water clarity, in turn, has led to increased growths of rooted aquatic plants, including Eurasian water milfoil (*Myriophyllum spicatum*), in some lakes. Curiously, also within the Southeastern Wisconsin Region, zebra mussels have been observed attaching themselves to the stalks of the Eurasian water milfoil plants, dragging the stems out of the zone of light penetration due to the weight of the zebra mussel shells, and interfering with the competitive strategy of the Eurasian water milfoil plants. This has contributed to improved growths of native aquatic plants in some cases, and to the growths of filamentous algae too large to be ingested by the zebra mussels in others. Since zebra mussels have become established in Powers Lake, their populations should be carefully monitored, both to minimize the risk of the shellfish being transported to other lakes, and to monitor the impacts of the shellfish on water clarity and water quality even though water clarity has remained largely unchanged since the initial study. Regardless of the seemingly beneficial impacts of these animals, the overall effect is that, as zebra mussels and other invasive species spread to inland lakes and rivers, so do the environmental, aesthetic, and economic costs to water users.

In addition to in-lake direct measurements of water clarity using a Secchi disk, transparency of many Wisconsin lakes has been measured using remote sensing technology. The Environmental Remote Sensing Center (ERSC), established in 1970 at the University of Wisconsin-Madison campus, was one of the first remote sensing facilities

Map 5

PLANNED LAND USE WITHIN THE POWERS LAKE TOTAL TRIBUTARY AREA: 2035



SINGLE-FAMILY RESIDENTIAL
COMMERCIAL
INDUSTRIAL
TRANSPORTATION, COMMUNICATIONS, AND UTILITIES
GOVERNMENTAL AND INSTITUTIONAL
RECREATIONAL
WETLANDS
WOODLANDS
SURFACE WATER
AGRICULTURAL, UNUSED, AND OTHER OPEN LANDS
EXTRACTIVE AND LANDFILL

N

0 1,000 2,000 Feet

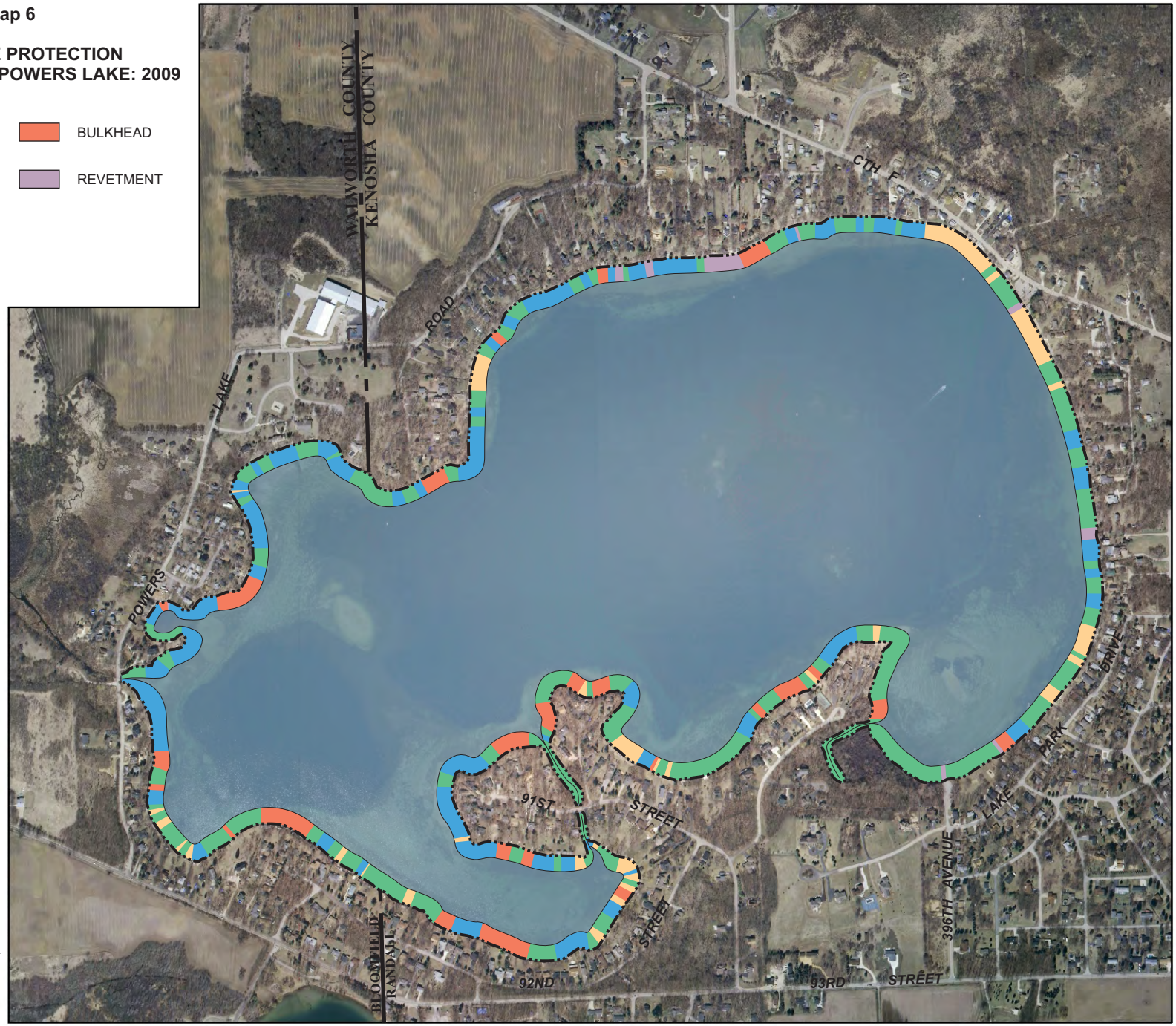
Source: SEWRPC.

Map 6

SHORELINE PROTECTION STRUCTURES ON POWERS LAKE: 2009

RIPRAP
BULKHEAD
BEACH
REVETMENT
NATURAL

Source: SEWRPC.



GRAPHIC SCALE
0 500 1000 FEET

DATE OF PHOTOGRAPHY: APRIL 2005

Table 4

ESTIMATED ANNUAL POLLUTANT LOADINGS BY LAND USE CATEGORY WITHIN THE AREA TRIBUTARY TO POWERS LAKE: 2000 AND 2035

Land Use Category	Pollutant Loads: 2000			
	Sediment (tons)	Phosphorus (pounds)	Copper (pounds)	Zinc (pounds)
Urban				
Residential[a]	3.5	71.6	0.0	3.6
Commercial	4.3	13.2	2.4	16.4
Industrial	0.7	2.4	0.4	3.0
Governmental	3.0	16.2	0.8	9.6
Transportation	0.6	13.6	- -	- -
Recreational	0.4	9.4	- -	- -
Subtotal	12.5	126.4	3.6	32.6
Rural				
Agricultural	258.4	987.3	- -	- -
Wetlands	0.5	11.2	- -	- -
Woodlands	0.2	3.8	- -	- -
Water	43.0	59.4	- -	- -
Extractive	9.2	35.3	- -	- -
Subtotal	311.3	1,097.0	- -	- -
Total	323.8	1,223.4	3.6	32.6

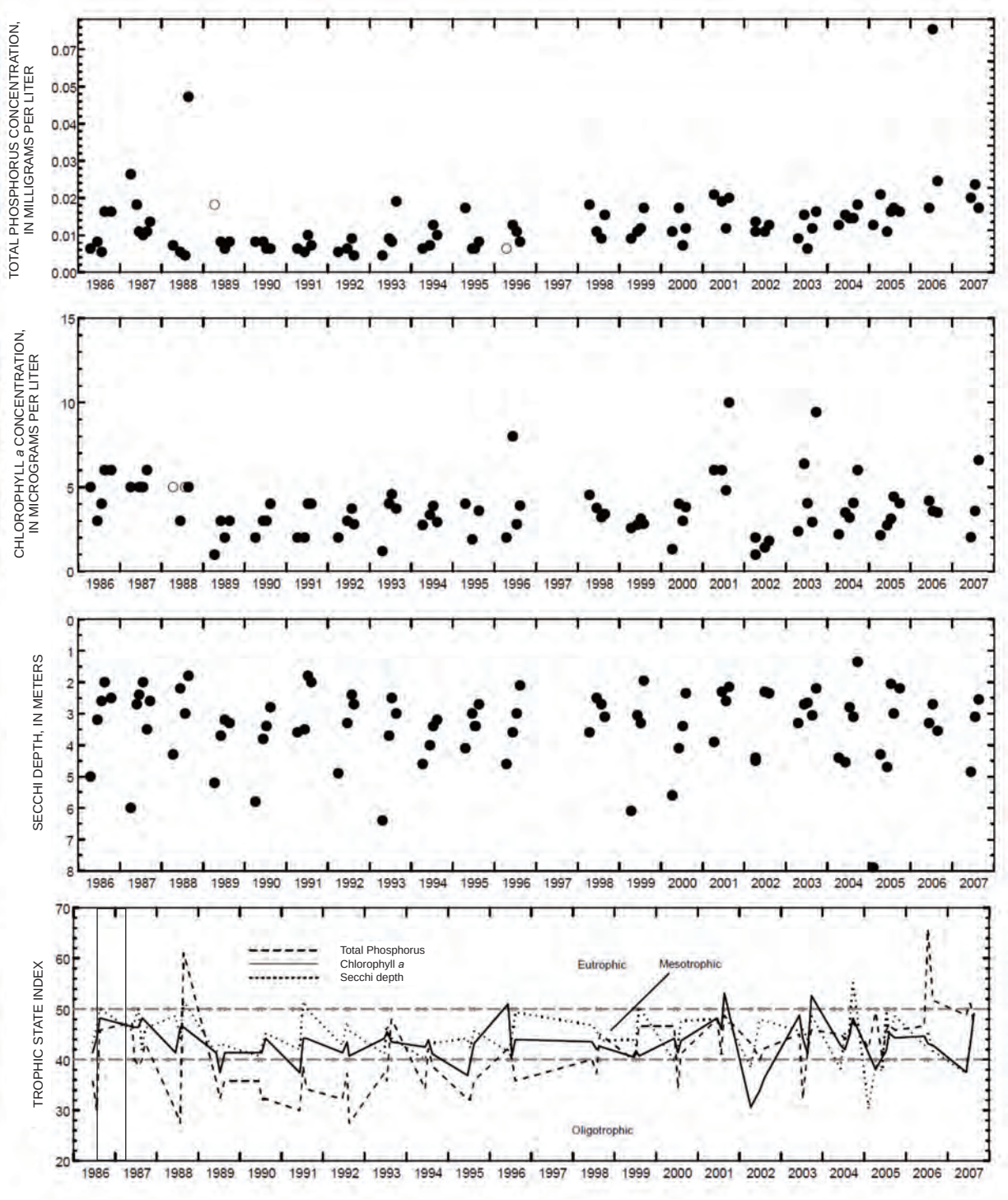
Land Use Category	Pollutant Loads: 2035			
	Sediment (tons)	Phosphorus (pounds)	Copper (pounds)	Zinc (pounds)
Urban				
Residential[a]	8.3	171.0	0.0	8.5
Commercial	3.9	12.0	2.2	14.9
Industrial	2.6	8.2	1.5	10.4
Governmental	13.0	68.8	3.6	40.8
Transportation	0.9	21.7	- -	- -
Recreational	1.1	23.7	- -	- -
Subtotal	29.7	305.4	7.3	74.6
Rural				
Agricultural	117.9	450.6	- -	- -
Wetlands	0.5	11.2	- -	- -
Woodlands	0.2	3.8	- -	- -
Water	42.9	59.4	- -	- -
Extractive	- -	- -	- -	- -
Subtotal	161.5	525.0	- -	- -
Total	191.2	830.4	7.3	74.6

[a]*Includes the contribution from onsite sewage disposal systems. The contribution from onsite sewage disposal systems, based upon the per capita phosphorus contribution contained within wastewater estimated within the WILMS model, could range from approximately 7.3 pounds per year to as much as about 196.0 pounds per year, depending upon soil type, system condition, and system locations. For purposes of this analysis, 61.2 pounds per year were used as that value provided the loading that was best correlated to the measured in-lake phosphorus concentration.*

Source: SEWRPC.

Figure 1

SURFACE WATER TOTAL PHOSPHORUS AND CHLOROPHYLL-*a* CONCENTRATIONS AND SECCHI-DISK TRANSPARENCIES, AND TROPHIC STATE INDEX VALUES, FOR POWERS LAKE: 1986-2008

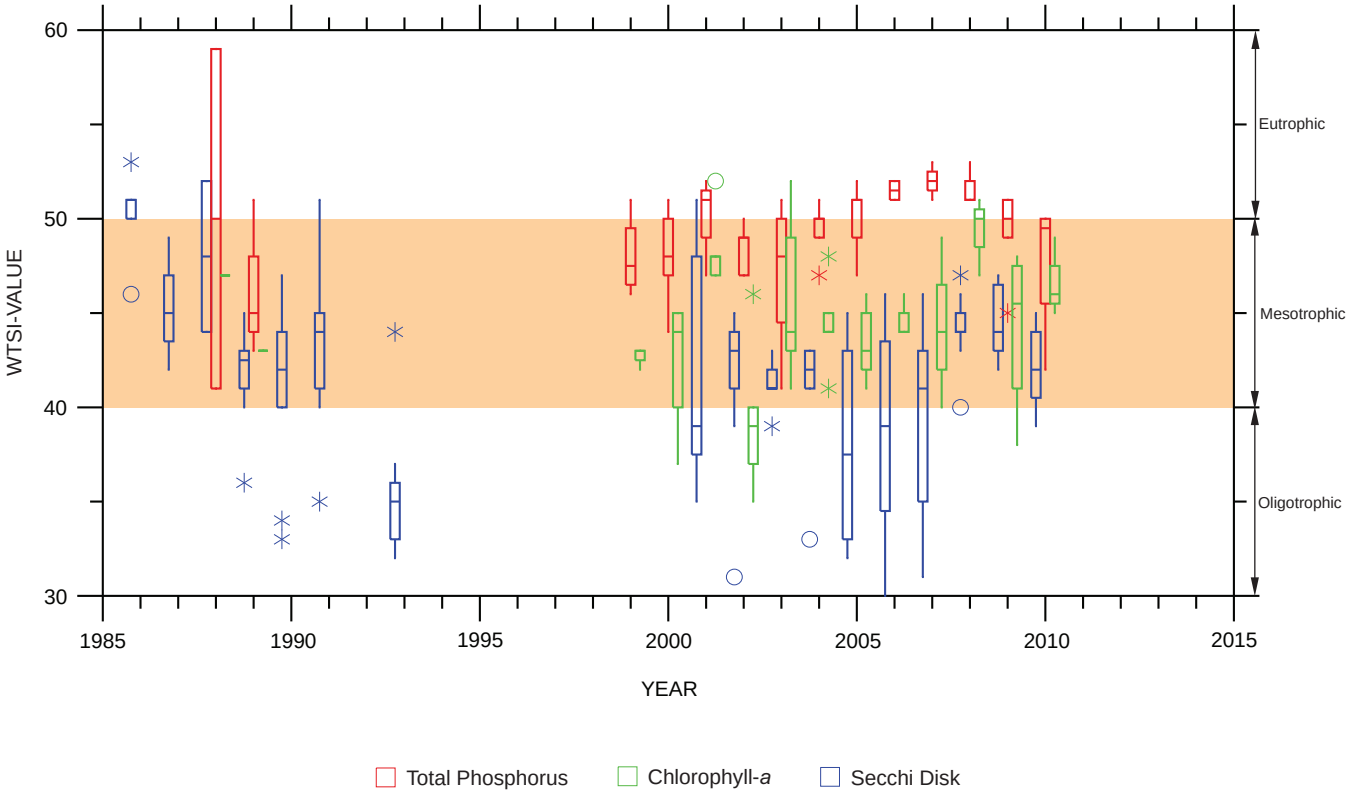


NOTE: Open circles on the first two plots indicate laboratory detection limit for selected analyses. Actual concentrations for these particular analyses are less than the plotted circles.

Source: U.S. Geological Survey.

Figure 2

TROPHIC STATE INDEX VALUES FOR POWERS LAKE: 1986-2010



Source: University of Wisconsin-Extension Citizen Monitoring Network and Wisconsin Department of Natural Resources Surface Water Information Management System.

in the United States. Using data gathered by satellite remote sensing over a three-year period, the ERSC generated a map based on a mosaic of satellite images showing the estimated water clarity of the largest 8,000 lakes in Wisconsin. The WDNR, through its volunteer Self-Help Monitoring Program (now the CLMN), was able to gather water clarity measurements from about 800 lakes, or about 10 percent of Wisconsin's largest lakes. Of these, the satellite remote sensing technology utilized by ERSC was able to accurately estimate clarity, providing a basis for extrapolating water clarity estimates to the remaining 90 percent of lakes. Measurements collected through ERSC remote sensing program from 2003 through 2008, estimated the average water clarity of Powers Lake to be 11.9 feet, a value indicative of good- to very-good water quality. Such data are consistent with the in-lake measured transparencies observed by the USGS.

Dissolved Oxygen

Dissolved oxygen levels are one of the most critical factors affecting the living organisms of a lake ecosystem. Generally, dissolved oxygen levels are higher at the surface of a lake, where there is an interchange between the water and atmosphere, stirring by wind action, and production of oxygen by plant photosynthesis. Dissolved oxygen levels are usually lowest near the bottom of a lake, where decomposer organisms and chemical oxidation processes utilize oxygen in the decay process.

When a lake becomes stratified—that is, when a thermal gradient (called a "thermocline") or chemical gradient ("chemocline") of sufficient intensity produces a barrier separating upper waters, called the epilimnion, from lower waters, known as the hypolimnion—the surface supply of oxygen to the hypolimnion is cut off. Eventually,

if there is not enough dissolved oxygen to meet the demands of bottom-dwelling aquatic life and decaying organic material, the dissolved oxygen levels in the bottom waters may be reduced to zero, a condition known as anoxia or anaerobiasis.

Where oxygen levels are depleted in the hypolimnion, fish tend to move upward, nearer to the surface of the lake, where higher dissolved oxygen concentrations exist. This migration, when combined with temperature, can select against some fish species that prefer the cooler water temperatures that generally prevail in the lower portions of the lakes. When there is insufficient oxygen at these depths, then these fish are susceptible to summerkills, or, alternatively, are driven into the warmer water portions of the lake where their condition and competitive success may be severely impaired. Hypolimnetic anoxia is common in many of the lakes in southeastern Wisconsin. Additionally, this condition can lead to winter fish kills if oxygen stores are not sufficient to meet the total demand for oxygen during period of ice and snow cover. Neither summer- nor winterkills were an issue in Powers Lake. Measurements showed oxygen was present throughout the entire water column during winter stratification. Surface water to bottom water gradients of dissolved oxygen in Powers Lake were generally on the order of 0.5 milligram per liter (mg/l) to 1.0 mg/l, ranging from a minimum of 6.2 mg/l in the bottom waters of the Lake to a maximum of 8.9 mg/l in the surface waters. About 5.0 mg/l is considered the minimum level below which oxygen-consuming organisms, such as fish, become stressed, while fish are unlikely to survive when dissolved oxygen concentrations drop below 2.0 mg/l. Dissolved oxygen concentrations in Powers Lake were above these critical limits.

In addition to biological consequences, the lack of dissolved oxygen at depth can enhance the development of chemoclines, or chemical gradients, with an inverse relationship to the dissolved oxygen concentration. For example, the sediment-water exchange of elements, such as phosphorus, iron, and manganese, is increased under anaerobic conditions, resulting in increased hypolimnetic concentrations of these elements. Under anaerobic conditions, changes in iron and manganese oxidation states enable the release of phosphorus from the iron and manganese complexes to which they were bound under aerobic conditions. This "internal loading" can affect water quality significantly if these nutrients and salts are mixed into the epilimnion, especially during early summer, when these nutrients can become available for algal and rooted aquatic plant growth. During the studies of Powers Lake, the amount of phosphorus present in the bottom waters of the Lake indicated limited internal loading. This is consistent with the aerobic status of the hypolimnion as noted above.

Chlorophyll-*a*

Chlorophyll-*a* is the major photosynthetic ("green") pigment in algae. The amount of chlorophyll-*a* present in the water is an indication of the biomass or amount of algae in the water. The mean chlorophyll-*a* concentration for lakes in the Southeastern Wisconsin Region is about 43 micrograms per liter (μg/l), with a median concentration of about 10 μg/l.[5] Chlorophyll-*a* levels above about 10 μg/l generally result in a green coloration of the water that may be severe enough to impair recreational activities, such as swimming or waterskiing.[6]

In the comprehensive lake management plan for Powers Lake,[7] chlorophyll-*a* levels ranged from a low of 1.0 μg/l to a high of 6.0 μg/l, although one measurement of 13 μg/l, recorded in January of 1987, suggested the likely occurrence of an algal bloom under the ice. The average chlorophyll-*a* concentration during the initial study was 4.0 μg/l. During the current study, chlorophyll-*a* concentrations recorded since 1990 remained about the same,

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[5]Ibid.

[6]*J.R. Vallentyne, "The Process of Eutrophication and Criteria for Trophic State Determination," in* Modeling the Eutrophication Process—Proceedings of a Workshop at St. Petersburg, Florida*, November 19-21, 1969, pages 57-67.*

[7]*SEWRPC Community Assistance Planning Report No. 196,* op. cit.

ranging from 1.0 μg/l to 10 μg/l, with an average value of 4.0 μg/l. These chlorophyll-*a* concentrations are consistent with the views expressed by the respondents to the community-based questionnaire survey, the results of which are summarized in Chapter III of this report. Algal growth continued to be the least used indicator of water quality in comparison with water clarity, the most frequently used indicator, and general aesthetic conditions.

Nutrient Characteristics

Nitrogen-to-Phosphorus Ratios

Aquatic plants and algae require such nutrients as phosphorus and nitrogen for growth. In hard-water alkaline lakes, most of these nutrients are generally found in concentrations that exceed the needs of growing plants. However, in lakes where the supply of one or more of these nutrients is limited, plant growth is limited by the amount of the nutrient that is available in the least quantity relative to all of the others. The ratio (N:P) of total nitrogen (N) to total phosphorus (P) in lake water indicates which nutrient is the factor most likely to be limiting aquatic plant growth in a lake.[8] Where the N:P ratio is greater than 14:1, phosphorus is most likely to be the limiting nutrient. If the ratio is less than 10:1, nitrogen is most likely to be the limiting nutrient. The N:P ratios in Powers Lake during spring turnover are always greater than 14:1, indicating that phosphorus was the limiting factor for plant production. Since 1990, the N:P ratio has been between about 70:1 and 80:1.

Total Phosphorus

Statewide standards for phosphorus concentrations in lakes were adopted during November 2010. The Statewide phosphorus standard supersedes the regional guideline value of 20 μg/l or less during spring turnover established by the regional water quality management plan.[9] Pursuant to Section NR 102.06, "Phosphorus," of the *Wisconsin Administrative Code*, Powers Lake would be considered to be a nonstratified seepage lake, and subject to a 0.040 mg/l (40 μg/l) total phosphorus criterion, above which value the lake would be considered to be impaired with respect to phosphorus. Total phosphorus concentrations include the phosphorus contained in plant and animal fragments suspended in the lake water, phosphorus bound to sediment particles, and phosphorus dissolved in the water column, and is, therefore, usually considered a good indicator of nutrient status in a lake. A concentration of less than 40 μg/l is the level considered as necessary to limit algal and aquatic plant growths to levels consistent with recreational water use objectives, as well as water use objectives for maintaining a warmwater fishery and other aquatic life. During the previous period, total phosphorus concentrations during spring turnover in Powers Lake ranged from 7.0 μg/l to 29 μg/l, with the total phosphorus concentration in the surface water averaging 12 μg/l, indicating good water quality. Since 1990, total phosphorus concentrations have remained relatively stable, ranging from 6.0 μg/l to 15 μg/l during spring, with an average spring concentration of 8.0 μg/l.

Seasonal gradients of phosphorus concentrations between the epilimnion and hypolimnion of a lake reflect the biogeochemistry of this growth element. When aquatic organisms die, they usually sink to the bottom of the lake, where they decompose. Phosphorus from these organisms is then either stored in the bottom sediments or rereleased into the water column. Because phosphorus is not highly soluble in water, it readily forms insoluble precipitates with calcium, iron, and aluminum under aerobic conditions and accumulates, predominantly, in the lake sediments. As described above, if the bottom waters become depleted of oxygen during stratification, certain chemical changes occur, including the change in the oxidation state of iron from the insoluble Fe^{3+} state to the more soluble Fe^{2+} state. The effect of these chemical changes is that phosphorus becomes soluble and is more

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[8]*M.O. Allum, R.E. Gessner, and T.H. Gakstatter, U.S. Environmental Protection Agency Working Paper No. 900,* An Evaluation of the National Eutrophication Data, *1976.*

[9]*See SEWRPC Planning Report No. 30,* A Regional Water Quality Management Plan for Southeastern Wisconsin—2000, *Volume One,* Inventory Findings, *September 1978; Volume Two,* Alternative Plans, *February 1979; and Volume Three,* Recommended Plan, *June 1979.*

readily released from the sediments in a process known as "internal loading." This process also occurs under aerobic conditions, but generally at a slower rate than under anaerobic conditions. As the waters mix, this phosphorus may be widely dispersed throughout the lake waterbody and become available for algal growth.

Because Powers Lake does not stratify to any significant degree, internal loading is minimal, with little difference reported in the concentrations of total phosphorus between the surface and bottom waters of the Lake. Consequently, as noted during the previous study period, internal loading of phosphorus was not indicated at that time. This status has not changed. Should any such loading occur, the magnitude of the release and its subsequent effects in contributing to algal growth in the surface waters of the Lake may be moderated by a number of circumstances, including the rates of mixing during the spring and fall overturn events. Slow mixing generally results in any phosphorus released from the bottom waters of the Lake being reprecipitated and consequently unavailable to aquatic plants.[10]

Total Nitrogen

During the current study period, the USGS reported that the total nitrogen concentrations in Powers Lake ranged from 0.33 mg/l to 0.81 mg/l, with an average concentration during the period from 1990 through 2010 of 0.58 mg/l. This range in total nitrogen concentrations is slightly lower than that documented by the USGS during the initial comprehensive lake management planning program, which ranged from 0.43 mg/l to 1.4 mg/l. Curiously, the mean concentration during this period also was 0.58 mg/l, despite the greater range in concentrations.

POLLUTION LOADINGS AND SOURCES

Pollutant loads to a lake are generated by various natural processes and human activities that take place in the 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 across the land surface enter the lake directly as surface runoff and, indirectly, as groundwater inflows, including drainage from onsite wastewater treatment systems. Pollutants transported by streams also enter a lake as surface water inflows.

In drained lakes, like Powers Lake, pollutant loadings transported by precipitation falling directly onto the lake surface and runoff from the tributary areas immediately surrounding the Lake, in the absence of identifiable or point source discharges from industries or wastewater treatment facilities, comprise the principal routes by which contaminants enter the waterbodies.[11] The lack of clearly identifiable inflowing watercourses to Powers Lake would suggest that the input of contaminants carried into the Lake by inflowing streams is likely to be minimal, compared with the other sources.[12] Although groundwater contributes a significant amount of water to Powers

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[10]*See, for example, R.D. Robarts, P.J. Ashton, J.A. Thornton, H.J. Taussig, and L.M. Sephton, "Overturn in a hypertrophic, warm, monomictic impoundment (Hartbeespoort Dam, South Africa),"* Hydrobiologia*, Volume 97, 1982, pages 209-224.*

[11]*Sven-Olof Ryding and Walter Rast, "The Control of Eutrophication of Lakes and Reservoirs,"* Unesco Man and the Biosphere Series, *Volume 1, Parthenon Press, Carnforth, 1989; Jeffrey A. Thornton, Walter Rast, Marjorie M. Holland, Geza Jolankai, and Sven-Olof Ryding, "The Assessment and Control of Nonpoint Source Pollution of Aquatic Ecosystems,"* Unesco Man and the Biosphere Series, *Volume 23, Parthenon Press, Carnforth, 1999.*

[12]*Powers Lake receives some intermittent inflow from an unnamed tributary which enters the Lake from the wetland complex northeast of the Lake. This is considered as local drainage for the purposes of this report. Powers Lake forms the headwaters of the East Branch of the Nippersink River, which flows from the Lake southerly through Tombeau Lake, then southwesterly to its confluence with the North Branch of the Nippersink River and, eventually, the Illinois-Fox River.*

Lake, groundwater is not usually a source of pollution to a lake, although the Kenosha County land and water resource management plan does note relatively high nitrate concentrations in the groundwater adjacent to the Lake.[13] Currently, there are no significant point source discharges of pollutants into Powers Lake. For this reason, the discussion that follows is based upon nonpoint source pollutant loadings to the Lake.

Nonpoint sources of water pollution include urban sources, such as runoff from residential, commercial, transportation, construction, and recreational activities; and rural sources, such as runoff from agricultural lands and onsite sewage disposal systems. Nonpoint sourced phosphorus, suspended solids, and urban-derived metals inputs to Powers Lake were estimated using the Wisconsin Lake Model Spreadsheet (WiLMS version 3.0),[14] and the unit area load-based (UAL) models developed for use within the Southeastern Wisconsin Region.[15] These two models operate on the general principal that, depending on land use (agricultural, residential, etc.), a given surface area of land within a lake's tributary area will deliver a predetermined mass of pollutants to the lake. Values predicted by these two models can then be compared to those observed at monitoring stations in the lake. This comparison serves two purposes: 1) the identification of potential water quality issues of concern, and 2) the indication of potential sources of water pollution not accounted for on the basis of land use.[16]

Phosphorus Loadings

Table 4 sets forth the estimated annual phosphorus loads to Powers Lake under year 2000 land use conditions in its tributary area. Those loads were estimated based upon land use inventory data set forth in the regional land use plan.[17] It was estimated that, under year 2000 conditions, the annual total phosphorus load to Powers Lake from its tributary area was 1,225 pounds, Of that total phosphorus load, it was estimated that 1,040 pounds per year, or about 85 percent of the total loading, were contributed by runoff from rural lands, mostly agricultural, and 125 pounds per year, or about 10 percent, were contributed by runoff from urban lands, mostly residential sources. About 60 pounds per year, or about 5 percent, were contributed by direct precipitation onto the lake surface.

The regional water quality management plan recommended that phosphorus loads to Powers Lake be reduced by 60 percent from the then-estimated total phosphorus load to the Lake of 2,040 pounds per year to protect and maintain good water quality in the Lake.[18] Full implementation of the regional water quality management plan,

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[13]*See SEWRPC Community Assistance Planning Report No. 255, 1st Edition,* A Land and Water Resource Management Plan for Kenosha County: 2000-2004, *September 2000, Table 32; the nitrate concentration in groundwater in the Lake Knolls Subdivision was reported as 4.6 mg/l and the copper concentration as 170 µg/l, both of which are below the Maximum Contaminant Level Goals (MCLGs) for Safe Drinking Water established in Chapter NR 809 of the* Wisconsin Administrative Code.

[14]*John C. Panuska and Jeff C. Kreider, Wisconsin Department of Natural Resources Publication No. PUBL-WR-363-94,* Wisconsin Lake Modeling Suite Program Documentation and User's Manual, Version 3.3 for Windows, *August 2002*.

[15]*SEWRPC Planning Report No. 30,* op. cit.

[16]*The forecast total phosphorus load to the Lake, generated through the WiLMS and UAL models, allows calculation of the likely in-lake average annual total phosphorus concentration which can be compared with the observed values reported in the USGS TSI or Level 2 CLMN datasets. Significant differences between forecast and observed values generally indicates the presence of an unidentified source; occasionally, such a difference can be ascribed to the fact that a lake may fall outside the range of typical lakes used to derive the mathematical relationships used in the WiLMS and UAL models.*

[17]*SEWRPC Planning Report No. 48,* op. cit.

[18]*SEWRPC Planning Report No. 30, Volume Two,* op. cit.

therefore, would have been expected to reduce the estimated 2,040 pounds of phosphorus entering the Lake per year to about 820 pounds of phosphorus per year by plan year 2000.

To this end, the District of Powers Lake (DoPL) has undertaken an extensive campaign of community awareness creation and land acquisition as major actions to implement the recommended reduction in phosphorus loading. These efforts have contributed to a reduction of the estimated phosphorus load to Powers Lake from 2,040 pounds per year forecast in the regional water quality management plan to 1,225 pounds per year, based upon year 2000 land use. This phosphorus load results in an average in-lake phosphorus concentration of 18 µg/l, as noted below. This suggests that the Powers Lake community has been successful in maintaining an in-lake phosphorus concentration that approximates the regional guideline of 20 µg/l, well below the State criterion of 40 µg/l.

Table 4 also shows the estimated annual phosphorus loads to Powers Lake from its tributary area under planned year 2035 conditions.[19] As a result of anticipated land use changes expected to occur through 2035, the annual total phosphorus load to the Lake is anticipated to diminish as agricultural activities within the area tributary to Powers Lake are replaced by urban residential land uses. The most likely annual total phosphorus load to the Lake under the planned conditions is estimated to be 830 pounds. Of the total annual forecast phosphorus load, 465 pounds per year, or about 56 percent of the total loading, are estimated to be contributed by runoff from rural land, and 305 pounds per year, or about 37 percent, from urban land. About 60 pounds, or about 7 percent, are expected to be contributed by direct precipitation onto the lake surface. Thus, it may be anticipated that not only will the amount of the phosphorus load decrease, but that the distribution of the sources of the phosphorus load to the Lake may change, with the amount of phosphorus being contributed from urban sources experiencing an increase from about one-tenth of the total in 2000 to about two-fifths of the total in 2035, while the amount of phosphorus from agricultural sources will decrease from about four-fifths of the total in 2000 to about one-half of the total in 2035.

Phosphorus release from the lake bottom sediments, or internal loading as discussed above, does not appear to have been a contributing factor to the total phosphorus loading to Powers Lake. Using the estimated phosphorus load and the hydrographical characteristics of the Lake as inputs to the phosphorus loading model of the Organization for Economic Cooperation and Development (OECD) results in an estimated in-lake surface water total phosphorus concentration of 18 µg/l, which is within the range of observed in-lake total phosphorus concentrations reported from Powers Lake and slightly higher than the mean in-lake total phosphorus concentrations observed during the current study period.[20] This agreement suggests that the external phosphorus sources included within the nutrient loading estimates account for the whole mass of phosphorus entering Powers Lake on an annual basis.

Sediment Loadings

The estimated sediment loadings to Powers Lake from its tributary area under existing year 2000 and planned year 2035 conditions and as set forth in the adopted regional land use plan[21] are shown in Table 4. A total annual sediment loading of 324 tons was estimated to be contributed to Powers Lake from its tributary area under year 2000 conditions, as shown in Table 4. Of the likely annual sediment load, it was estimated that 268 tons per year, or about 83 percent of the total loading, were contributed by runoff from rural lands, mostly from agricultural sources, and 12 tons, or 4 percent, were contributed by urban lands. Approximately 43 tons, or about 13 percent of the annual sediment load, were contributed by atmospheric deposition onto the lake surface.

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[19]Ibid.

[20]*Organization for Economic Cooperation and Development,* Eutrophication of Waters: Monitoring, Assessment and Control*, OECD, 1982.*

[21]*SEWRPC Planning Report No. 48,* op. cit.

Under 2035 conditions, the annual sediment load to the Lake from its tributary area is anticipated to diminish. The most likely annual sediment load to the Lake under 2035 land use conditions is estimated to be 191 tons. Of this forecast sediment load anticipated for Powers Lake, 118 tons of sediment are estimated to be contributed to the Lake from rural sources and 30 tons from urban sources. Direct deposition of sediment onto the Lake surface is expected to deliver about 43 tons of sediment per year through direct precipitation onto the lake surface.

Soil loss from agricultural lands has been considered to be one of the major sources of sediment and nutrients in the Fox River and its tributaries. Based upon estimates set forth in the regional water quality management plan,[22] soil loss from croplands was identified as a significant source of sediment loading to the Fox River. In order to meet the water use objectives, the regional plan identified an overall need to reduce soil loss from rural lands in the Fox River watershed by about 25 percent, although this reduction goal was noted to be higher in the Benedict Lake, Dyer Lake, and Powers Lake tributary areas. In these areas, the plan recommended that rural nonpoint source sediment loads be reduced by 50 percent.[23] The plan further recommended that urban nonpoint source sediment loads be reduced by 50 percent in the Powers Lake tributary area.

Urban Heavy Metals Loadings

Urbanization brings with it increased use of metals and other materials that contribute pollutants to aquatic systems.[24] The majority of these metals become associated with sediment particles,[25] and are, consequently, likely to be encapsulated into the bottom sediments of a lake.

The estimated loadings of copper and zinc likely to be contributed to Powers Lake from its tributary area under existing year 2000 land use conditions and forecast year 2035 conditions are shown in Table 4. Under year 2000 land use conditions, the annual copper and zinc loads to Powers Lake are estimated to be four pounds and 33 pounds, respectively, with all loads generated from urban lands. Under planned year 2035 conditions, as set forth in the adopted regional land use plan,[26] the annual heavy metal loads to the Lake are anticipated to increase to about seven pounds of copper and 75 pounds of zinc per year.

TROPHIC STATUS

Lakes are commonly classified according to their degree of nutrient enrichment, or trophic status. The ability of lakes to support a variety of recreational activities and healthy fish and other aquatic life communities is often correlated to the degree of nutrient enrichment that has occurred. There are three terms generally used to describe the trophic status of a lake: oligotrophic, mesotrophic, and eutrophic.

Oligotrophic lakes are nutrient-poor lakes. These lakes characteristically support relatively few aquatic plants and often do not contain very productive fisheries. Oligotrophic lakes may provide excellent opportunities for swimming, boating, and waterskiing. Because of the naturally fertile soils and the intensive land use activities, there are relatively few oligotrophic lakes in southeastern Wisconsin.

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[22] *SEWRPC Planning Report No. 30, Volume One,* op. cit.

[23] *SEWRPC Memorandum Report No 93,* A Regional Water Quality Management Plan for Southeastern Wisconsin: An Update and Status Report, *March 1995.*

[24] *Jeffrey A. Thornton, et al.,* op. cit.

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

[26] *SEWRPC Planning Report No. 48,* op. cit.

Mesotrophic lakes are moderately fertile lakes which may support abundant aquatic plant growths and productive fisheries. However, nuisance growths of algae and macrophytes are usually not exhibited by mesotrophic lakes. These lakes may provide opportunities for all types of recreational activities, including boating, swimming, fishing, and waterskiing. Many lakes in southeastern Wisconsin are mesotrophic.

Eutrophic lakes are nutrient-rich lakes. These lakes often exhibit excessive aquatic macrophyte growths and/or experience frequent algae blooms. If the lakes are shallow, fish winterkills may be common. While portions of such lakes are not ideal for swimming and boating, eutrophic lakes may support very productive fisheries. Although some eutrophic lakes are present in the Region, severely eutrophic lakes are rare, especially since the regionwide implementation of recommendations put forth in the regional water quality management plan. Severely enriched lakes are sometimes referred to as being hypertrophic.

Several numeric "scales," based on one or more water quality indicators, have been developed to define the trophic condition of a lake. Because trophic state is actually a continuum from very nutrient poor to very nutrient rich, a numeric scale is useful for comparing lakes and for evaluating trends in water quality conditions. Care must be taken, however, that the particular scale used is appropriate for the lake to which it is applied. In this case, two indices appropriate for Wisconsin lakes have been used; namely, the Vollenweider-OECD open-boundary trophic classification system,[27] and the Carlson Trophic State Index (TSI),[28] with a variation known as the Wisconsin Trophic State Index value (WTSI).[29] The WTSI, summarized in Figure 2, is a refinement of the Carlson TSI, summarized in Figure 1. The WTSI is designed to account for the greater humic acid content—brown water color—present in Wisconsin lakes, and has been adopted by the WDNR for use in lake management investigations.

During the previous study period, TSI ratings calculated from Secchi disk, total phosphorus, and chlorophyll-*a* levels resulted in Powers Lake being classified as mesotrophic, or moderately enriched. This is a typical condition observed in most lakes in southeastern Wisconsin.[30] The data set forth herein for the period subsequent to the date of completion of the initial comprehensive lake management plan for Powers Lake remain consistent with this trophic state, as shown in Figure 2. Based upon the Secchi-disk transparency values reported in the CLMN data base, the average WTSI value during the period between 1990 and 2010 was about 40, or essentially the same as that estimated during the aforementioned ERSC satellite remote sensing study, during which Powers Lake was estimated to have a TSI value of 46. A value above 50 is generally indicative of the enriched conditions associated with eutrophic lakes. Based upon both the remote sensing and volunteer monitoring data, Powers Lake can be classified as a mesotrophic waterbody, which status is consistent with the objectives established for the Lake in the regional water quality management plan.[31]

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[27]*H. Olem and G. Flock, U.S. Environmental Protection Agency Report EPA-440/4-90-006,* The Lake and Reservoir Restoration Guidance Manual, Second Edition*, Walworth, D.C., August 1990.*

[28]*R.E. Carlson, "A Trophic State Index for Lakes,"* Limnology and Oceanography*, Vol. 22, No. 2, 1977.*

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

[30]*SEWRPC Memorandum Report No. 93,* op. cit.

[31]*Ibid.*

AQUATIC PLANTS: DISTRIBUTION AND MANAGEMENT AREAS

An aquatic plant survey was conducted by SEWRPC staff during 1990 as part of the formulation of the comprehensive lake management plan for Powers Lake.[32] Prior to that survey, the aquatic plant community in Powers Lake has been documented by the WDNR in 1967 and by a private firm in 1986. Based upon these data, it was recommended in the comprehensive lake management plan for Powers Lake that aquatic plant surveys be conducted at least every five years. Consequently, the DoPL contracted for the conduct of such surveys with Aron & Associates during 1993, 1999, and 2006. SEWRPC staff conducted a further aquatic plant survey on Powers Lake during July of 2009. All of these surveys conducted on Powers Lake prior to 2009 were conducted using the modified Jesson and Lound aquatic plant survey methodology,[33] adopted during 1994 by the WDNR for use throughout the State,[34] through 2010, at which time the State reverted to a grid-based methodology.[35] Both aquatic plant survey techniques were employed on Powers Lake, and a comparison of the two methods is included below. For consistency with previous work, however, the discussion that follows is based upon the transect methodology.

Aquatic Plant Diversity in Powers Lake

During the 2009 transect survey, SEWRPC staff observed 22 different aquatic plant species in Powers Lake, evidence of the diversity of the aquatic plant communities in the Lake at that time, as shown in Table 5 and on Map 7. The dominant species was muskgrass (*Chara* spp.), although bladderwort (*Utriculara vulgaris*) and coontail (*Ceratophyllum demersum*) were also present in good numbers. Other species present in fair numbers included Sago pondweed (*Potamogeton pectinatus*), eel-grass/wild celery (*Vallisneria americana*), bushy pondweed (*Najas flexilis*), flat-stem pondweed (*Potamogeton zosteriformis*), clasping-leaf pondweed (*Potamogeton richardsonii*), Illinois pondweed (*Potamogeton illinoensis*), Eurasian water milfoil (*Myriophyllum spicatum*), and white water lily (*Nymphaea odorata*). Species that were present, but in very low numbers, included waterweed (*Elodea canadensis*), floating-leaf pondweed (*Potamogeton natans*), small pondweed (*Potamogeton pusillus*), water stargrass (*Zosterella dubia*), variable pondweed (*Potamogeton gramineus*), yellow water lily (*Nuphar advena*), water smartweed (*Polygonum amphibium*), curly-leaf pondweed (*Potamogeton crispus*), stonewort (*Nitella* spp.), and white water crowfoot (*Ranunculus longistirostris*).

The WDNR reverted to a grid-based sampling methodology in 2010.[36] For this reason, SEWRPC staff also conducted a grid-based survey of the aquatic plant flora of Powers Lake. The grid-based survey was conducted immediately following the completion of the transect-based survey during August of 2009 in order to minimize the effect of seasonality on the results. The results of this survey are shown in Table 6 and on Map 8. SEWRPC staff observed 20 different aquatic plant species in Powers Lake, evidence of the diversity of the aquatic plant communities in the Lake at that time, as shown in Table 6 and on Map 8. The dominant species was muskgrass

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[32] *SEWRPC Community Assistance Planning Report No. 196*, op. cit.

[33] *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.*

[34] *Memo from Stan Nichols, to J. Bode, J. Leverence, S. Borman, S. Engel, D., Helsel, entitled "Analysis of Macrophyte Data for Ambient Lakes-Dutch Hollow and Redstone Lakes example," Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension, February 4, 1994.*

[35] *Wisconsin Department of Natural Resources, Publication No. PUB-SS-1068 2010,* Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: Sampling Design, Field and Laboratory Procedures, Data Entry and Analysis, and Applications, *2010.*

[36] *Wisconsin Department of Natural Resources, Publication No. PUB-SS-1068 2010,* op. cit.

Table 5

AQUATIC PLANT SPECIES OBSERVED IN POWERS LAKE UTILIZING THE MODIFIED JESSON AND LOUND TRANSECT-BASED SAMPLING METHODOLOGY: JULY 2009

Aquatic Plant Species	Number of Sites Found	Frequency of Occurrence[a]	Relative Frequency of Occurrence[b]	Relative Density[c]	Importance Value[d]
Ceratophyllum demersum (coontail)	43	39.1	9.8	2.2	84.6
Chara spp. (muskgrass)	97	88.2	22.0	3.6	319.1
Elodea canadensis (waterweed)	4	3.6	0.9	3.3	11.8
Myriophyllum spicatum (Eurasian water milfoil)	16	14.6	3.6	1.6	22.7
Najas flexilis (bushy pondweed)	26	23.6	5.9	2.2	51.8
Najas marina (spiny naiad)	25	22.7	5.6	1.9	42.7
Nitella spp. (stonewort)	1	0.9	0.2	1.0	0.9
Nuphar advena (yellow water lily)	2	1.8	0.4	1.5	2.7
Nymphaea odorata (white water lily)	9	8.2	2.0	2.4	20.0
Polygonum amphibium (water smartweed)	1	0.9	0.2	3.0	2.7
Potamogeton crispus (curly-leaf pondweed)	3	2.7	0.6	1.0	2.7
Potamogeton gramineus (variable pondweed)	4	3.6	0.9	1.3	4.6
Potamogeton illinoensis (Illinois pondweed)	23	20.9	5.2	1.4	30.0
Potamogeton natans (floating-leaf pondweed)	3	2.7	0.6	3.3	9.1
Potamogeton pectinatus (Sago pondweed)	43	39.1	9.7	1.7	66.4
Potamogeton pusillus (small pondweed)	5	4.6	1.1	1.2	5.5
Potamogeton richardsonii (clasping-leaf pondweed)	19	17.3	4.3	2.4	41.8
Potamogeton zosteriformis (flat-stem pondweed)	25	22.7	5.6	2.0	44.6
Ranunculus longirostris (white water crowfoot)	1	0.9	0.2	1.0	0.9
Utricularia vulgaris (bladderwort)	60	54.6	13.6	2.0	110.9
Vallisneria americana (eel-grass/wild celery)	31	28.2	7.0	2.0	56.4
Zosterella dubia (water stargrass)	3	2.7	0.6	1.7	4.6

NOTE: Sampling occurred at 110 sampling sites along 31 transects.

[a]*The percent frequency of occurrence is the number of occurrences of a species divided by the number of samplings with vegetation, expressed as a percentage. It is the percentage of times a particular species occurred when there was aquatic vegetation present, and is analogous to the Jesson and Lound point system.*

[b]*The relative frequency of occurrence is the number of occurrences of a species divided by the number of sites where the plants were found (i.e., 440 sites), expressed as a percentage. It is the percentage of times a particular species occurred when there was aquatic vegetation present.*

[c]*The average density is the sum of density ratings for a species divided by the number of sampling points with vegetation. The maximum density possible of 4.0 is assigned to plants that occur at all four points sampled at a given depth and is an indication of how abundant a particular plant is throughout a lake.*

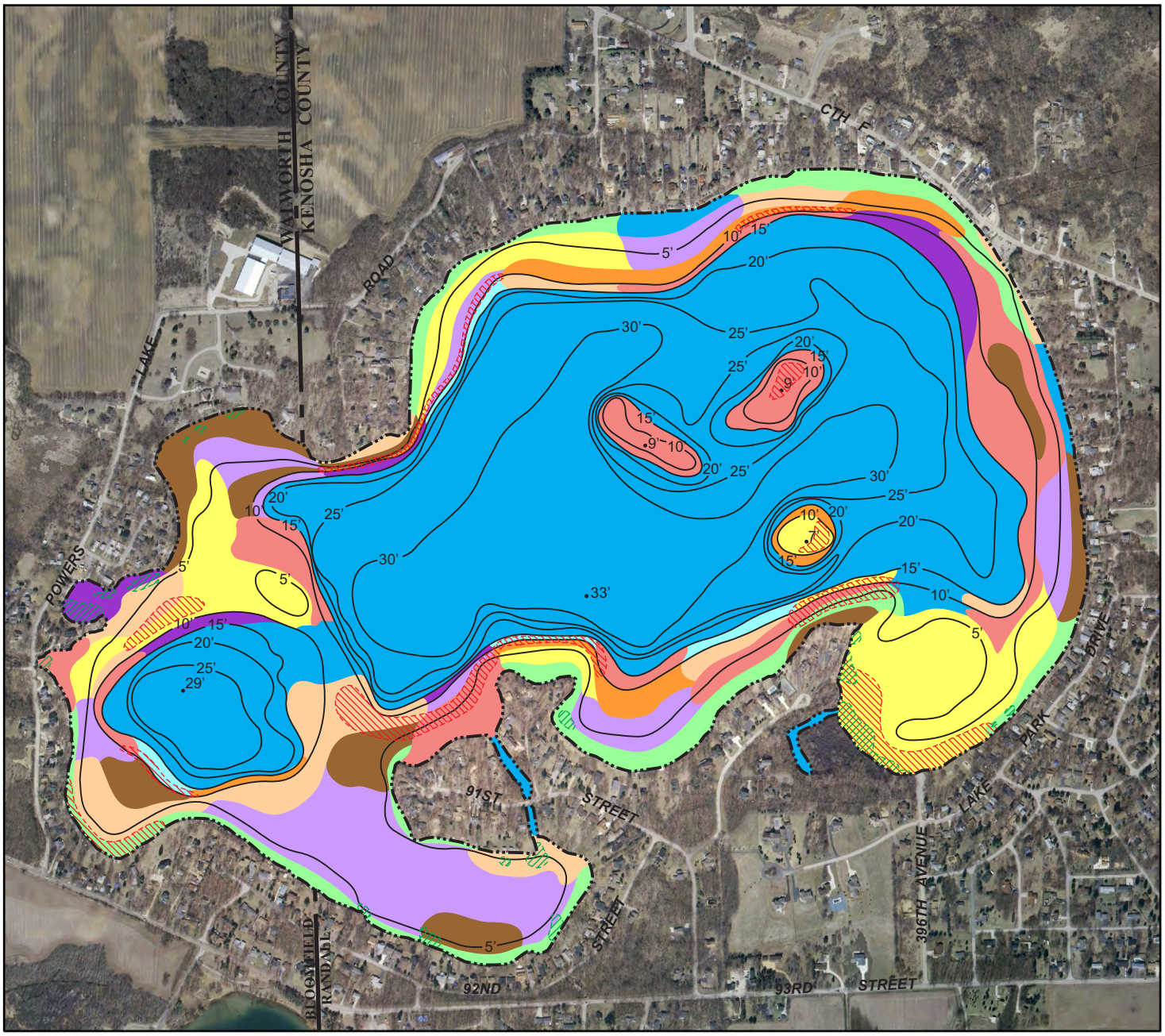
[d]*The importance value is the product of the relative frequency of occurrence and the average density, expressed as a percentage. This number provides an indication of the dominance of a species within a community.*

Source: SEWRPC.

(*Chara* spp.), although bladderwort (*Utriculara vulgaris*) and eel-grass/wild celery (*Vallisneria americana*) were also present in good numbers. Other species present in fair numbers included Sago pondweed (*Potamogeton pectinatus*), Illinois pondweed (*Potamogeton illinoensis*), and coontail (*Ceratophyllum demersum*). Species that were present, but in very low numbers, included waterweed (*Elodea canadensis*), floating-leaf pondweed (*Potamogeton natans*), small pondweed (*Potamogeton pusillus*), bushy pondweed (*Najas flexilis*), flat-stem pondweed (*Potamogeton zosteriformis*), clasping-leaf pondweed (*Potamogeton richardsonii*), Eurasian water milfoil (*Myriophyllum spicatum*), water stargrass (*Zosterella dubia*), variable pondweed (*Potamogeton gramineus*), yellow water lily (*Nuphar advena*), white water lily (*Nymphaea odorata*), water smartweed (*Polygonum amphibium*), and white water crowfoot (*Ranunculus longistirostris*).

Map 7

AQUATIC PLANT COMMUNITY DISTRIBUTION IN POWERS LAKE UTILIZING THE MODIFIED JESSON AND LOUND TRANSECT-BASED SAMPLING METHODOLOGY: 2009



DATE OF PHOTOGRAPHY: APRIL 2005

- 20' — WATER DEPTH CONTOUR IN FEET
- OPEN WATER
- WATER LILIES
- EURASIAN WATER MILFOIL
- MUSKGRASS
- MUSKGRASS AND BLADDERWORT
- COONTAIL, SAGO PONDWEED, AND SMALL PONDWEED
- MUSKGRASS, COONTAIL, SAGO PONDWEED, AND SPINY NAIAD
- COONTAIL, BLADDERWORT, SAGO PONDWEED, WILD CELERY, AND CLASPING LEAF PONDWEED
- MUSKGRASS, COONTAIL, SAGO PONDWEED, WILD CELERY, BUSHY PONDWEED, FLAT STEM PONDWEED, AND ILLINOIS PONDWEED
- MUSKGRASS, BLADDERWORT, WILD CELERY, FLAT STEM PONDWEED, CLASPING LEAF PONDWEED, AND ILLINOIS PONDWEED
- MUSKGRASS, BLADDERWORT, SAGO PONDWEED, WILD CELERY, BUSHY PONDWEED, SPINY NAIAD, AND ILLINOIS PONDWEED
- MUSKGRASS, BLADDERWORT, COONTAIL, SAGO PONDWEED, WILD CELERY, BUSHY PONDWEED, FLAT STEM PONDWEED, SPINY NAIAD, CLASPING LEAF PONDWEED, WATERWEED, AND FLOATING LEAF PONDWEED

GRAPHIC SCALE
0 500 1000 FEET

Source: SEWRPC.

Table 6

AQUATIC PLANT SPECIES OBSERVED IN POWERS LAKE UTILIZING THE GRID-BASED SAMPLING METHODOLOGY: JULY 2009

Aquatic Plant Species	Number of Sites Found	Frequency of Occurrence[a]	Relative Frequency of Occurrence[b]
Ceratophyllum demersum (coontail)	29	8.7	4.4
Chara spp. (muskgrass)	306	92.4	46.9
Elodea canadensis (waterweed)	3	0.9	0.5
Myriophyllum spicatum (Eurasian water milfoil)	13	3.9	2.0
Najas flexilis (bushy pondweed)	15	4.5	2.3
Najas marina (spiny naiad)	20	6.0	3.1
Nitella spp. (stonewort)	- -	- -	- -
Nuphar advena (yellow water lily)	- -	- -	- -
Nymphaea odorata (white water lily)	- -	- -	- -
Polygonum amphibium (water smartweed)	4	1.2	0.6
Potamogeton crispus (curly-leaf pondweed)	- -	- -	- -
Potamogeton gramineus (variable pondweed)	4	1.2	0.6
Potamogeton illinoensis (Illinois pondweed)	34	10.3	5.3
Potamogeton natans (floating-leaf pondweed)	1	0.3	0.1
Potamogeton pectinatus (Sago pondweed)	36	10.9	5.6
Potamogeton pusillus (small pondweed)	9	2.7	1.3
Potamogeton richardsonii (clasping-leaf pondweed)	12	3.6	1.9
Potamogeton zosteriformis (flat-stem pondweed)	17	5.1	2.6
Ranunculus longirostris (white water crowfoot)	1	0.3	0.1
Utricularia vulgaris (bladderwort)	105	31.7	16.1
Vallisneria americana (eel-grass/wild celery)	39	11.8	5.9
Zosterella dubia (water stargrass)	5	1.5	0.7

NOTE: Sampling occurred at 331 sampling points within a 758 point grid.

[a]*The percent frequency of occurrence is the number of occurrences of a species divided by the number of sampling points with vegetation (i.e., 653 points), expressed as a percentage which adds to 100 percent.*

[b]*The relative frequency of occurrence is the number of occurrences of a species divided by the number of sampling points (i.e., 331 points), expressed as a percentage. It is the percentage of times a particular species occurred when there was aquatic vegetation present.*

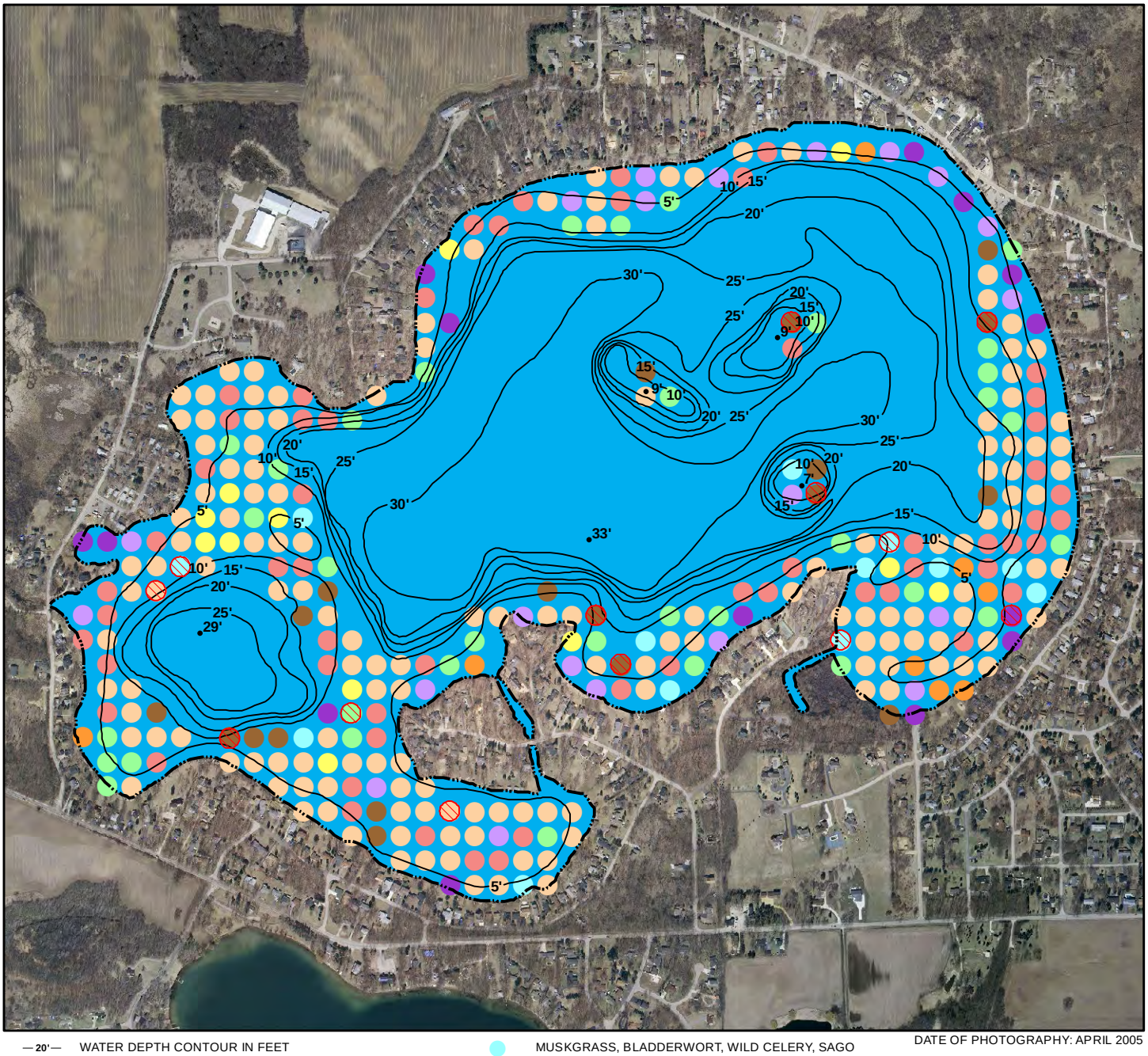
Source: SEWRPC.

A complete species list of aquatic plant species, compiled from the results of the 2009 SEWRPC aquatic plant survey in Powers Lake, along with comments on the ecological significance of each plant on the list, is set forth in Table 7. Representative illustrations of these aquatic plants can be found in Appendix A. Overall, Powers Lake contained a good diversity of aquatic species; the presence of a diverse plant community, especially pondweeds, is generally considered to be indicative of a healthy lake and good habitat for fishes and aquatic life.

A key aspect of the ability of an ecosystem, such as a lake, to maintain its ecological integrity is through "biological diversity." Conserving the biological diversity, or biodiversity, of an ecosystem helps not only to sustain the system, but preserves a spectrum of options for future decisions regarding the management of that system. During 2009, the aquatic plant community in Powers Lake demonstrated good biodiversity relative to many other lakes in southeastern Wisconsin, with 20 submersed species of aquatic plants being observed. By way

Map 8

AQUATIC PLANT COMMUNITY DISTRIBUTION IN POWERS LAKE UTILIZING THE GRID-BASED SAMPLING METHODOLOGY: 2009



DATE OF PHOTOGRAPHY: APRIL 2005

— 20' — WATER DEPTH CONTOUR IN FEET

OPEN WATER

EURASIAN WATER MILFOIL

MUSKGRASS

MUSKGRASS AND BLADDERWORT

MUSKGRASS AND ILLINOIS PONDWEED

MUSKGRASS AND WILD CELERY

MUSKGRASS, BLADDERWORT, WILD CELERY, ILLINOIS PONDWEED, COONTAIL, AND BUSHY PONDWEED

MUSKGRASS, BLADDERWORT, COONTAIL, SAGO PONDWEED, AND CLASPING LEAF PONDWEED

MUSKGRASS, BLADDERWORT, WILD CELERY, SAGO PONDWEED, SPINY NAIAD, FLAT STEM PONDWEED, CLASPING LEAF PONDWEED, FLOATING LEAF, AND WATER STAR GRASS

MUSKGRASS, WILD CELERY, COONTAIL, FLAT STEM PONDWEED, BUSHY PONDWEED, SAGO PONDWEED, CLASPING LEAF PONDWEED, AND VARIABLE PONDWEED

MUSKGRASS, BLADDERWORT, ILLINOIS PONDWEED, SAGO PONDWEED, SPINY NAIAD, AND SMALL PONDWEED

N

0 500 1,000 1,500 Feet

Source: SEWRPC.

Table 7

POSITIVE ECOLOGICAL SIGNIFICANCE OF AQUATIC PLANT SPECIES PRESENT IN POWERS LAKE: 2009

Aquatic Plant Species Present	Ecological Significance
Ceratophyllum demersum (coontail)	Provides good shelter for young fish; supports insects valuable as food for fish and ducklings; native
Chara spp. (muskgrass)	A favorite waterfowl food and fish habitat, especially for young fish; native
Elodea canadensis (waterweed)	Provides shelter and support for insects which are valuable as fish food; native
Myriophyllum spicatum (Eurasian water milfoil)	None known; nonnative
Najas flexilis (bushy pondweed)	Important food source for waterfowl, marsh birds, and muskrats; provides food and shelter for fish; native
Najas marina (spiny naiad)	Important food source for waterfowl, marsh birds, and muskrats; provides food and shelter for fish; native
Nitella spp. (stonewort)	Sometimes grazed by waterfowl; forage for fish; native
Nuphar advena (yellow water lily)	Seeds provide food for waterfowl; leaves, stems, and flowers are food for deer; rhizomes are food source for muskrats and beaver; leaves provide shelter and shade for fish and habitat for invertebrates; native
Nymphaea odorata (white water lily)	Seeds provide food for waterfowl; leaves, stems, and flowers are food for deer; rhizomes are food source for muskrats and beaver; leaves provide shelter and shade for fish and habitat for invertebrates; native
Polygonum amphibium (water smartweed)	Seed are food for waterfowl, muskrats, birds, and deer; leaves provide shelter for young fish; native
Potamogeton crispus (curly-leaf pondweed)	Nonnative
Potamogeton gramineus (variable pondweed)	The fruit is an important food source for waterfowl; the stem and leaves supply food for muskrat, beaver, deer, and moose and provide forage and cover for fish; native
Potamogeton illinoensis (Illinois pondweed)	Provides shade and shelter for fish; harbor for insects; seeds are eaten by wildfowl; native
Potamogeton natans (floating-leaf pondweed)	Provides food for waterfowl, muskrat, beaver, and deer; good fish habitat; native
Potamogeton pectinatus (Sago pondweed)	This plant is the most important pondweed for ducks, in addition to providing food and shelter for young fish; native
Potamogeton pusillus (small pondweed)	Provides food for ducks, geese, muskrat, beaver, and deer, and provides food and shelter for fish; native
Potamogeton richardsonii (clasping-leaf pondweed)	The fruit is an important food source for waterfowl; the stem and leaves supply food for muskrat, beaver, deer, and moose and provide forage and cover for fish; native
Potamogeton zosteriformis (flat-stem pondweed)	Provides some food for ducks; native
Ranunculus longirostris (white water crowfoot)	Fruit and foliage good food sources for waterfowl; native
Utricularia vulgaris (bladderwort)	Stems provide food and cover for fish; native
Vallisneria americana (eel-grass/wild celery)	Provides good shade and shelter, supports insects, and is valuable fish food; native
Zosterella dubia (water stargrass)	Locally important food source for waterfowl and forage for fish; native

NOTE: Information obtained from *A Manual of Aquatic Plants* by Norman C. Fassett, University of Wisconsin Press; *Guide to Wisconsin Aquatic Plants*, Wisconsin Department of Natural Resources; and, *Through the Looking Glass...A Field Guide to Aquatic Plants*, Wisconsin Lakes Partnership, University of Wisconsin-Extension.

Source: SEWRPC.

of comparison, nearby Pell Lake has been reported to have 13 species of submersed aquatic plants;[37] Lake Mary has been reported to have 15 species;[38] Elizabeth Lake, 18 species;[39] Geneva Lake, 20 species;[40] and, Voltz Lake, 10 species.[41]

Aquatic plants in lakes and waterways have specific requirements for sunlight and substrate, and, consequently, plant communities vary with depth, water quality, and other "drivers" that affect the ability of the plants to succeed in a specific locality. For these reasons, some areas of a lake may contain plant communities with very little diversity, e.g., communities with five or fewer species, while other areas can be extremely diverse. In Powers Lake, the areas with poor diversity were found mostly in the mid-depth areas of the Lake. Most nearshore areas of the Lake contained plant communities of moderate diversity, with between five and 11 species being present. Such moderately diverse communities were found uniformly scattered over the northern three-quarters of the lake basin, although these moderately diverse areas were interspersed with areas of lesser diversity. The majority of these less diverse areas, however, were populated by native aquatic plants. Few areas were dominated by aquatic invasive plants such as Eurasian water milfoil. These areas were typically located along the southern and western shores of the Lake, as shown on Maps 7 and 8.

Comparison of the Transect- and Grid-Based Methodologies

That the two methodologies provide varying levels of information about the aquatic plant community can be seen by comparing Tables 5 and 6. The transect methodology provides an objective means of determining relative density and importance value of the various aquatic plant species observed, as documented in Table 5. The grid-based methodology provides only presence or absence data in an objective manner. The recommended sampling methodology does include provision for a subjective assessment of relative density by including a visually determined estimate of abundance. Because of the subjective nature of this assessment, various observers are more likely to assign differing scores for density, whereas, in terms of the transect-based methodology, the four samples taken at each transect point allow an objective assessment to be made. The WDNR, themselves, note that "the presence/absence data cannot be used to estimate biomass or percent cover, [and] it is less sensitive to interannual or seasonal variations in plant abundance."[42] The WDNR also note that "the method is relatively rapid and cost-effective and can be used on the large scale to collect baseline data and statistically compare communities over time."[43]

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[37]*SEWRPC Memorandum Report No. 158,* A Lake Protection and Recreational Use Plan for Pell Lake, Walworth County, Wisconsin, *May 2006.*

[38]*SEWRPC Community Assistance Planning Report No. 302,* A Lake Management Plan For Elizabeth Lake And Lake Mary, Kenosha County, Wisconsin, *Volume One,* Inventory Findings, *July 2009.*

[39]Ibid.

[40]*SEWRPC Community Assistance Planning Report No. 60, 2nd Edition,* A Lake Management Plan for Geneva Lake, Walworth County, Wisconsin, *May 2008.*

[41]*SEWRPC Memorandum Report No. 159,* An Aquatic Plant Management Plan for Voltz Lake, Kenosha County, Wisconsin, *January 2005.*

[42]*See also J.D. Madsen, "Point Intercept and Line Intercept Methods for Aquatic Plant Management," U.S. Army Corps of Engineers Waterways Experiment Station Aquatic Plant Control Technical Note No. MI-02, 1999; and, L. Dodd-Williams, G.O. Dick, R.M. Smart, and C.S. Owens, "Point Intercept and Surface Observation GPS (SOG): A Comparison of Survey Methods – Lake Gaston, NC/VA," U.S. Army Corps of Engineers Research and Development Center Report No. ERDC/TN APCRP-EA-19, 2008.*

[43]*Wisconsin Department of Natural Resources, Publication No. PUB-SS-1068 2010,* op. cit.

Table 8

COMPARISON OF AQUATIC PLANT SPECIES OBSERVED IN POWERS LAKE UTILIZING THE MODIFIED JESSON AND LOUND TRANSECT-BASED SAMPLING METHODOLOGY AND THE GRID-BASED SAMPLING METHODOLOGY: JULY 2009

Aquatic Plant Species	Transect Method		Grid Method	
	Number of Sites Found	Relative Frequency of Occurrence[a]	Number of Sites Found	Relative Frequency of Occurrence[a]
Ceratophyllum demersum (coontail)	43	9.8	29	4.4
Chara spp. (muskgrass)	97	22.0	306	46.9
Elodea canadensis (waterweed)	4	0.9	3	0.5
Myriophyllum spicatum (Eurasian water milfoil)	16	3.6	13	2.0
Najas flexilis (bushy pondweed)	26	5.9	15	2.3
Najas marina (spiny naiad)	25	5.6	20	3.1
Nitella spp. (stonewort)	1	0.2	- -	- -
Nuphar advena (yellow water lily)	2	0.4	- -	- -
Nymphaea odorata (white water lily)	9	2.0	- -	- -
Polygonum amphibium (water smartweed)	1	0.2	4	0.6
Potamogeton crispus (curly-leaf pondweed)	3	0.6	- -	- -
Potamogeton gramineus (variable pondweed)	4	0.9	4	0.6
Potamogeton illinoensis (Illinois pondweed)	23	5.2	34	5.3
Potamogeton natans (floating-leaf pondweed)	3	0.6	1	0.1
Potamogeton pectinatus (Sago pondweed)	43	9.7	36	5.6
Potamogeton pusillus (small pondweed)	5	1.1	9	1.3
Potamogeton richardsonii (clasping-leaf pondweed)	19	4.3	12	1.9
Potamogeton zosteriformis (flat-stem pondweed)	25	5.6	17	2.6
Ranunculus longirostris (white water crowfoot)	1	0.2	1	0.1
Utricularia vulgaris (bladderwort)	60	13.6	105	16.1
Vallisneria americana (eel-grass/wild celery)	31	7.0	39	5.9
Zosterella dubia (water stargrass)	3	0.6	5	0.7

[a]*The relative frequency of occurrence is the number of occurrences of a species divided by the number of transect sites where the plants were found (i.e., 440 sites), or the number of points where plants were found (i.e., 331 points) expressed as a percentage. It is the percentage of times a particular species occurred when there was aquatic vegetation present.*

Source: SEWRPC.

Nevertheless, comparison of the aquatic plant data acquired using the two sampling methodologies, summarized in Table 8, suggests that both the grid-based and transect-based methodologies provide essentially the same information with regard to the numbers and types of aquatic plant species observed in Powers Lake. Both aquatic plant sampling methods resulted in muskgrass (*Chara* spp.) being identified as the dominant aquatic plant species in the Lake, with bladderwort (*Utriculara vulgaris*) being the next most frequently encountered species. The two methodologies, however, differed in terms of the third most frequently encountered species, with the transect methodology indicating that coontail (*Ceratophyllum demersum*) was the third most frequently encountered species and the grid-based method indicated that eel grass or water celery (*Vallisneria americana*). Both aquatic plants are considered to be of high value for fishes and other aquatic organisms, as shown in Table 7, so these differences are not considered to be significant for purposes of aquatic plant management in Powers Lake.

Two aquatic plant species with a lesser frequency of occurrence—stonewort and curly-leaf pondweed—were not observed during the grid-based survey. While the proximity of the two sampling periods would be expected to minimize the possibility of species changes associated with season, it is possible that the apparent loss of curly-leaf pondweed from Powers Lake could be associated with the fact that this plant tends to be an early season representative of the pondweed family, typically dying back as the summer progresses. That this seasonality may

explain the difference in records is supported to an extent by the ongoing presence of other pondweed species—such as Illinois pondweed, flat-stem pondweed, and clasping-leaf pondweed—as important but minor parts of the aquatic plant flora of the Lake. Again, these differences are not considered to be significant for purposes of aquatic plant management in Powers Lake.

In like manner, comparison of Maps 7 and 8 reflect relatively minor differences in the distributions of the aquatic plant species sampled. The grid-based methodology identified an additional stand of Eurasian water milfoil along the southern side of the main lake basin, in an area which the transect-based methodology suggested was slightly outside of the estimated extent of the Eurasian water milfoil beds identified with that methodology. With these few exceptions, both survey methodologies suggested a similar pattern of aquatic plant distribution in Powers Lake.

From the point of view of aquatic plant management, the agreement with respect to the dominant aquatic plant species and their relative areas of distribution indicated by both methodologies is important; the objective of aquatic plant management practices is to address recreational and other use impairments that arise as a result of certain aquatic plants being dominant in a lake ecosystem at the expense of other aquatic plants, especially when the plants that dominate the aquatic flora are nonnative species such as Eurasian water milfoil and the disadvantaged aquatic plants are native species. Aquatic plant management measures are generally employed to restore the balance between desirable native aquatic plant species and other species as a basis to support and sustain a range of lake uses that include swimming, fishing, and recreational boating, among others.

Aquatic Plant Species of Special Significance

Native Aquatic Plants

There was one native plant species with high ecological value observed in Powers Lake during the 2009 survey; that is, the macro-alga, muskgrass (*Chara vulgaris*). Although this plant lacks a root system, muskgrass is an effective bottom sediment stabilizer, benefiting water quality, and is a favored waterfowl food source. It is prevalent in the plant communities of many lakes in the Region, and frequently is seen as an indicator of good water quality in a lake.[44] Muskgrass also is implicated in maintaining water quality conditions that assist native aquatic plant species to successfully outcompete nonnative aquatic plant species.

In addition to muskgrass, various species of pondweeds have been recorded from Powers Lake. These species of aquatic plants are known to be highly seasonal, with some species preferring the cooler water temperatures and lower light regimes that characterize either spring or autumn. Typically, these species do not occur in the warmer waters of summer, with its incrementally higher intensity of ambient light. This results in a steady progression of pondweed species from early spring through late autumn. Of the pondweeds that occur in the Region, white-stem pondweed (*Potamogeton praelongus*), because of its sensitivity to changes in water quality and intolerance of turbidity, is considered an excellent water quality indicator species. It has been observed in Powers Lake during the previous aquatic plant surveys, from 1967 through 1999; however, it was not observed during either the 2006 or 2009 surveys. This absence may be an indication of a possible decline in overall water quality in Powers Lake, but also and more probably, given the evidence of the water quality data discussed above, reflect the seasonality of the plant, which prefers cooler water temperatures.[45]

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[44]*In general, hardwater lakes are dominated by aquatic plants, such as elodea and chara. Hardwater lakes are associated with watersheds rich in carbonate minerals, such as dolomite, and typically have high alkalinity values. See Peter K. Hepler, "Calcium: A Central Regulator of Plant Growth and Development,"* The Plant Cell, *Volume 17, August 2005, pages 2142-2155.*

[45]*Washington State, Department of Printing, Publication 01-10-032,* An Aquatic Plant Identification Manual for Washington's Freshwater Plants, *2001.*

Nonnative Species

During the 2009 aquatic plant survey of Powers Lake, two nonnative aquatic plant species of special significance were observed: Eurasian water milfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*). Both are considered detrimental to the ecological health of the Lake and are declared nuisance species identified in Chapters NR 40 and NR 109 of the *Wisconsin Administrative Code*.

Eurasian Water Milfoil

Eurasian water milfoil is one of eight milfoil species found in Wisconsin and the only one known to be exotic or nonnative. Because of its nonnative nature, Eurasian water milfoil has few natural enemies that can inhibit its growth, which can be explosive under suitable conditions. The plant exhibits this characteristic growth pattern in lakes with organic-rich sediments, or where the lake bottom has been disturbed; e.g., it frequently has been reported as a colonizing species following dredging. Unless its growth is anticipated and controlled, Eurasian water milfoil populations can displace native plant species and interfere with the aesthetic and recreational use of the waterbodies. This plant has been known to cause severe recreational use problems in lakes within the Southeastern Wisconsin Region.

Eurasian water milfoil reproduces by the rooting of plant fragments. Consequently, some recreational uses of lakes can result in the expansion of Eurasian water milfoil communities. For example, when boat propellers fragment Eurasian water milfoil plants, these fragments, as well as fragments that occur for other reasons, such as wind-induced turbulence or fragmentation of the plant by fishes, are able to generate new root systems, allowing the plant to colonize new sites. The fragments also can cling to boats, trailers, motors, and/or bait buckets, and can stay alive for weeks contributing to the transfer of milfoil to other lakes. For this reason, it is very important to remove all vegetation from boats, trailers, and other equipment after removing them from the water and prior to launching in other waterbodies.

Curly-Leaf Pondweed

Curly-leaf pondweed is a plant that thrives in cool water and exhibits a peculiar split-season growth cycle that helps give it a competitive advantage over native plants and makes management of this species difficult. In late summer, the plant produces specialized over-wintering structures, or “turions.” In late summer, the main body of the plant dies off and drops to the bottom where the turions lie dormant until the cooler fall water temperatures trigger the turions to germinate. Over the winter, the turions produce winter foliage that thrives under the ice. In spring, when water temperatures begin to rise again, the plant has a head start on the growth of native plants and quickly grows to full size, producing flowers and fruit earlier than its native competitors. Because it can grow in more turbid waters than many native plants, protecting or improving water quality is an effective method of control of this species; clearer waters in a Lake can help native plants compete more effectively with curly-leaf pondweed.

Past and Present Aquatic Plant Management Practices in Powers Lake

Aquatic plant communities do undergo cyclical and periodic changes which reflect, in part, changing climatic conditions on an interannual scale and, in part, the evolution of the aquatic plant community in response to long-term changes in a lake’s “hydroclimate.” These latter changes include factors such as long-term trends in nutrient loading, sedimentation rates, and recreational use patterns. The former, interannual changes may occur over a period of three to seven years, and may be temporary; the latter, evolutionary changes may occur over a decadal period or longer and are longer-lasting. Some species, such as the pondweeds noted above, exhibit distinct seasonality, with individual species having well-defined growing periods that reflect water temperature, insolation, and other factors. In addition, the changes in aquatic plant populations in a lake may reflect the results of aquatic management practices and/or may reflect a natural periodicity experienced by a species. Such periodicity, especially in Eurasian water milfoil populations, has been observed elsewhere in southeastern Wisconsin, and potentially reflects the influences of a combination of stressors. These stressors include biological factors, such as the activities of naturally occurring Eurasian water milfoil weevils, as well as climatic and limnological factors, such as insolation, water temperature, and lake circulation patterns.

Table 9

AQUATIC PLANT SPECIES OBSERVED IN POWERS LAKE: 1967-2009

Aquatic Plant Species	1967	1986	1990	1993	1999	2006	2009
Ceratophyllum demersum (coontail)	X	- -	- -	X	X	X	X
Chara spp. (muskgrass)	X	X	X	X	X	X	X
Elodea canadensis (waterweed)	- -	- -	X	X	X	X	X
Myriophuyllum exalbescens (northern water milfoil)	- -	X	- -	X	- -	- -	- -
Myriophyllum spicatum (Eurasian water milfoil)	- -	X	- -	X	X	X	X
Najas flexilis (bushy pondweed)	- -	X	- -	X	X	X	X
Najas marina (spiny naiad)	- -	X	- -	X	- -	X	X
Nitella spp. (stonewort)	- -	- -	- -	- -	- -	- -	X
Nuphar advena (yellow water lily)	- -	- -	- -	- -	- -	- -	X
Nymphaea odorata (white water lily)	- -	X	X	X	X	X	X
Polygonum amphibium (water smartweed)	- -	- -	- -	- -	- -	- -	X
Potamogeton crispus (curly-leaf pondweed)	- -	X	X	X	X	X	X
Potamogeton friesii (Fries pondweed)	-	- -	- -	X	- -	X	- -
Potamogeton gramineus (variable pondweed)	- -	X	X	X	X	X	X
Potamogeton illinoensis (Illinois pondweed)	- -	- -	- -	X	- -	X	X
Potamogeton natans (floating-leaf pondweed)	X	X	X	X	X	X	X
Potamogeton pectinatus (Sago pondweed)	X	X	X	X	X	X	X
Potamogeton praelongus (white-stem pondweed)	X	X	X	X	X	- -	- -
Potamogeton pusillus (small pondweed)	- -	- -	- -	X	- -	- -	X
Potamogeton richardsonii (clasping-leaf pondweed)	- -	- -	- -	X	X	X	X
Potamogeton zosteriformis (flat-stem pondweed)	- -	- -	- -	X	X	X	X
Ranunculus longirostris (white water crowfoot)	- -	- -	- -	X	X	- -	X
Utricularia vulgaris (bladderwort)	- -	X	X	X	X	X	X
Vallisneria americana (eel-grass/wild celery)	X	X	X	- -	X	X	X
Zosterella dubia (water stargrass)	- -	- -	- -	- -	X	X	X

NOTE: The 1967 survey was conducted by the Wisconsin Department of Natural Resources; the 1986 survey by was conducted by Applied Research and Technology; the 1990 and 2009 surveys were conducted by SEWRPC; and, the 1993, 1999, and 2006 surveys were conducted by Aron & Associates. The surveys since 1990 have been conducted using the modified Jesson and Lound transect methodology.

Source: SEWRPC.

Table 9 compares aquatic plant species observed during various surveys from 1967 through 2009. It is immediately obvious from an inspection of this table that the current aquatic plant community in Powers Lake is much more diverse than that reported in earlier decades. It also appears that the aquatic plant community has remained relatively stable through the first decade of the 21st Century. The seasonality of the pondweeds (*Potamogeton* spp.) can be inferred from their presence or absence during various surveys; the key conclusion to be drawn from the pondweed data is that these plants comprise a significant component of the aquatic plant flora of the Lake, indicating good water quality at least during the past 15-year period, since 1993.

An aquatic plant management program has been carried out on Powers Lake in a documented manner since 1973. Records of aquatic plant management efforts on Wisconsin lakes were first maintained by the WDNR beginning in 1950. Prior to 1950, aquatic plant management interventions are likely, but were not recorded. Currently, all forms of aquatic plant management are subject to permitting by the WDNR pursuant to authorities granted the Department under Chapters NR 107 and NR 109 of the *Wisconsin Administrative Code*.

Since 1973, the aquatic plant management activities in Powers Lake could be characterized as primarily a chemical control program designed to minimize nuisance growths of aquatic macrophytes. A cumulative summary of chemical applications for Powers Lake is shown in Table 10. Unlike many waterbodies in southeastern Wisconsin, there are no records of the use of sodium arsenite as an aquatic herbicide on Powers

Table 10

CHEMICAL CONTROLS ON POWERS LAKE: 1973-2008

Year	Total Acres Treated	Algae Control			Macrophyte Control					
		Copper Sulfate (gallons)	Copper (gallons)	Cutrine or Cutrine Plus (gallons)	Sodium Arsenite (pounds)	2,4-D (gallons)	2,4-D (pounds)	Diquat (gallons)	Glyphosate (gallons)	Endothall/ Aquathol (gallons)
1973	1.00	- -	- -	- -	- -	- -	- -	- -	- -	6.0
1981	3.80	- -	- -	4.0	- -	12.0	- -	- -	- -	2.0
2000	2.50	- -	- -	- -	- -	6.2	- -	- -	- -	- -
2001	N/A	- -	- -	- -	- -	4.4	- -	- -	- -	- -
2002	7.80	2.0	- -	- -	- -	1.8	450	2.0	- -	2.0
2003	0.20	- -	- -	- -	- -	0.4	- -	- -	- -	0.1
2004	14.50	1.0	- -	- -	- -	3.8	1,515	- -	- -	- -
2005	9.85	- -	0.50	- -	- -	- -	1,030	0.5	- -	0.5 + 3 lbs.
2006	6.10	- -	0.70	- -	- -	- -	560	0.7	- -	0.7
2007	20.74	- -	- -	- -	- -	0.5	1,950	- -	- -	- -
2008	19.75	- -	- -	- -	- -	- -	2,190	- -	- -	- -
Total	- -	3.0	1.12	4.0	- -	29.1	7,695	3.2	- -	11.3 + 3 lbs.

Source: Wisconsin Department of Natural Resources and SEWRPC.

Lake,[46] and, prior to 2000, aquatic plant management on Powers Lake had been limited to a few spot applications of copper-based algicides and the herbicides 2,4-D, which is generally used to control Eurasian water milfoil populations, and endothall, which is generally used to control curly-leaf pondweed populations. Since 2000, annual chemical treatments have been the primary method of aquatic plant management, focusing on both Eurasian water milfoil (2,4-D and diquat) and curly-leaf pondweed (endothall). Occasional treatments with copper-based algicides also have continued. These treatments have minimized nuisance growths of the designated nuisance species—Eurasian water milfoil and curly-leaf pondweed—to the benefit of an increasingly diverse aquatic plant flora in Powers Lake.

FISH AND WILDLIFE

Fish and Fisheries

The WDNR reports that walleye, northern pike, and panfish are considered to be "common," largemouth bass are "abundant," and smallmouth bass are considered to be "present" in Powers Lake.[47] Also present in Powers Lake are the lake chubsucker (*Erimyzon sucetta*), a State-designated special-concern species, and the pugnose shiner (*Notropis anogenus*), a State-designated threatened species. Stocking of Powers Lake with smallmouth bass occurred in 2000 and 2002; walleye were stocked in 2001, 2003, and 2005; and northern pike were stocked in 2004, as shown in Table 11.

[46]*Sodium arsenite was typically sprayed onto the surface of a lake, within an area of up to 200 feet from the shoreline, between mid-June and mid-July in a volume sufficient to result in a concentration of about 10 mg/l sodium arsenite (about 5.0 mg/l arsenic) in the treated lake water. The sodium arsenite typically remained in the water column for less than 120 days, during which period the arsenic residue was naturally converted from a highly toxic form to a less toxic, less biologically active form that subsequently was deposited in the lake sediments. By 1969, it became apparent that arsenic was accumulating in the sediments of treated lakes, so the use of sodium arsenite was discontinued in the State.*

[47]*Wisconsin Department of Natural Resources Publication No. PUB-FH-800 2005,* Wisconsin Lakes, *2005.*

Table 11

FISH STOCKED INTO POWERS LAKE

Year	Species Stocked	Number
2000	Smallmouth bass	900
2001	Walleye	1,000
2002	Smallmouth bass	600
2003	Walleye	800
2004	Northern pike	400
2005	Walleye	23,022

Source: Wisconsin Department of Natural Resources and SEWRPC.

Presently, Powers Lake is managed by the WDNR as a largemouth bass-northern pike-panfish lake; northern pike and walleye are stocked to provide additional angling opportunities and to supplement natural reproduction. A fish survey, conducted by the WDNR during 2000, resulted in a fairly large and diverse number of fish species being observed, including largemouth bass, bluegill, northern pike, pumpkinseed, rock bass, yellow perch, black crappie, smallmouth bass, walleye, green sunfish, grass pickerel, bowfin, longnose gar, yellow bullhead, common carp, lake chubsucker, brook silverside, and spottail shiner.[48]

Amphibians, Reptiles, Birds, and Mammals

Amphibians and reptiles are vital components of the Powers Lake ecosystem, and include frogs, toads, and salamanders; and turtles and snakes, respectively. About 14 species of amphibians and 16 species of reptiles would normally be expected to be present in the Lake's tributary area.[49] The tributary area also supports a significant population of waterfowl including mallards, wood duck, and blue-winged teal. Heron, Canada geese, and Sandhill cranes also are present. During the migration seasons a greater variety of waterfowl may be present and in greater numbers.

With respect to wildlife, most of the wildlife remaining in and around the shorelands of the Lake are urban-tolerant species: smaller animals and waterfowl would be expected to inhabit the lakeshore areas; muskrats, beaver, grey and fox squirrels, and cottontail rabbits are likely to be abundant and widely distributed in the immediate riparian areas; and, larger mammals, such as the whitetail deer and coyote, are likely to be confined to the larger wooded areas and the open meadows found within the tributary area of the Lake. The remaining undeveloped areas provide the best-quality cover for many wildlife species.

Sensitive Areas, Critical Species Habitat, and Environmental Corridors

Within or immediately adjacent to bodies of water, the WDNR, pursuant to authorities granted under Chapter 30 of the *Wisconsin Statutes* and Chapter NR 107 of the *Wisconsin Administrative Code*, can designate environmentally sensitive areas on lakes that have special biological, historical, geological, ecological, or archaeological significance, "offering critical or unique fish and wildlife habitat, including seasonal or life-stage requirements, or offering water quality or erosion control benefits of the body of water." Currently, there are no WDNR-designated environmentally sensitive areas in Powers Lake.

As part of its regional planning program, and as a logical extension of its environmental corridor concept expounded through the regional, county-, and local-level land use plans for southeastern Wisconsin,[50] SEWRPC has identified natural areas and critical species habitat areas within the Southeastern Wisconsin Region.[51] These

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[48]*Electronic mail communication from Douglas Welch, of the WDNR staff, to Michael A. Borst, of the SEWRPC staff, dated January 22, 2010.*

[49]*SEWRPC Community Assistance Planning Report No. 196,* op. cit.

[50]*See SEWRPC Planning Report No. 7,* The Regional Land Use-Transportation Study, *1965, and subsequent editions; see also Bruce P. Rubin and Gerald H. Emmerich, Jr., "Refining the Delineation of Environmental Corridors in Southeastern Wisconsin,"* SEWRPC Technical Record, *Volume 4, Number 2, March 1981.*

[51]*SEWRPC Planning Report No. 42,* A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, *September 1997.*

areas reflect the attributes of the landscape necessary to protect and preserve the ambience, natural beauty, and biological diversity of southeastern Wisconsin that are essential to maintain the public health and welfare, support and sustain economic development, and provide continuing choices and opportunities for future generations. Areas identified as critical species habitat and/or natural areas were designated as being of local significance, regional significance, or state or national significance. Two such areas were identified in the area tributary to Powers Lake, as shown on Map 9:

1. Powers Lake Tamarack Relict: A privately owned, 152-acre, wetland complex of marsh, sedge meadow, shrub-carr, and relict tamaracks classified as NA-3, identifying it as an area of local significance.

2. Powers Lake: A drained lake with good water quality, wildlife habitat, surface area, shoreline development,[52] and other physical characteristics, with an assessment score of eight out of a possible score of 22, classifying it as AQ-3, identifying it as a lake of local significance.

Within the Powers Lake tributary area, the lakeshore is located within a SEWRPC-delineated environmental corridor, as shown on Map 10. Areas within designated environmental corridors are candidates for protection through proper zoning and/or public ownership. Pursuant to the recommendations set forth in the applicable regional and local level plans,[53] the DoPL, in partnership with the county and municipal governments and WDNR, have acquired critical wetlands draining to Powers Lake. Of those areas not already publicly owned, the remaining areas of natural shoreline and riparian wetland areas are perhaps the most sensitive areas in need of greatest protection. To this end, the DoPL and its partners have maintained an ongoing program of public information and education aimed at encouraging sound environmental stewardship and appropriate "good housekeeping" practices within the community.

RECREATIONAL USES AND FACILITIES

Powers Lake is used year-round for a variety of active recreational purposes, as well as a visual amenity. Having a TSI value at or below 47 as noted above, the Lake, as set forth in the regional water quality management plan,[54] is considered to have water quality that is likely to support a full range of recreational uses. Active recreational uses include powerboating, waterskiing and tubing, paddleboating, canoeing, kayaking, swimming, and fishing during the summer months, and cross-country skiing, snowmobiling, and ice-fishing during the winter. Popular passive recreational uses include walking, bird watching, and picnicking. The Lake experiences occasional intense recreational boating use on weekends and holidays during the summer, as noted in Chapter III of this report. Public boating access to Powers Lake is provided primarily through a State-owned and town-operated site at the northeastern end of the Lake along CTH F. This site provides a paved fee-required boat launch, pier, and car-trailer parking. As a consequence, Powers Lake is deemed to have adequate public access as defined in Chapter NR 1 of the *Wisconsin Administrative Code*, which establishes quantitative standards for determining the adequacy of public recreation boating access, setting maximum and minimum standards for parking facilities for car-top and car-trailer units based upon lake surface area.

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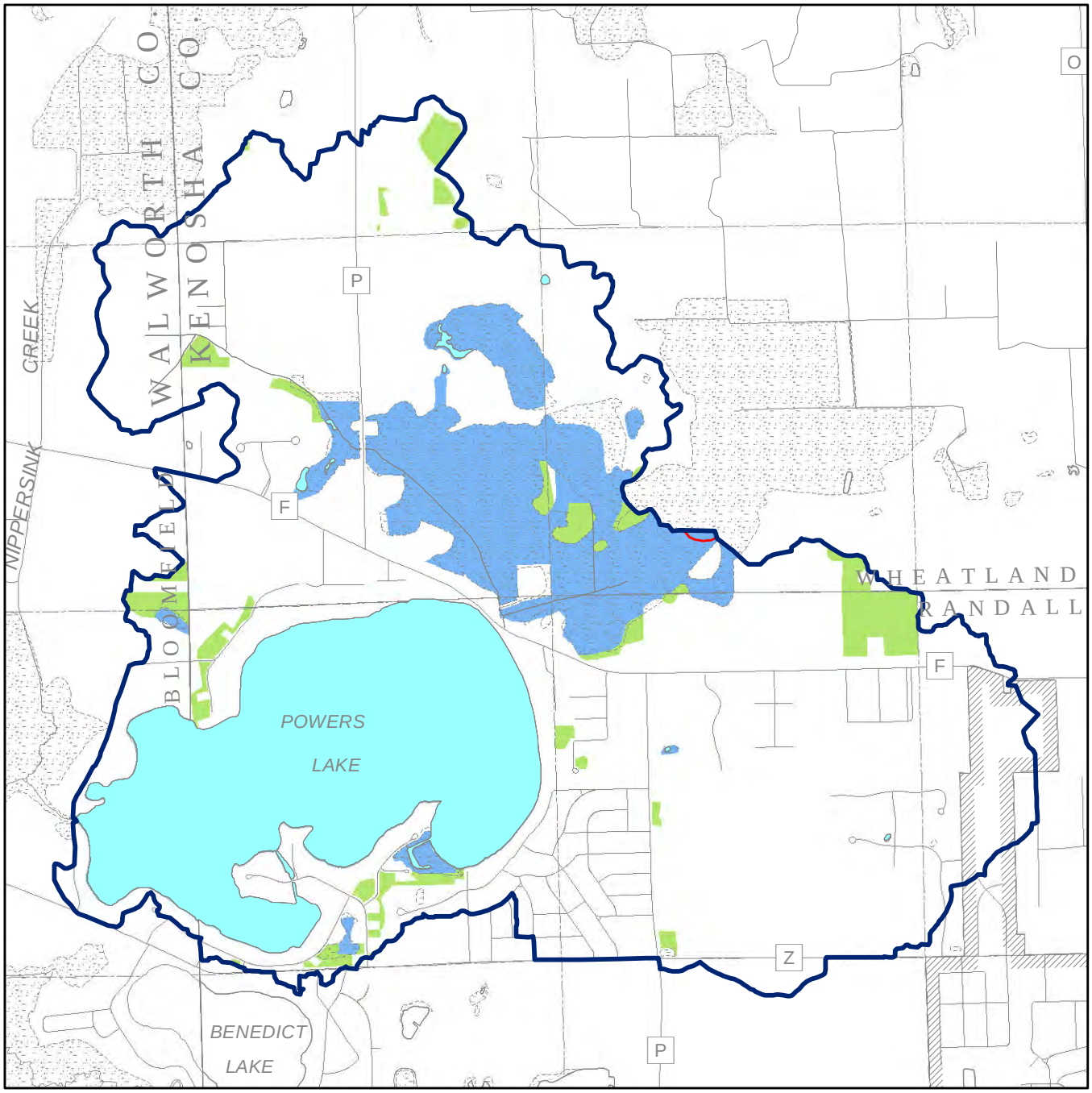
[52]*See Table 1 of this report. Shoreline development factor is the ratio of the shoreline length to the circumference of a circular lake with the same area. A value of 1.00 would represent a circular lake; Powers Lake has a shoreline development factor of 1.77, indicating that its shoreline is almost twice that of a circular lake, or that it is a waterbody with an extensive shoreline offering opportunities both for human occupation and aquatic habitat.*

[53]*See SEWRPC Planning Reports No. 42 and 48,* op. cit.*; and, SEWRPC Community Assistance Planning Reports No. 196, 288, and 299,* op. cit.

[54]*SEWRPC Planning Report No. 30,* op. cit. *See also SEWRPC Memorandum Report No. 93,* op. cit.

Map 9

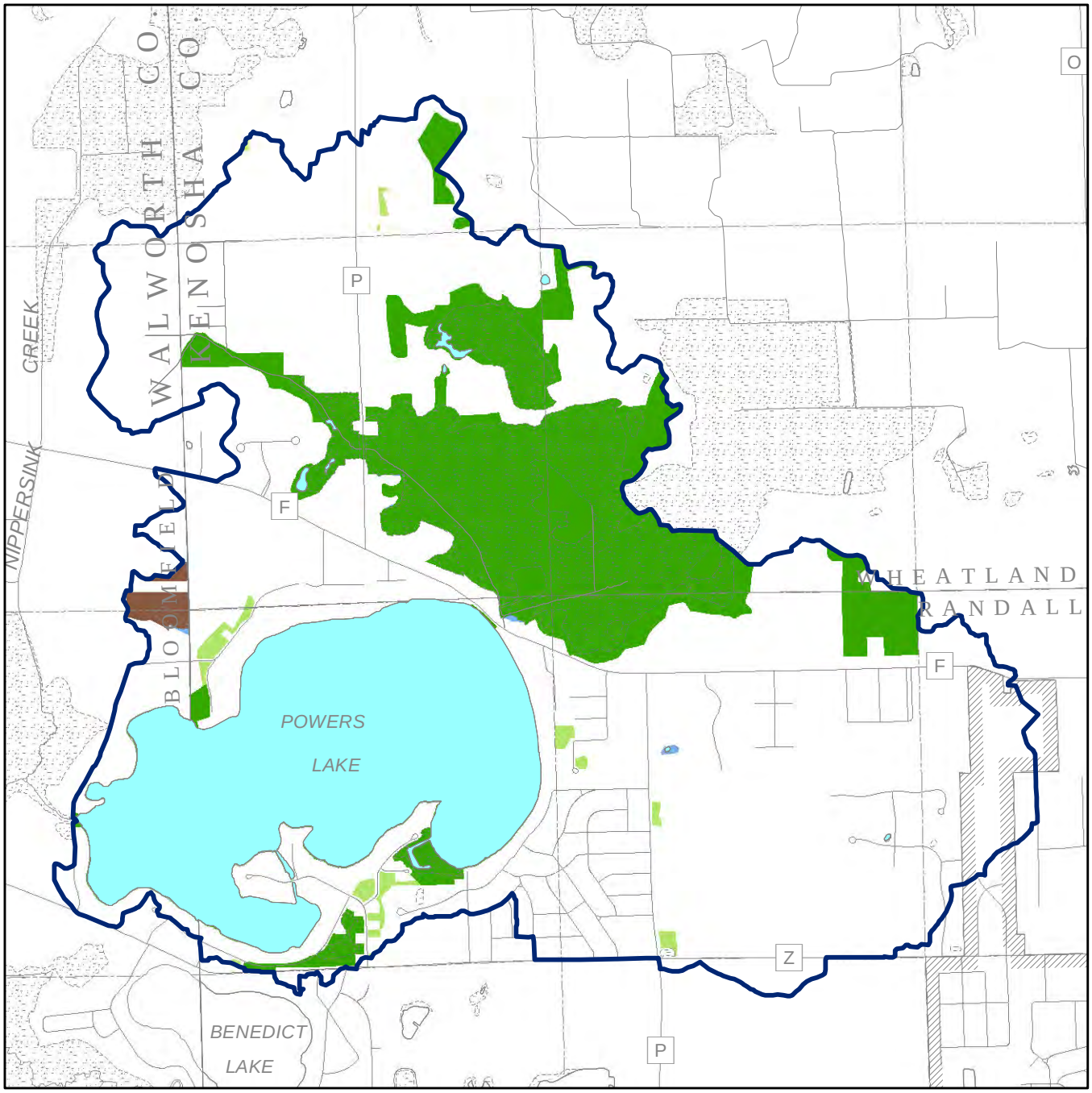
NATURAL AREAS AND CRITICAL SPECIES HABITAT WITHIN THE POWERS LAKE TOTAL TRIBUTARY AREA



Source: SEWRPC.

Map 10

PRIMARY ENVIRONMENTAL CORRIDORS WITHIN THE POWERS LAKE TOTAL TRIBUTARY AREA



Primary Environmental Corridor

Secondary Environmental Corridor

Isolated Natural Resource Area

Surface Water

Source: SEWRPC.

N

0 1,000 2,000 Feet

Table 12

WATERCRAFT DOCKED OR MOORED ON POWERS LAKE: 2009[a]

Type of Watercraft									
Powerboat	Fishing Boat	Pontoon Boat	Personal Watercraft	Canoe	Sailboat	Kayak	Paddleboat	Rowboat	Total
250	42	220	148	56	86	46	66	60	974

[a]*Including trailered watercraft and watercraft on land observable during survey.*

Source: SEWRPC.

Other access sites to Powers Lake include Lakeside and Bayview Parks, both located in Lake Knolls Bay at the southeastern end of the Lake, and a livery associated with a tavern/restaurant located on the western end of the Lake. Bayview and Lakeside Parks are both Town of Randall park sites. Lakeside Park provides a picnic area, a swim beach, and car-only parking, while Bayview Park has a paved boat ramp with car-only parking.

Lake Use and Water Quality Community Survey

During the summer of 2009, a questionnaire survey of Powers Lake residents was conducted by the DoPL, in cooperation with SEWRPC. The purpose of this survey was 1) to determine the opinions and ideas of residents regarding the state of the Lake, and 2) to evaluate the success of the District in implementing measures to protect and enhance the community. This survey was the third in a series of decadal community questionnaire surveys conducted since 1990, when the initial community survey was conducted as part of the process of formulating the initial comprehensive lake management plan for Powers Lake.[55] The results of this survey, as well as a comparison of responses to similar questionnaire surveys taken at Powers Lake since 1990, are set forth in detail in Chapter III of this report, and are referenced below as appropriate.

Watercraft Census

A census of watercraft docked or moored on Powers Lake was conducted by SEWRPC staff during 2009. At that time, a total of 974 watercrafts were observed, either moored in the water or stored on land in the shoreland areas around the Lake, as shown in Table 12. This represents a significant increase in the numbers of watercraft docked and moored around the Lake compared with the 745 watercraft of all descriptions reported in the initial comprehensive lake management plan.[56] The majority of this difference can be accounted for in the increased number of personal watercrafts (PWCs) observed on the Lake during the 2009 survey, which increased from 16 PWCs in 1990 to 148 PWCs in 2009. Smaller increases in numbers of powerboats and fishing boats—292 vessels observed during 2009, compared with 264 vessels observed during 1990—and pontoon boats—220 vessels observed during 2009, compared with 115 vessels observed during 1990—accounted for the majority of the remainder of the difference.

The types of watercraft docked or moored on a lake, as well as the relative proportion of nonmotorized to motorized watercraft, reflect the attitudes of the primary users of the lake—the lake residents. On Powers Lake, about 68 percent of all docked or moored boats are motorized, with powerboats comprising the single largest category, although pontoon boats were almost as numerous. In a similar survey conducted on Lake Wandawega in Walworth County, only about 15 percent of watercraft were motorized, with pontoon boats comprising the single

[55]*SEWRPC Community Assistance Planning Report No. 196,* op. cit.

[56]Ibid.

largest category of motorized watercraft, while on the Lauderdale Lakes, also in Walworth County, motorized watercraft accounted for about 73 percent of all watercraft, with powerboats comprising the single largest category of motorized watercraft. This would indicate that recreational high-speed boating is more of a major active recreational use on Powers Lake and the Lauderdale Lakes than on nearby Wandawega Lake.

To assess the degree of recreational boat use on a lake, it has been estimated that, in southeastern Wisconsin, the number of watercraft operating on a lake at any given time is between about 2 percent and 5 percent of the total number of watercraft docked and moored. On Powers Lake, this would equal from about 19 boats to about 49 boats. Based upon the counts of watercraft docked or moored around Powers Lake, and assuming that the number of watercraft operating on the Lake at any given time is between about 2 percent and 5 percent of the total number of watercraft, boating densities would range between about one boat per 10 acres to about one boat per 25 acres. These estimates would be consistent with the assessment of the community that the Lake is heavily used.[57]

There is a range of opinions on the issue of what constitutes optimal boating density, or the optimal number of acres of open water available on which to operate a boat. In this regard, during the mid-1980s, an average area of about 16 acres per powerboat or sailboat was considered suitable for the safe and enjoyable use of such watercraft on a lake. Over time, motorized watercraft of all kinds have steadily increased in power and speed. Consequently, for safe waterskiing and fast boating, the regional park and open space plan suggested an area of about 40 acres per boat as the minimum area necessary for safe operation.[58] Since 1995, Chapter NR 1 of the *Wisconsin Administrative Code* has established standards for recreational boating access to public inland lakes in the State. For a lake with the surface area of Powers Lake, these standards impose a minimum requirement for provision of car-trailer unit parking of one space (boat) per 30 acres of "boatable" lake surface area, or 15 spaces, and a maximum requirement of one space (boat) per 15 acres, or 30 spaces.

Recreational Use Surveys

Another way to assess the degree of recreational watercraft use on a lake is through direct counts of boats actually in use on a lake at a given time. During 2009, surveys to assess the types of watercraft in use on a typical summer weekday and a typical summer weekend day were conducted by SEWRPC staff. The results of these surveys are shown in Table 13. As indicated in the table, there was moderately high use of boats on Powers Lake, especially on weekends. Powerboats were the most popular watercraft in use on the Lake both on weekdays and weekend days. On weekdays, fishing boats were the second most popular watercraft in use; on weekend days, pontoon boats were the second most popular watercraft in use. These results are not significantly different from those reported in the comprehensive lake management plan, which, although employing slightly different categories of watercraft, noted that pleasure boating was the most popular activity on both weekdays and weekend days, with fishing a close second. Curiously, the total numbers of watercraft reported to be in operation were somewhat lower during the 2009 survey than during the 1990 survey. This decreased boating use is consistent with the level of activity reported by respondents to the questionnaire survey, as summarized in Chapter III of this report.

Boating densities on weekdays during 2009 ranged from about 51 acres per boat to about 75 acres per boat; weekend day boating densities ranged from about 36 acres per boat to about 49 acres per boat. These values are generally within those considered appropriate in the regional park and open space plan for the safe conduct of high-speed boating. It should be noted, however, that the higher degree of boating activity that often occurs on regional lakes during holiday weekends may produce high-speed boating densities that temporarily exceed these values.

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[57]*See Chapter III of this report.*

[58]*See SEWRPC Planning Report No. 27,* A Regional Park and Open Space Plan for Southeastern Wisconsin: 2000, *November 1977.*

Table 13

WATERCRAFT IN USE ON POWERS LAKE: SUMMER 2009

Date and Time	Powerboat	Pontoon Boat	Fishing Boat	Personal Watercraft	Sailboat	Canoe/ Kayak	Wind Surf Board	Paddleboat	Total
Thursday, July 23									
9:30 a.m. to 10:30 a.m.	5	2	7	2	1	3	0	1	21
2:00 p.m. to 3:00 p.m.	9	4	4	4	0	0	0	0	21
Total for the Day	14	6	11	6	1	3	0	1	42
Percent	33	14	28	14	2	7	0	2	100
Sunday, August 9									
9:00 a.m. to 10:00 a.m.	10	5	8	1	0	2	0	0	26
1:00 p.m. to 2:00 p.m.	13	7	2	6	3	2	2	2	37
Total for the Day	23	12	10	7	3	4	2	2	63
Percent	37	19	16	11	5	6	3	3	100

Source: SEWRPC.

Table 14

RECREATIONAL USE IN/ON POWERS LAKE: SUMMER 2009

Date and Time	Participants									
	Fishing from Shoreline	Pleasure Boating	Skiing/ Tubing	Sailing	Operating Personal Watercraft	Swimming	Fishing from Boats	Canoeing/ Paddle Boating	Park Goers	Total
Thursday, July 23										
9:30 a.m. to 10:30 a.m.	5	4	3	2	2	0	20	6	0	42
2:00 p.m. to 3:00 p.m.	0	15	25	0	7	35	9	0	16	107
Total for the Day	5	19	28	2	9	35	29	6	16	149
Percent	3	13	19	1	6	24	19	4	11	100
Sunday, August 9										
9:00 a.m. to 10:00 a.m.	0	14	14	0	1	5	17	3	9	63
1:00 p.m. to 2:00 p.m.	2	53	30	5	7	4	4	6	12	123
Total for the Day	2	67	44	5	8	9[a]	21	9	21	186
Percent	1	36	24	3	4	5	11	5	11	100

[a]*The number of swimmers on Sunday, August 9, was likely unusually low due to the beach being closed on that date by the Health Department; counts on this date refer to people observed swimming at private residences.*

Source: SEWRPC.

Table 14 shows the various types of recreational activities engaged in by people using Powers Lake during a typical summer weekday and a typical summer weekend day in 2009. The most popular weekday recreational activities on the Lake were swimming, fishing from boats, waterskiing/tubing and powerboating. On weekend days, the most popular activities pleasure boating and waterskiing/tubing; fishing from boats and going to the parks were also popular weekend day activities.

LAKE OUTFLOW

As noted above, as a consequence of the regional scale rainfall and flood events experienced in Southeastern Wisconsin during the month of June in 2008, 2009, and 2010,[59] the DoPL Commissioners expressed concern that, because the Lake was acting as a drained lake, Powers Lake was subject to limitations regarding the ability of the East Branch of the Nippersink Creek to pass flood flows originating from the Lake. The DoPL Commissioners sought clarification of whether this perceived limitation affecting the outflow from Powers Lake could be related to observed persistent high water levels in the Lake. Flows in this portion of the East Branch of the Nippersink Creek are controlled by the water level control structure at the outlet of Powers Lake, the road culverts at Powers Lake Road, and the water level control structure at the outlet of Tombeau Lake.[60]

The DoPL contracted with Hey & Associates, Inc., during 2010 to investigate the Powers Lake outflow structure, and the stream channel downstream of Powers Lake.[61] Hey & Associates, Inc., noted the limited capacity of the dam outlet structure to pass flood flows greater than 90 cubic feet per second (cfs); SEWRPC staff have photo-documented this outflow structure, as shown in Figure 3. Hey & Associates, Inc., also noted that the East Branch of the Nippersink Creek has a very low stream gradient with about 3.1 feet of fall over the approximately 2,750 feet reach of the Creek between Powers Lake at the upstream end and Tombeau Lake at the downstream end of the Creek. This low gradient was identified by Hey & Associates, Inc., as potentially contributing to a back water effect downstream of the Powers Lake dam that could decrease discharge from the Lake and contribute to high water levels within Powers Lake. Hey & Associates, Inc., stated that more detailed analysis of the degree to which the culvert size was restricting outflow from Powers Lake would be required for the effect of restricted flows on water surface levels to be quantified.[62] At the time of writing, however, the DoPL has taken no decision on whether to seek such a quantification.

In addition to their observations on the outlet structure of Powers Lake, Hey & Associates, Inc., noted evidence of beaver activity in the section of the East Branch of the Nippersink Creek downstream of Powers Lake. Figures 4 through 6 illustrate the in-stream conditions observed by Commission staff during a site visit to follow-up on the observations made by Hey & Associates, Inc. Figure 4 shows the in-stream conditions of the East Branch of the Nippersink Creek downstream of Powers Lake to the point where the east-west portion of Powers Lake Road crosses the Creek, the location of which is shown on the aerial photograph reproduced in Figure 7. The stream segment between the outlet of Powers Lake and Powers Lake Road included a large beaver dam, located west of Powers Lake on the East Branch of Nippersink Creek, the approximate location of which is shown in Figure 7. Figure 5 shows the in-stream conditions of the East Branch of the Nippersink Creek downstream of Powers Lake Road to its point of entry into Tombeau Lake, the location of which also is shown in Figure 7. Further evidence of beaver activity was observed, although the beaver huts were not associated with the construction of beaver dams within this segment of the stream corridor. Finally, Figure 6 shows the Tombeau Lake outlet structure. SEWRPC staff noted some debris impeding outflow from the structure.

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[59]*See U.S. Geological Survey Scientific Investigations Report No. 2008–5235,* Flood of June 2008 in Southern Wisconsin*, 2008.*

[60]*See SEWRPC Memorandum Report No. 140,* A Lake Protection Plan for Benedict and Tombeau Lakes, Kenosha and Walworth Counties, Wisconsin, *May 2001*.

[61]*Hey & Associates, Inc., Memorandum, "Powers Lake Outlet and Outlet Channel Maintenance," July 2010.*

[62]Ibid.

Figure 3

OUTLET STRUCTURE OF POWERS LAKE: 2010

VIEW UPSTREAM TOWARD POWERS LAKE

VIEW DOWNSTREAM TOWARD THE EAST BRANCH OF NIPPERSINK CREEK

Source: SEWRPC.

LOCAL ORDINANCES

As shown in Table 15, the Towns of Randall and Wheatland have each adopted the Kenosha County ordinances in regard to general zoning, floodland zoning, shoreland or shoreland-wetland zoning, and construction site erosion control and stormwater management. The Town of Randall has adopted its own ordinance regarding subdivision control, while the Town of Wheatland has adopted the Kenosha County ordinance in this regard. The Town of Bloomfield has adopted the Walworth County ordinances regarding general zoning, floodland zoning, shoreland or shoreland-wetland zoning, subdivision control, and construction site erosion control and stormwater management. Recreational boating activities on Powers Lake are currently regulated by the Town of Randall boating ordinance, adopted jointly with the other riparian municipalities, appended hereto as Appendix B.[63]

[63]*The Town of Randall rescinded the slow no-wake clauses set forth in Paragraph 20.06(4)(e) of the* Town of Randall Code of Ordinances *by a vote of the Town Board of four to one in November 2008.*

Figure 4

EAST BRANCH OF NIPPERSINK CREEK DOWNSTREAM OF POWERS LAKE: 2010

Figure 4 (continued)

Figure 4 (continued)

Figure 4 (continued)

Source: SEWRPC.

Figure 5

EAST BRANCH OF NIPPERSINK CREEK UPSTREAM OF TOMBEAU LAKE: 2010

Figure 5 (continued)

Source: SEWRPC.

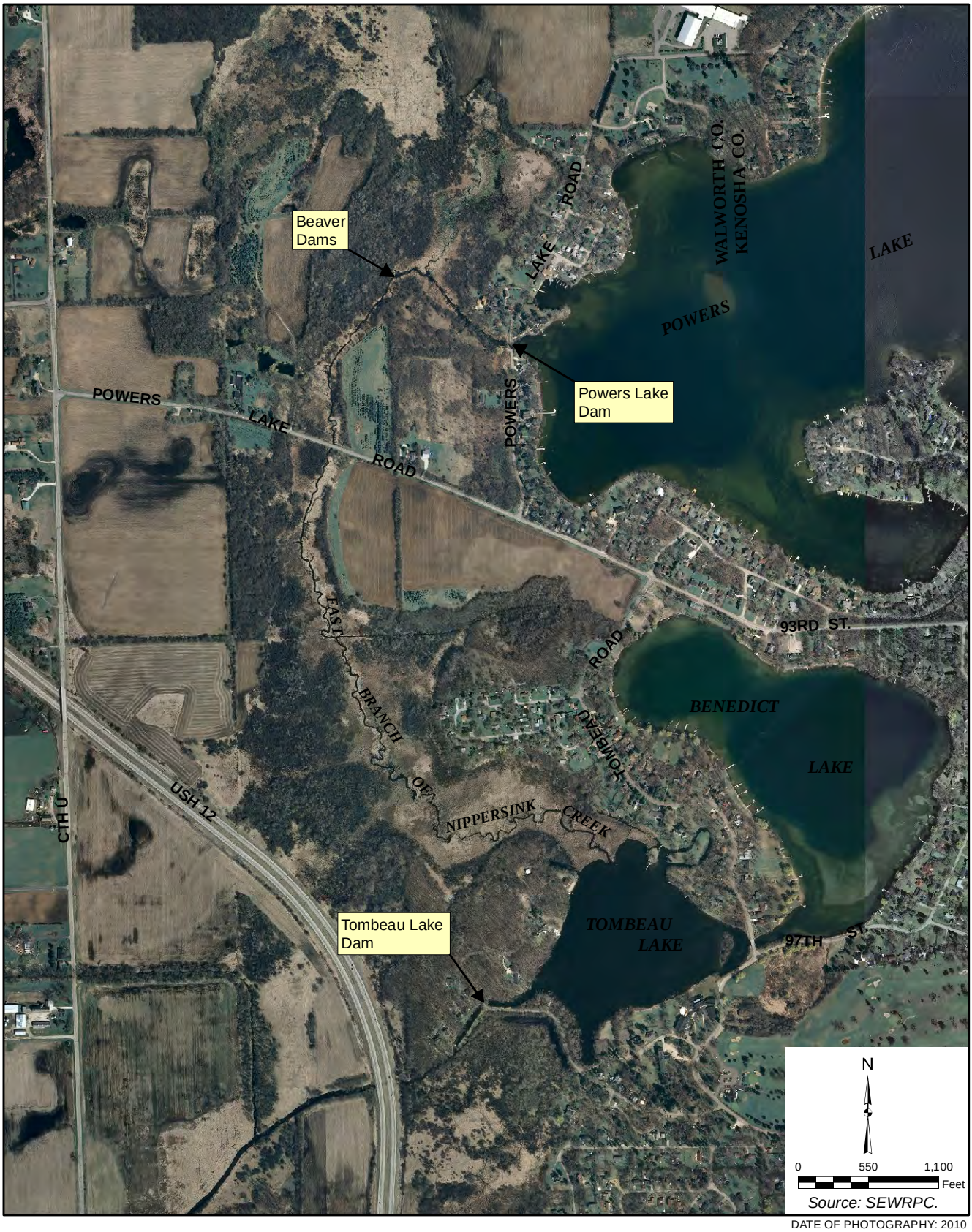
Figure 6

TOMBEAU LAKE OUTLET STRUCTURE: 2010

Source: SEWRPC.

Figure 7

AERIAL PHOTOGRAPH SHOWING THE LOCATIONS OF WATER LEVEL CONTROL STRUCTURES ON THE EAST BRANCH OF THE NIPPERSINK CREEK DOWNSTREAM OF POWERS LAKE



DATE OF PHOTOGRAPHY: 2010

Table 15

LAND USE REGULATIONS WITHIN THE AREA TRIBUTARY TO POWERS LAKE IN KENOSHA AND WALWORTH COUNTIES BY CIVIL DIVISION

Community	Type of Ordinance				
	General Zoning	Floodland Zoning	Shoreland or Shoreland-Wetland Zoning	Subdivision Control	Construction Site Erosion Control and Stormwater Management
Kenosha County	Adopted	Adopted	Adopted and Wisconsin Department of Natural Resources approved	Adopted	Adopted
Town of Randall	County ordinance	County	County	Adopted	County
Town of Wheatland	County ordinance	County	County	County	County
Walworth County	Adopted	Adopted	Adopted and Wisconsin Department of Natural Resources approved	Adopted	Adopted
Town of Bloomfield	County ordinance	County	County	County	County

Source: SEWRPC.

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Chapter III

COMMUNITY QUESTIONNAIRE SURVEY

BACKGROUND

The District of Powers Lake (DoPL), with the assistance of the Southeastern Wisconsin Regional Planning Commission (SEWRPC), has undertaken a questionnaire-based survey of the Powers Lake community at decadal intervals since 1990. The results of these surveys have been used by the DoPL to guide their program of lake management. The 1990 survey was used to support the recommendations set forth in the DoPL comprehensive lake management plan,[1] while the 2000 survey was used by the DoPL to determine progress in plan implementation. Pursuant to the recommendations of the comprehensive lake management plan, a further survey was conducted during 2010 during the period of formulation of this lake protection plan, The responses to the survey, combined with the inventory data and information set forth in Chapter II of this report, form the basis for refining the recommendations set forth in the initial comprehensive lake management plan.

QUESTIONNAIRE SURVEY TECHNIQUE

The current questionnaire survey was constructed as a mail-drop questionnaire survey of the electors of the DoPL and undertaken during 2009-2010 (hereinafter, the 2010 survey). The questionnaire was compiled in a manner consistent with the lake user survey protocol prepared by the University of Wisconsin-Extension (UWEX) for the Wisconsin Lakes Partnership. A copy of the Powers Lake recreational water use and water quality survey is appended hereto as Appendix C.

This questionnaire mirrored those prepared and distributed during the summers of 1990 and 2000. The current survey was designed to review the issues and concerns identified during the initial surveys, as one element in the review of the status of the implementation of the lake management plan. As with the year 2000 survey, the 2010 questionnaire included some additional questions not previously included that focused on the community's attitude toward certain emerging issues and concerns. Funding for the year 2010 survey was provided, in part, through a Chapter NR 190 Lake Management Planning Grant awarded to the DoPL by the Wisconsin Department of Natural Resources (WDNR).

The overall purpose of the survey was to discover the degree of satisfaction of the respondents with respect to ongoing or future lake management activities undertaken by the DoPL to address lake water quality, recreational opportunities, and ordinance enforcement, as well as to identify their knowledge of lake management activities

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[1]*SEWRPC Community Assistance Planning Report No. 196*, A Management Plan for Powers Lake, Kenosha and Walworth Counties, Wisconsin, *November 1991*.

undertaken by the DoPL. More specifically, the survey was designed to facilitate determination of the types of actions necessary to achieve or maintain desired water quality and lake use conditions conducive to supporting the full range of recreational and environmental uses of Powers Lake, as an initial step in the process of refining and updating the management program conducted by the DoPL.

The SEWRPC staff prepared, in cooperation with the DoPL Board of Commissioners, and distributed the Powers Lake recreational water use and water quality survey to electors of the DoPL during August 2009. Upon return, these surveys were carefully tabulated and evaluated by the SEWRPC staff. This chapter includes a summary of the responses to the survey received through December 31, 2009.

A total of 93 surveys, or 30 percent of the 298 questionnaires dispatched, was received by that date. A summary of the responses, including the many various written respondents' comments, is appended hereto as Appendix D.

The response rate to this recent questionnaire survey was less than that experienced during previous surveys. Indeed, the response rate declined from over 50 percent for the 1990 survey, to about 40 percent for the 2000 survey, to about 30 percent for the current survey. The reason for this declining response rate is unclear, given that the numbers of surveys sent out remained approximately the same across all three survey periods. One inference that could be drawn from this declining response rate would be that the DoPL is successfully addressing the issues of concern among the community, with potential respondents feeling less urgency in sharing their concerns with the DoPL. This interpretation is not inconsistent with the level of satisfaction expressed by respondents with regard to the performance of the public inland lake protection and rehabilitation district.

RESPONDENT PROFILE

Of the total number of respondents to the 2010 survey, about 80 percent identified Powers Lake as their secondary residence, the majority of whom described their time spent at the Lake as being mostly during the extended summer (spring to fall) time period, with weekends year-round being the second-most popular choice for spending time at the Lake. On average, respondents spent about 83 days at Powers Lake each year; over 80 percent have lived on Powers Lake for more than 10 years.

These results were similar to those reported in the year 2000 survey, in which about 63 percent of respondents identified Powers Lake as their secondary residence and about 80 percent had lived on Powers Lake for more than 10 years. During 1990, part-time and weekend residents comprised about 70 percent of respondents, the majority of whom (about 80 percent) had lived on the Lake for more than 10 years.

The consistency of the composition of the respondents strongly suggests that respondents to the 2010 survey are likely to have responded to at least one of the previous surveys. Such consistency among the respondents also suggests that the respondents have experience of the Lake over several seasons and years, and are unlikely to be influenced by the existing lake conditions, especially since the majority of respondents have lived on the Lake for more than 10 years.

The respondent profile also suggests that the Powers Lake community is relatively stable. People moving into the community are likely to remain for some considerable time. This characteristic implies a commitment to the community and to the Lake that is the focal point of this lake-oriented community.

In like manner to the previous community surveys, a majority of respondents to the 2010 survey (about 80 percent) indicated that they used only Powers Lake for recreational purposes. This is consistent with the long-term commitment most respondents have made to the community, as reflected by the fact that four-fifths of the respondents have lived in the community for more than 10 years.

LAKE USE

Lake Use Intensity

Perceptions of the intensity of lake use varied between weekdays and weekend days, with two-thirds of respondents indicating they felt the Lake was used only lightly on weekdays, while about 75 percent of respondents felt that on weekend days the Lake was heavily to overly used. These perceptions were unchanged from previous years, when a majority of respondents (about 95 percent) felt that Powers Lake was lightly-to-moderately used during weekdays, but heavily-to-overly used during weekends. Many of the respondents who felt that the Lake waters were heavily-to-overly used during the weekends suggested that this level of usage was exacerbated by the availability of public recreational boating access to Powers Lake.

As in the 2000 survey, the majority of Powers Lake respondents used the Lake with their families.

Angling Use

About one-third of respondents reported fishing the Lake during the spring, summer, and fall, while less than 10 percent of respondents reported ice fishing. These values were similar to those reported during both the 1990 and the 2000 surveys. Open water fishers reported having fished an average of about 21 days during 2010, with about equal numbers fishing from boats or from piers, while eight days was the average for ice fishing. This level of angling effort, whether through the ice or during open-water periods, is almost identical to that reported during the 2000 survey.

Fish species caught were similar to those reported to have been caught during the 1990 and 2000 surveys; namely, panfish, largemouth bass, smallmouth bass, northern pike, yellow perch, and crappie.

During the 2010 survey, walleye and smallmouth bass populations were generally perceived to have declined since the 2000 survey, while northern pike, largemouth bass, yellow perch, and crappie were reported to have largely stayed about the same or declined slightly. In contrast to previous surveys, however, anglers did not report catching either longnose gar or bowfin which had previously made up a small percentage of the catch from Powers Lake. Respondents reported that they perceived the numbers of carp to have stayed the same or increased a little; in both previous surveys, a majority of anglers had indicated that the carp population was continuing to increase.

That said, 36 percent of anglers responding felt that the fishing quality of the Lake was good, while 60 percent felt that the fishing quality was fair. These responses were virtually unchanged from those provided during the 2000 survey, but indicated a somewhat greater degree of satisfaction with the quality of the fishing experience than reported during the 1990 survey.

Boating Use

Boating of many kinds—powerboating (including pontoon boats), personal watercraft (PWC) operation, waterskiing, sailing/boardsailing, and rowing/canoeing—were popular water-based activities on Powers Lake. In 2010, over 60 percent of all respondents reported powerboating an average of about 35 days during spring and summer; nearly 50 percent of respondents reported waterskiing an average of about 27 days during the same time period; PWC users operated their craft an average of nearly 40 days during spring and summer; sailboarders and sailboaters operated their craft an average of about 16 days during spring and summer; and, rowers and kayakers operated their craft an average of about 19 days during spring and summer.

In 2010, engine size of respondents' ski boats averaged over 200 horsepower, pontoon boats averaged over 65 horsepower, fishing boats averaged over 85 horsepower, and PWC averaged over 100 horsepower. These sizes represent an increase in size from the 2000 survey at which time skiboats averaged about 190 horsepower, pontoon boats averaged about 65 horsepower, fishing boats averaged about 80 horsepower, and PWC averaged just over 80 horsepower.

Other Recreational Uses

In addition to the angling and boating opportunities provided by Powers Lake, respondents indicated participation in a range of other recreational opportunities, including both active recreational uses, such as swimming, walking, and jogging; and passive uses, such as picnicking/barbecuing and bird watching. In-lake contact recreational activities such as swimming and diving, remained an important active recreational use of Powers Lake. About one-third of respondents reported swimming an average of nearly 40 days during the spring and summer in 2010. Walking and jogging around the Lake are recreational activities enjoyed by Lake users an average of nearly 42 days during spring and summer, and over 67 days, on average, year round in 2010.

Passive recreational uses included picnicking/barbecuing and bird watching. In 2010, respondents were engaged in picnicking/barbequing an average of over 84 days throughout the year. Bird-watchers, although not a large group in terms of those respondents who reported being involved in the activity, reported being engaged over 200 days throughout the year.

The shift from time spent in active recreational pursuits to more time spent engaged in passive pursuits is consistent with the demographic characteristics of the community, in which the majority of respondents have been residents for more than a decade, while the constancy observed in the numbers of participants and days of operation of PWCs, for example, are likely to reflect the presence of a younger generation. In some cases, this dichotomy can be explained by a previous generation passing the “lake house” to their children or to an older generation, including children and grandchildren, in the mix of occupants. This latter, more inclusive, concept of a household is supported, in part, by the numbers of respondents (more than one-quarter) who are weekend residents of the Powers Lake community, suggesting that they are actively engaged elsewhere during the week. Conversely, the large number of part-year residents is consistent with an older population, who may winter in a climate warmer than is typically the case in Wisconsin.

Less than 10 percent of respondents reported engaging in snowmobiling or cross-country skiing during fall and winter.

Of all recreational activities mentioned on the 2010 survey, the three receiving the highest ranking of relative importance to respondents were: powerboating, swimming, and walking/jogging.

MAJOR ISSUES AND CONCERNS

The three most significant concerns identified by respondents to the 2010 survey were: 1) general water quality, 2) use of the Lake and access sites by nonresidents, and 3) number of boats.

These issues are similar to those identified as priority issues of concern during the 2000 survey—water quality, numbers of boats, use and access by nonresidents, and numbers of PWCs—and to those identified during the 1990 survey—water quality, numbers of PWCs, numbers of boats, and aquatic plants. In addition, during the 1990 survey, the issues of failing septic systems, excessive algae, increasing development around the Lake, low water levels, sizes of boats, and noise and sedimentation were identified as significant issues of concern by about one-half or more of respondents.

In this regard, it is illustrative that some of the concerns initially identified during 1990 no longer appear in the summary of issues of concern identified by one-half or more of respondents. In some cases, these issues have been addressed through actions implemented by the DoPL and surrounding municipalities, including the two counties. Implementation of construction site erosion control ordinances and septic pumping ordinances, as well as effective zoning ordinances, have limited some of the concerns that had been expressed during the 1990 survey. Nevertheless, concerns regarding the Lake and its watershed remain, especially with regard to water quality and aquatic plants, and numbers of boats. These issues and concerns are described in more detail below. Respondent comments regarding what could be done about their concerns to improve the situation included:

- Need more buoys by swim area;
- Raise price to launch;
- Be more strict on inspections;
- Control zebra mussels, algae, and aquatic plants;
- Enforce launch fees for nonresidents and ticket illegal trailer parking; and,
- Dredge shallow areas.

As noted above, a summary of survey responses, including the many written comments submitted by the respondents, is appended hereto as Appendix D.

General Water Quality

Although a majority of respondents to the 2010 Powers Lake questionnaire survey, 63 percent, were concerned about the general water quality of the Lake, nearly 94 percent reported that they considered the Lake to have good water quality. In analyzing the reason for this perception, respondents were asked to indicate the basis for their responses by indicating whether their responses were based upon water clarity, the presence of algae and aquatic plants, and/or general aesthetics. Of these characteristics, the largest number of respondents, 91 percent, indicated that their responses were based upon water clarity, a result similar to the findings in the 2000 survey in which the largest group, 85 percent, also identified water clarity as that characteristic most influential in their determination of what constitutes good water quality. The smallest number of respondents, 54 percent in 2010 and 56 percent in 2000, identified algae/aquatic plants as responsible for water quality in Powers Lake.

When asked how they would describe good water quality, respondent answers included the following:

- No invasive plants or fish;
- A variety of plant and animal life;
- Low *e-coli*;
- No green scum; and,
- No odor.

There was an almost even split between those respondents who felt that water quality had remained the same and those who felt that water quality had deteriorated since they had first moved to or visited the area: A plurality of respondents, 46 percent, indicated that they had perceived the Lake to have deteriorated during their period of their residence at the Lake, while about 44 percent felt that the Lake has stayed the same. Few respondents indicated any perceived improvement in the water quality of the Lake during their period of residence at the Lake. This response was almost unchanged from that provided by respondents to the 2000 survey.

Use of the Lake and Access Sites by Nonresidents

This issue was identified as the single most important concern by 32 percent of respondents who identified it as a concern among a list of about 20 issues. Attitudes of respondents on this issue can best be represented through examination of their numerous written responses, which included the following:

- Restrict nonresident use;
- Increase launch fee for nonresidents;
- No [trailer] parking on Bloomfield Road;
- Enforce launch fees for nonresidents and ticket illegal trailer parking;
- Limit use of Lake to area homeowners;

- Regulate number of nonresident boaters; and,
- Reduce nonresident access on weekends.

The subject of nonresident use of a waterbody often evokes strong emotional responses from riparian homeowners who tend to attach varying degrees of personal ownership to the waterbody. It is not unusual for residents to have a sense of protection regarding the waterbody and to develop feelings of resentment toward persons whom they look upon as "outsiders." This was an especially sensitive topic at the time of construction of the public recreational boating access site, and remains an issue of concern. The *Wisconsin Constitution*, in Article IX, guarantees that "the river Mississippi and the navigable waters leading into the Mississippi and St. Lawrence, and the carrying places between the same, shall be common highways and forever free, as well to the inhabitants of the State as to the citizens of the United States, without any tax, impost or duty therefor." Consequently, Chapter NOR of the *Wisconsin Administrative Code* seeks to ensure that all citizens have access to the waters of the State by establishing standards for access through public recreational boating access sites.

Numbers of Boats

A third issue of major concern reported by respondents during the 2010 survey was the perceived overabundance of boats. In contrast to the 1990 and 2000 surveys, PWC use continued to decline as an issue of concern facing the Powers Lake community. Operation of PWCs formed an issue of concern to 85 percent of respondents during 1990, and continued to be an issue of concern to about 60 percent of respondents during 2000. By the time of the year 2010 survey, such concerns were reported by less than 35 percent of respondents. Concern for the numbers of boats, however, continued to be an important consideration, having been identified as an issue of concern by 82 percent of respondents in 1990, 60 percent of respondents in 2000, and 55 percent of respondents in 2010.

OTHER ISSUES AND CONCERNS

Abundance of Aquatic Plants

Aquatic plants continued to be an issue of concern among the Powers Lake community, although the numbers of respondents indicating significant concern over the abundance of aquatic plants in the Lake has declined with each survey. In the 2000 survey, a majority of 64 percent of respondents felt Powers Lake had excessive algal and aquatic plant growth; in 2010, this percentage dropped to 53 percent. Respondents offered the following reasons for their concerns:

- Milfoil and algae major problems on east shore—the Knolls;
- Milfoil and algae a problem in Jefferson Bay;
- Boats spread plants lake to Lake;
- Use of fertilizer on lakefront lawns;
- Big boats and wakeboard boats chop weeds and spread them;
- Too much muck in some areas of the Lake;
- Types of plants have changed over the years;
- Natural (native) plants need to flourish; and,
- Invasive plants continue to flourish.

When queried concerning methods of control of excessive algae and aquatic plants, respondents to the 2010 survey indicated a preference for mechanical harvesting and chemical control use (herbicides), as well as septic pumping as a means of reducing the nutrient load to the Lake that supports and sustains the growths of aquatic plants. Respondents to the 2000 survey cited similar preferences for mechanical harvesting, chemical usage, and septic pumping, and a significant number felt fertilizer use should be restricted within 500 feet of the lakeshore. This latter concern was addressed by the State of Wisconsin prior to the 2010 survey with the promulgation of

2009 *Wisconsin Act* 9 which prohibited the intentional application and retail sale of turf fertilizer containing phosphorus or available phosphate. 2009 *Wisconsin Act* 9 also set forth provisions "regulating certain manure and finished sewage sludge products."

Respondent comments on the preferred methods of control of algae and aquatic plants included:

- Power wash at launch;
- Fine people that fertilize;
- Close all boat launches but one;
- Limit boats at ramp;
- Install sewers;
- Police and educate all boat(er)s coming and going at launch; and,
- Need to dredge Honey Bear Bay.

Regulations and Law Enforcement Issues and Concerns

As noted above, respondents continued to agree that Powers Lake was lightly- to moderately-used during weekdays and heavily- to overly-used during the weekends. Nevertheless, there was a general level of satisfaction with the existing boating ordinances and regulations, and manner of their enforcement: 63 percent of respondents to the 2010 survey indicated they were satisfied or well-satisfied with the boating ordinances, and 58 percent were satisfied or well-satisfied with their enforcement. In this regard, the level of satisfaction expressed by the respondents was similar to that expressed in the 1990 survey, and an improvement over that expressed during the 2000 survey in which slightly less than one-half of respondents expressed satisfaction with boating ordinance enforcement on the Lake.

Reasons given as to why they were not satisfied with the boating regulations included:

- Waterski route should not be mandatory to go into Jefferson Bay depending on how busy Bay is;
- Regulate the number of boats on the Lake;
- We like no wake until 10:00 a.m.;
- More "Quiet Times;"
- Patrol boat cannot sit at entrance to Jefferson Bay—too narrow;
- Increase no-wake hours on weekends;
- Limit number of boats on Lake;
- Need tougher rules on cleanliness of boats entering the Lake;
- Need cut-across for skiers;
- No wake after 6:00 p.m. on Fridays, Saturdays, and Sundays;
- Some areas should be for fishing only; and,
- Control noise (loud music) from boats.

Although a majority of respondents indicated satisfaction with the level of enforcement on the Lake, those who were not satisfied gave reasons, including the following:

- PWCs not policed enough;
- Need more emphasis on safety;
- Often harass boaters who are obeying the rules and ignore skiers who are going the wrong way;
- There needs to be two slow-no-wake periods from noon to 2:00 p.m. on weekends; and,
- Often the police boat is at the dock long before sunset, so some boats continue to pull skiers after sunset.

There were two methods of limiting various lake-related recreational activities suggested in the survey; namely, restriction of activities to certain ***areas*** of the Lake; and, restriction of activities to certain ***hours*** of the day. Respondents to the 2010 survey indicated a significant preference for regulating powerboating, waterskiing, and PWC operation, both to certain areas of the Lake, and to certain hours of the day. Between 40 and 50 percent of respondents indicated support for limiting the hours of these three activities on the Lake; fewer respondents indicated a preference for recreational use zoning that would limit these same activities to specific portions of the Lake. During 1990 there was some considerable support, about 75 percent of respondents, to limit the areas of the Lake within which PWCs could be operated. This support subsequently diminished, with the community currently suggesting that powerboating, waterskiing and PWC operation be considered in like manner and managed through control of operating hours. A similar trend was observed with respect to snowmobile operation during the winter months.

Respondent comments on the use of time-restrictions to regulate recreational activities included:

- Need definite clock times…"sunset" too open to interpretation;
- 10:00 a.m. to 7:00 p.m.;
- No power [boating] and jet skiing before 11:00 a.m. or after 7:30 p.m. on all of Lake;
- Leave hours as they are;
- 10:00 a.m. to dusk; and,
- Need to enforce no wake at sunset.

Respondent comments on the use of area-restrictions to regulate recreational activities included:

- Wave runners not in bay;
- Boats anchored in the ski lanes;
- No more restrictions;
- Fishermen should have to stay 25 feet from private piers;
- Kayaks near buoy line only; and,
- No more than two or three boats at sandbar.

Watershed Issues and Concerns

While there was a general level of satisfaction with the existing boating ordinances and regulations and manner of their enforcement, there was somewhat less satisfaction with the application of other ordinances that affected the Lake. In terms of ***level of development*** (land use regulations), the majority of respondents, 53 percent, were either satisfied or well satisfied in this regard; 20 percent had no strong feeling; 8 percent were either dissatisfied or very dissatisfied; and 19 percent felt they needed more information. Respondent comments on this topic included the following:

- Too many oversized piers;
- Building too close to wetlands;
- Should ban fertilizers and pesticides from lawns;
- Houses have been built in sensitive watershed areas; and,
- Creek should be cleaned—beaver dam and downed trees.

In regards to ***stormwater management*** (zoning regulations), 42 percent of respondents were either satisfied or well satisfied, 32 percent had no strong feeling, 3 percent were either dissatisfied or very dissatisfied, and 23 percent felt they needed more information. Respondent comments included the following:

- There is stormwater management on Powers Lake?; and,
- Concerned about lake levels which vary a lot.

Concerning the issue of ***sanitation regulations*** (solid waste disposal and sewerage regulations) on Powers Lake, 45 percent of respondents were either satisfied or well satisfied, 21 percent had no strong feeling, 17 percent were either dissatisfied or very dissatisfied, and, 17 percent felt they needed more information. Respondent comments included the following:

- People in Jefferson Bay should be required to put in holding tanks since land is so boggy;
- Too many septic tanks between house and lake;
- We need sewers; and,
- Lake seems to be dirtier and more difficult to see some animals that were fairly common years ago.

Given that between one-sixth and one-quarter of respondents indicated a need for further information on these ordinance-related topics, inclusion of information on these topics should be considered for inclusion in forthcoming newsletters and/or placement on the DoPL website. Information also could be featured at the annual meetings of the DoPL.

Lake Management District Issues and Concerns

As noted above, the vast majority of respondents, about 92 percent, indicated that they considered the DoPL to be generally doing a good job in managing Powers Lake, in contrast to the 2000 survey in which 77 percent felt the DoPL was doing a good job. Respondent comments in 2010 in this regard included:

- Getting things done;
- We talk, but nothing changes;
- Need to check on outside boats on a constant basis;
- Lighten up on ecology and make boating rules; and,
- Do more education of public.

In contrast to the nearly one-half of the respondents, 43 percent, to the 2000 survey who reported that they attended the annual meeting of the DoPL on a regular basis, only about 31 percent of the respondents to the 2010 survey indicated regular attendance at the annual meetings of the DoPL. The major reasons for not attending were: having to work, 21 percent; being out of town on the day of the meeting, 30 percent; meeting held at an inconvenient time, 38 percent; and would prefer the meeting to be held on another day, 11 percent. The majority of respondents who are unable to attend annual meetings due to schedule conflicts felt Saturdays would be best for scheduling annual meetings. When asked if they would attend annual meetings if the meetings were not held

on Fridays at 5:00 p.m. (17:00), responses were evenly divided between yes and no; no respondents seemed to prefer Saturdays, or Fridays at 7:00 p.m. (19:00), as viable alternatives.

While there was good awareness of the efforts by the DoPL to share news and information about the Lake—about four-fifths of respondents were aware of the DoPL website, and over 95 percent of respondents read the DoPL newsletter—there was less awareness of lake-related activities outside of the Powers Lake community. Less than 10 percent of respondents subscribed to the UWEX *Lake Tides* publication, maintained membership in the Wisconsin Association of Lakes (WAL), or attended the Wisconsin Lakes Convention. While it is not unexpected that people focus on their own community, especially given the fact that many respondents, about two-thirds, maintained a primary residence elsewhere, this finding provides an opportunity for the DoPL to utilize information gained through *Lake Tides*, the WAL *Lake Connection*, and the Wisconsin Lakes Convention in the DoPL newsletter and sharing links on the DoPL website.

While the percentage response to the community survey conducted by the DoPL has declined over the 30 years during which these surveys have been conducted, the rate of response and nature of the responses offered indicate an ongoing interest in the Lake and in the community. This interest has been recognized by the DoPL with the creation of the DoPL website (*http://districtofpowerslake.com/*) and its newsletter, which can be accessed through the website (*http://districtofpowerslake.com/NewsLetters.php*). Publication of these materials remains an important element of the work of the DoPL.

FISCAL RESPONSIBILITY FOR LAKE-RELATED IMPROVEMENTS

The 2010 community survey resulted in a shift of opinion with respect to the funding of the DoPL. Whereas during 2000, the majority of respondents to the Powers Lake survey, 67 percent, indicated a willingness to contribute more money for lake-related improvements, a slight majority of the respondents to the 2010 survey, 52 percent, indicated they would not be prepared to pay more than they currently do for lake improvements. Comments from those who were unwilling to pay more for lake improvements as to who should pay for lake improvements included:

- People who launch;
- WDNR;
- All Randall Township;
- State of Wisconsin, but do not raise our taxes;
- We already pay too much taxes—there should be enough;
- Out of State licensed boats;
- Nonresidents;
- Powerboaters; and,
- Operate within your budget.

Such responses reflect the perception of many lake communities that they are unfairly bearing the burden for maintaining resources that form "common highways and forever free, as well to the inhabitants of the State as to the citizens of the United States, without any tax, impost or duty therefor."[2] Riparian property owners do have exclusive rights of access, use, and opportunities to harvest natural resources from streams.[3]

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[2]*See Section 1 of Article IX of the* Wisconsin Constitution.

[3]*Paul G. Kent and Tamara A. Dudiak,* Wisconsin Water Law: A Guide to Water Rights and Regulations, Second Edition, *University of Wisconsin-Extension Publication No. G3622, 2001, page 13.*

With respect to the recreational boating access launch fee, the ability of the launch-site owner/operator to charge a fee for the service provided is limited pursuant to Chapter NR 1 of the *Wisconsin Administrative Code* to a fee that is consistent with the fee charged for entry to the Wisconsin State Parks. Provision is made in Chapter NR 1 for additional charges in cases where recreational boating launch sites have restroom facilities, attendants, and related improvements.

With respect to financial assistance from the State, funds for lake management activities are available primarily through the Chapter NR 190 Lake Management Planning Grant Program and the Chapter NR 191 Lake Protection Grant Program. The DoPL has applied to both of these programs for financial support of lake management activities in recent years. Some additional funding may be available through the Chapter NR 153 Targeted Runoff Management (TRM) Grant Program, with respect to the management of runoff from the roadways surrounding Powers Lake.

Other issues or concerns respondents wanted to bring to the attention of the DoPL included:

- Water quality improvement;
- Enforcement of regulations; and,
- Large boats and excessive noise.

CONCLUDING REMARKS

The first community survey of the Powers Lake community was conducted under the auspices of the planning program that led to the compilation of the comprehensive lake management plan for Powers Lake.[4] This plan has guided the selection and implementation of lake management practices in-and-around Powers Lake since its publication in 1991. The success of these management measures was gauged through the second community survey conducted in the Powers Lake community during 2000. This survey reinforced the ongoing conduct of the lake management program being carried out by the DoPL, while more clearly focusing the scope of DoPL activities into the areas of water quality protection, watercraft/recreational use regulation, and public access management.

The current community survey, which forms the third in the series of surveys conducted, confirms the community support for the actions being undertaken by the DoPL, but refines these actions further by reemphasizing the need for DoPL interventions in the areas of water quality protection and watercraft/recreational use regulation, while refocusing the actions of the DoPL toward aquatic plant management. With respect to the funding for these interventions, the current survey indicated that the community desires to "hold the line" in terms of community investments in the water resource that is Powers Lake, and supports the actions of the DoPL Board of Commissioners in seeking external funding through which to implement ongoing lake management actions. To this end, it should be noted that the DoPL Board of Commissioners have successfully accessed State support for the 2010 aquatic plant management program implemented on Powers Lake through the Chapter NR 198 Aquatic Invasive Species Prevention and Control Grants program and support for this planning program through the Chapter NR 190 Lake Management Planning Grant Program.

[4]*SEWRPC Community Assistance Planning Report No. 196*, op. cit.

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Chapter IV

ISSUES OF CONCERN

INTRODUCTION

Powers Lake is able to support a variety of recreational opportunities. However, there are a number of existing and potential future problems and issues of concern identified in this lake protection plan that should be addressed to enhance these recreational opportunities and contribute to the maintenance of quality of life experiences of the users of the Lake and the residents in the Powers Lake community.

This chapter utilizes the scientific data summarized in Chapter II and the survey information gathered from Powers Lake residents and summarized in Chapter III to define the major land and lake concerns. This chapter is based on the premise that in-lake concerns are a reflection of land use and land management within the drainage area tributary to the Lake. While it is true that lakes, as accreting systems, will trap and metabolize nutrients and other contaminants that are generated from the upstream watershed by natural processes, humans can and do accelerate this process of mobilizing contaminants and hastening the process of lake aging, or eutrophication. These nutrients and contaminants can modify the basic ecological and hydrological processes within a lake, often in a negative manner when viewed from the perspective of lakeshore residents and lake users. The issues of concern identified through the scientific studies included: public recreational water use, water quality, aquatic plant management, land use and acquisition, and lake outflow.

In addition, issues of concern were identified through the mail-drop questionnaire survey of the Powers Lake households conducted during 2009. Based upon the inputs of the survey respondents, the planning issues identified above were further refined and prioritized. The questionnaire survey was designed as part of a decadal effort to evaluate and assess the legitimate demands of the lake residents for: 1) access to quality water-based recreational opportunities, and 2) maintenance of residential ambience within the lakeshore area. The lakeshore area, for purposes of this investigation, was defined as those lands that are included within the boundary of the public inland lake protection and rehabilitation district, the District of Powers Lake (DoPL). The survey used in this evaluation is included herein as Appendix C, and the results of the survey are summarized in Chapter III of this report and in Appendix D. Based upon the responses to the questionnaire survey, the most significant lake-oriented issues of concern to the DoPL residents included: public recreational water use, water quality, and aquatic plant management.

The coincidence of the issues of concern identified using scientific criteria with those identified by the respondents to the questionnaire survey mirrors the experiences gained from the previous community surveys, and maintains a focus on those aspects of the Lake and its environs that fall, in part, within the purview of the DoPL: issues related to public recreational water use are governed by local ordinance, as noted in Chapter II of this report, while aquatic plant management, for example, is wholly within the scope of the DoPL. The issue of water

quality crosses jurisdictional boundaries with some elements, such as water quality monitoring, being executed by the DoPL while other elements, such as stormwater and wastewater management, being managed by the towns and counties that fall within the watershed.

In addition to these priority issues of concern, the scientific investigation identified two related issues of concern; namely, land use and acquisition, and lake outflow management. These five issues of concern are discussed below.

PUBLIC RECREATIONAL WATER USE

Public recreational use of Powers Lake was assessed through the field observations of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff undertaken during 2009, the results of which were presented as part of the inventory information set forth in Chapter II of this report. These observations were supplemented by a further assessment of the present and forecast future recreational uses of Powers Lake acquired through analysis of the mail drop questionnaire survey conducted during 2010 by the DoPL in partnership with SEWRPC. This latter survey, as noted in Chapter III, was conducted pursuant to University of Wisconsin-Extension (UWEX) Lakes Partnership guidelines and current Wisconsin Department of Natural Resources (WDNR) protocols.

As was noted in the inventory findings presented in Chapter II of this report, Powers Lake is considered to have water quality conducive to full recreational uses. Active summer recreational uses include active recreational uses such as powerboating, waterskiing and tubing, fishing, paddleboating, canoeing, kayaking, and swimming while popular winter time activities include snowmobiling, ice fishing and cross-country skiing. The summer recreational uses involve both full and partial body contact, as well as noncontact recreational uses, with swimming and tubing being examples of contact recreation while boating and fishing are largely noncontact recreational activities. All of these activities, both winter and summer, are active recreational pursuits, while passive pursuits such as scenic viewing are also practiced year-round.

The Lake experiences occasional intense recreational boating use on weekends and holidays during the summer. Public boating access to Powers Lake is provided primarily through a WDNR-owned and town-operated site at the northeast end of the Lake which provides a paved, fee-required boat launch, launch pier, and car-trailer parking area. As a consequence of the development of this site, Powers Lake is deemed to have adequate public access as defined in Chapter NR 1 of the *Wisconsin Administrative Code*, which establishes quantitative standards for determining the adequacy of public recreation boating access, setting maximum and minimum standards based upon available parking facilities for car-top and car-trailer units.

The recreational use surveys conducted by SEWRPC staff on typical summer weekdays and weekend days suggested that, overall, there was moderately heavy use of boats on Powers Lake, especially on weekends. Power-boats were the most popular watercraft in use on the Lake, both on weekdays and weekend days. On weekdays, fishing boats were the second most popular watercraft in use; on weekend days, pontoon boats were the second most popular watercraft in use. The most popular weekday recreational activities on the Lake were swimming, fishing from boats, waterskiing/tubing, and powerboating. On weekend days, the most popular activities were pleasure boating and water skiing/tubing, and fishing from boats. On the weekends, going to the parks and related shoreline uses also were popular activities.

Powers Lake appears to be one of the more popular regional sites for recreational water use enthusiasts, especially boaters, although boating densities appear to be generally within those considered appropriate in both the regional park and open space plan and State standards, as set forth in Chapter NR 1 of the *Wisconsin Administrative Code* for the conduct of safe high-speed boating activities.

The respondents to the 2009 mail-drop questionnaire survey conducted by the DoPL indicated that, in about 80 percent of cases, Powers Lake was a secondary residence. The majority of the respondents described their time spent at the Lake as being mostly during the extended summer (spring to fall) time period, with weekends year-round being the second-most popular choice for spending time at the Lake. On average, respondents spent about

83 days at Powers Lake each year. Over 80 percent of the respondents have lived on Powers Lake for more than 10 years. A majority of respondents to the 2009 survey, about 80 percent, indicated that they used only Powers Lake for recreational purposes, which is consistent with the long-term commitment most respondents have made to the community, as reflected by the fact that four-fifths of the respondents have lived in the community for more than 10 years. In this most recent of three such community questionnaire surveys, the use of the Lake and access sites by nonresidents, and the number of boats, remained an issue of serious concern within the community, and confirmed community support for the actions being undertaken by the DoPL and towns in the areas of watercraft/recreational use regulation. Consequently, recreation and recreational use issues remain important issues to be considered.

WATER QUALITY

Water quality in Powers Lake has been described as generally good to very good. Water quality data from Powers Lake during the current study period were collected under the auspices of the UWEX Citizen Lake Monitoring Network (CLMN), formerly known as the WDNR Self-Help Monitoring Program. In addition, U.S. Geological Survey (USGS) Trophic State Index (TSI) monitoring was continued. These water quality data were summarized in Chapter II of this report.

Water clarity, or transparency, is often used as an indication of overall water quality. In-lake measurements of water clarity from 1986 through 2010 have consistently averaged about 11.0 feet, indicating good to very good water quality. These data have been supported in recent years by satellite measurements documented through the University of Wisconsin-Madison Environmental Remote Sensing Center (ERSC) remote sensing program, which estimated the average water clarity of Powers Lake to be 11.9 feet for the period from 2003 through 2008.

Measurements of dissolved oxygen concentrations in the waters of Powers Lake have indicated that the lake waters are reasonably well-oxygenated throughout the year. Consequently, summer- or winterkills of fish due to lack of adequate oxygen levels are unlikely. Additionally, the amount of phosphorus present in bottom waters of the Lake have indicated only limited internal loading of this nutrient. In-lake measurements of chlorophyll-*a* concentrations since 1990 have indicated levels sufficiently low as to be unlikely to produce chronic nuisance algal blooms severe enough to impair recreational activities, such as swimming or waterskiing; these data are consistent with the views expressed by the respondents to the community-based questionnaire survey, the results of which are summarized in Chapter III of this report.

Overall, in-lake and other measurements of the various chemical parameters that are used to assess water quality indicate that Powers Lake has historically, and continues to have, good to very good water quality. Because of the importance of actual and perceived water quality regarding the attitudes of lake users and residents, water quality continues to be an important issue.

AQUATIC PLANT MANAGEMENT

Lake issues of concern identified by respondents included weeds (aquatic plants); among these aquatic plants, the presence of Eurasian water milfoil (*Myriophyllum spicatum*) in the basin of Powers Lake was an important issue of concern. The invasive Eurasian water milfoil often outcompetes native aquatic plants and, without management, frequently dominates the plant communities in the lakes of southeastern Wisconsin to the detriment of native plant species and their associated fish and wildlife populations. There also is increasing evidence that Eurasian water milfoil will hybridize with native or northern water milfoil, increasing the invasive nature of this genus.[1]

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[1]*Michael L. Moody and Donald H. Les, "Evidence of Hybridity in Invasive Water Milfoil (*Myriophyllum*) Population,"* PNAS*, Vol. 99, No. 23, November 2002, pages 14867-14871.*

The recent aquatic plant survey of Powers Lake conducted by SEWRPC staff indicate that the Lake has a good variety of aquatic plant species, such biodiversity generally being considered evidence of a healthy lake with good habitat for fishes and aquatic life. However, the continued presence of Eurasian water milfoil in the Lake, along with the level of popularity of the Lake for human recreational and aesthetic activities, suggest that aquatic plant management is an issue that should continue to be considered.

ANCILLARY ISSUES OF CONCERN

Land Use and Acquisition

The lands within the drainage area tributary to Powers Lake have been identified as potential areas for urban density residential growth in the adopted Regional land use plan and Kenosha County comprehensive plan.[2] As noted in Chapter II, these land use changes have the potential to alter, and generally increase, the contaminant loadings to Powers Lake, especially with regard to heavy metals and other contaminants of primarily urban origin. Contaminant loads to a lake are generated by various natural processes and human activities that take place in the 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. Contaminants transported by the atmosphere are deposited onto the surface of the lake as dry fallout and direct precipitation. Contaminants transported across the land surface enter the lake directly as surface runoff and, indirectly, as groundwater inflows, including drainage from onsite wastewater treatment systems. Contaminants transported by streams also enter a lake as surface water inflows.

In drained lakes, like Powers Lake, contaminant loads transported by precipitation falling directly onto the Lake surface, and by runoff from the tributary area immediately surrounding the Lake, in the absence of identifiable or point source discharges from industries or wastewater treatment facilities or inflowing streams, comprise the principal routes by which contaminants enter the waterbody. Runoff from the tributary area immediately surrounding the Lake, conveys contaminants generated from urban and rural sources, or nonpoint sources, such as those transported by stormwater runoff from residential, commercial, transportation, construction, and recreational activities, and runoff from agricultural lands. Consequently, changes in land use within the watershed of Powers Lake were identified as an issue of concern by the Board of Commissioners of the DoPL.

Of particular concern is the trend toward increasing areas of impervious surface within the watershed of the Lake. Because these surfaces generate greater volumes of runoff, and potentially collect a greater mass of potential contaminants both through direct deposition and indirect atmospheric deposition as dry fallout, the likely effect of such densification of land usage would be to increase the nonpoint source pollution loads to Powers Lake. Additionally, an increasing utilization of agro-chemicals in urban landscaping may offset some of the benefits achieved through the introduction of: 1) integrated agricultural nutrient and pest management practices, 2) the stormwater management requirements set forth in Chapter NR 151 of the *Wisconsin Administrative Code*, and 3) the limits established by the Wisconsin Legislature on the use and sale of fertilizer containing phosphorus in turf fertilizers to be used in urban areas, pursuant to 2009 *Wisconsin Act* 9 and on the amount of phosphorus in certain cleaning agents, pursuant to 2009 *Wisconsin Act* 63.

In order to further offset the consequences of contaminants generated from changing land use activities within its tributary area, the DoPL has initiated a process of land acquisition aimed at targeting critical environmental lands within its watershed, especially those associated with the Powers Lake Tamarack Relict and its associated wetlands.[3] These areas are being protected through fee simple purchase in order to preserve and protect the source

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[2]*See SEWRPC Planning Report No. 48,* A Regional Land Use Plan for Southeastern Wisconsin: 2035, *June 2006; see also SEWRPC Community Assistance Planning Report No. 299,* A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, *April 2010.*

[3]*See SEWRPC Planning Report No. 42,* A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin, *September 1997, as amended.*

waters of Powers Lake. While some of these lands are subject to protections under existing local, county, state and Federal regulations, especially those lands which are designated as wetland, the degree of protection may change from time-to-time as laws are refined and amended. Consequently, outright ownership by an appropriate entity affords ongoing protection and preservation of purchased lands regardless of ordinance changes. For this reason, acquisition of portions of these lands was recommended in the comprehensive lake management plan and initiated by the DoPL.[4] Consequently, acquisition of critical lands within the area tributary to Powers Lake, with a focus on those lands contiguous to lands previously acquired by the DoPL, is an issue that should continue to be considered.

Finally, the nature of land conversion remains an issue of concern to the DoPL and its electors and property owners. The DoPL remains committed to maintaining the ambience of the Powers Lake community through the protection of lake water quality and its watershed. Recent proposals to alter local zoning have been met with a high degree of concern based upon the District's mandate pursuant to Subchapter IV of Chapter 33 of the *Wisconsin Statutes* to protect water quality, primarily on the basis that such changes to the community's zoning would increase nonpoint contaminant loadings to the Lake, with concomitant impacts on lake water quality, fish and aquatic life, recreation, and aesthetics.

Lake Outflow

As a consequence of the regional scale rainfall and flood events experienced in Southeastern Wisconsin during the month of June in 2008, 2009, and 2010,[5] the DoPL Commissioners expressed concern regarding the ability of the East Branch of the Nippersink Creek to pass flood flows originating from Powers Lake. As a headwater lake, waters from Powers Lake are affected not only by the water level control structure that forms the outlet of the Lake, but also by the ability of the East Branch of the Nippersink Creek to pass flows downstream, where flows are further controlled by road culverts at Powers Lake Road and the water level control structure at the outlet of Tombeau Lake.[6] SEWRPC staff noted the presence of a substantial beaver dam downstream of the Powers Lake outlet and upstream of Powers Lake Road which created an additional water level control structure within the upper reaches of the East Branch of the Nippersink Creek. Under extreme events, this structure could potentially influence the ability of water to leave Powers Lake; to this end, Hey & Associates, Inc., noted that the East Branch of the Nippersink Creek has a very low stream gradient with about 3.1 feet of fall over the approximately 2,750 feet reach of the Creek.[7] This low gradient was identified by Hey & Associates, Inc., as potentially contributing to a back water effect downstream of the Powers Lake dam that could decrease discharge from the Lake. Additionally, Hey & Associates, Inc., also noted the limited capacity of the dam outlet structure. All of these concerns could potentially result in water remaining in the Lake creating extended periods of high water, and/or the periodic overtopping of Powers Lake Road in the vicinity of the outlet structure.

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[4]*See SEWRPC Community Assistance Planning Report No. 196,* A Management Plan for Powers Lake, Kenosha and Walworth Counties, Wisconsin, *November 1991.*

[5]*See U.S. Geological Survey Scientific Investigations Report No. 2008–5235,* Flood of June 2008 in Southern Wisconsin, *2008.*

[6]*See SEWRPC Memorandum Report No. 140,* A Lake Protection Plan for Benedict and Tombeau Lakes, Kenosha and Walworth Counties, Wisconsin, *May 2001.*

[7]*Hey & Associates, Inc., Memorandum, "Powers Lake Outlet and Outlet Channel Maintenance," July 2010.*

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Chapter V

ALTERNATIVE AND RECOMMENDED LAKE PROTECTION AND MANAGEMENT PRACTICES

INTRODUCTION

Powers Lake contains a diverse aquatic plant community capable of supporting a warmwater fishery, albeit with some areas that suffer impairment of recreational opportunities and other lake-oriented activities due to an overabundance of aquatic macrophytes. For example, in those areas of the Lake where Eurasian water milfoil (*Myriophyllum spicatum*) is abundant, certain recreational uses are limited, the aesthetic quality of the Lake is impaired, and in-lake habitat degraded. The plant primarily interferes with recreational boating activities by encumbering propellers, clogging cooling water intakes, snagging paddles, and slowing sailboats by wrapping around keels and control surfaces. The plant also causes concern among swimmers who can become entangled within the plant stalks. Thus, without control measures, these areas can become problematic for navigation, fishing, and swimming. Native aquatic plants, generally found at slightly deeper depths, pose fewer potential problems for navigation, swimming, and fisheries, and generally have attributes that sustain a healthy fishery. Many native aquatic plants provide fish habitat and food resources, and offer shelter for juvenile fishes and young-of-the-year fish.

In this chapter, alternative and recommended actions for addressing the issues of concerns described in Chapter IV of this report are presented. These measures are focused primarily on those measures which can be implemented by the District of Powers Lake (DoPL), with lesser emphasis given to those measures which are applicable to other agencies having jurisdiction within the area tributary to the Lake.

PAST AND PRESENT MANAGEMENT MEASURES

The comprehensive lake management plan for Powers Lake set forth a program of lake management measures recommended for application in Powers Lake and its tributary area.[1] These measures included both tributary area-based actions and in-lake actions, and included measures applicable to Powers Lake. The recommended plan elements are summarized in Table 16. Since the publication of the comprehensive plan, the DoPL has executed a program of land and water resources management that has implemented many of the recommendations. This

[1]*SEWRPC Community Assistance Planning Report No. 196*, A Management Plan for Powers Lake, Kenosha and Walworth Counties, Wisconsin, *November 1991*.

Table 16

IMPLEMENTATION STATUS OF THE RECOMMENDED LAKE USE PLAN ELEMENTS FOR POWERS LAKE: 1991-2011

Plan Element	Subelement	Management Measures	Management Responsibility	Implementation Status: 2011
Land Use and Zoning	Wetland Zoning	Rezone two wetland areas currently zoned for development to C-1 Lowland Resource Conservancy	Kenosha County	Completed
Water Quality	Rural Nonpoint Source Pollution Control	Crop Rotation, contour cropping, contour strip-cropping, conservation tillage, fertilizer and pesticide management, permanent vegetative cover, buffer strips	Private landowners	Ongoing
	Construction Site Erosion Control	Adopt and enforce construction site erosion control ordinances	Kenosha and Walworth Counties, Towns of Bloom-field, Randall, and Wheatland	Ongoing
	Urban Nonpoint Source Pollution Control	Implement public education program promoting good housekeeping practices and low-cost urban practices	DoPL and private landowners, UWEX	Ongoing: DoPL newsletter and website, guest speakers at DoPL annual meeting
	Onsite Sewage Disposal System Management	Facility planning recommendations expected late 1991	WDNR, Kenosha and Walworth Counties, Towns of Bloom-field, Randall, and Wheatland, and private landowners	Ongoing by Counties
Wetland Protection	Wetland Acquisition	Purchase wetlands up to 306 acres, over time	DoPL	Partial acquisition completed; balance of acquisition pending
		Prepare management plan for wetlands to be acquired	DoPL	Land management plan prepared for portion of wetlands acquired by the DoPL
In-Lake Management	Protection of Environmentally Valuable Areas	Prohibit dredging, restrict boating to slow-no-wake in environ-mentally valuable areas, limit aquatic plant control and construction of piers and docks in Knolls and Honey Bear Bays	WDNR	Ongoing upon review of permit applications by private landowners
		Limit dredging, aquatic plant control, and construction of piers and docks in other environmentally valuable areas	WDNR	Pending
	Monitoring Programs	Fish surveys, comprehensive aquatic macrophyte survey, water quality sampling	WDNR, DoPL, USGS, UWEX CLMN	Ongoing
	Aquatic Plant Control	Hand (rake) removal of milfoil in selected areas	DoPL, UWEX, WDNR	Ongoing
	Shoreline Protection	Revegetate unprotected and unstable shoreline in environmentally valuable areas and maintain existing structures	WDNR and private landowners	Ongoing
		Protect unprotected and unstable shoreline outside of environ-mentally valuable areas using vegetation and structures	WDNR and private landowners	Ongoing

Table 16 (continued)

Plan Element	Subelement	Management Measures	Management Responsibility	Implementation Status: 2011
In-Lake Management (continued)	Education	Develop and implement an information and education program focusing on the ecology of the Lake	DoPL, UWEX	Completed and ongoing: DoPL newsletter and website
Recreational Use Management	Boating Ordinance Revisions	Investigate safety issues and recommend boating restrictions	Town of Randall	Completed: Town of Randall currently conducting a further review of the Town Ordinance
		Purchase and place additional buoys to delineate slow-no-wake areas in Jefferson, Knolls, and Honey Bear Bays	Town of Randall and WDNR	Ongoing
		Increase posting of boating ordinances at all public access sites. Display ordinances and *Wisconsin Statutes* pertaining to boating and jet skis. Post ordinance, fine assessments, and disposal information relative to littering. Provide waste disposal containers. Post [*Wisconsin*] *Statutes* and local ordinances relative to snowmobiling and ice shanties	Town of Randall	Completed: Town of Randall currently conducting a further review of the Town Ordinance
		Increase patrol hours and effectiveness of the Powers Lake Water Police during the weekends, consider retention and training of additional police officers	Town of Randall and Kenosha County	Ongoing
		Consider extending police surveillance during evening hours in winter	Town of Randall	Pending: Obstructions such as year round piers marked as required by Ordinance
		Develop, publish, and disseminate to residents and nonresidents at public access sites fact sheets providing information on summer and winter recreational use	DoPL	Completed and ongoing: DoPL newsletter and website
	Public Access	Consider the acquisition of shoreline property and property for additional parking	WDNR	Completed
	Dredging	Limit dredging for boat access in Jefferson Island Channel and in Jefferson and Harbor Lite's Bays; institute mitigation measures	DoPL	Ongoing: Maintenance dredging in channels

NOTE: The following abbreviations have been used:

DoPL = District of Powers Lake
USGS = U.S. Geological Survey
UWEX = University of Wisconsin-Extension
CLMN = Citizen Lake Monitoring Network
WDNR = Wisconsin Department of Natural Resources

Source: SEWRPC.

program of active lake management forms the foundation upon which the recommendations set forth in this Chapter are based.

Recommended Management Actions

Tributary Area Management Actions

The comprehensive lake management plan for Powers Lake set forth four major recommended actions with respect to land management in the tributary area, as summarized in on Map 11 and Table 16. These measures included the implementation of best practices on both rural agricultural lands and urban lands, the management of construction site erosion, onsite sewage disposal system management, and the protection of wetlands. Rural nonpoint source pollution control measures recommended included the development of detailed farm plans with the assistance of the County land conservation departments in the drainage area. Recommended urban management practices included implementation of urban good housekeeping practices. Implementation of the construction site best management practices set forth in the *Wisconsin Construction Site Best Management Practices Handbook* also was recommended. Further, the plan recommended review of the facilities plan for the provision of wastewater conveyance and treatment from urban density development around Benedict, Powers, and Tombeau Lakes in the Towns of Bloomfield, Randall, and Wheatland. Finally, the plan recommended the protection and potential acquisition of critical wetland areas located within the area tributary to Powers Lake. High priority wetlands were identified to the northeast of the main lake basin of Powers Lake, with two smaller parcels being identified to the southeast of the main lake basin, adjacent to Knolls Bay and Jefferson Bay.

In-Lake Management Actions

The comprehensive lake management plan for Powers Lake included several measures recommended for consideration by the Powers Lake community were designed to facilitate the application of the recommended lake management measures including continuing water quality sampling to track the implementation of the watershed-based and in-lake management measures. These measures also included the protection and possible purchase of the wetlands areas adjacent to watercourses draining to Powers Lake. Aquatic plant management recommendations were limited to hand pulling of aquatic plants around piers and docks, and vegetative shoreland protection measures were recommended for shorelands within environmentally sensitive areas of the Lake; use of shoreland protection structures was recommended outside of these sensitive areas.

The comprehensive lake management plan placed significant emphasis on recreational use management, including the refinement of the Town of Randall and Bloomfield recreational boating ordinance. Recommended refinements included consideration of a “quiet time” at midday on weekends and public holidays during which motorized boating traffic would be restricted to slow-no-wake speeds, implementation of slow-no-wake speed restrictions in the Bays, enhanced signage applicable to both open water and winter recreational use of the Lake, and enhanced enforcement. At the time of formulating the comprehensive lake management plan for Powers Lake, provision of public recreational boating access also was recommended, as was limited dredging of portions of Jefferson Bay.

Status of Recommended Lake Management Actions

Since the publication of the comprehensive lake management plan for Powers Lake, the DoPL and Powers Lake community including the Towns of Bloomfield, Randall, and Wheatland have implemented a range of actions in response to the planning recommendations. These are summarized in Table 16.

With respect to the recommended watershed management measures, the DoPL has acquired portions of the wetland area located to the northeast of the main lake basin. This acquisition was made with the assistance of Chapter NR 191 lake protection grant funding from the State of Wisconsin. The DoPL also has conducted an ongoing program of informational programming aimed at urban and rural property owners within the drainage area tributary to Powers Lake with the objective of encouraging landowners to adopt lake-friendly land management practices. This informational programming is supported by the participation of land and water resources professionals as a regular part of the annual meetings of the DoPL, the publication of a regular newsletter, and the creation of a DoPL website.

Map 11

RECOMMENDED LAKE USE PLAN FOR POWERS LAKE

LEGEND

ENVIRONMENTALLY VALUABLE AREA PROTECTION

- ● NO WEED HARVESTING OR HERBICIDE USE
  ● LIMIT PIER AND DOCK CONSTRUCTION
  ● LIMIT DREDGING
- WETLAND AREA CONSIDERED FOR REZONING FROM R-3 URBAN SINGLE-FAMILY RESIDENTIAL TO C-1 LOWLAND RESOURCE CONSERVANCY
- ISOLATED NATURAL AREA CONSIDERED FOR RE-ZONING FROM B-5 COMMERCIAL-RECREATIONAL BUSINESS TO C CONSERVATION

SHORELINE PROTECTION

- MAINTAIN EXISTING STABLE, UNPROTECTED SHORELINE

WITHIN ENVIRONMENTALLY VALUABLE AREAS:

- PROTECT EXISTING, UNPROTECTED AND UNSTABLE SHORELINE WITH VEGETATION
- MAINTAIN EXISTING STRUCTURES OR REPLACE WITH VEGETATION

OUTSIDE ENVIRONMENTALLY VALUABLE AREAS:

- PROTECT UNSTABLE AND UNPROTECTED AREAS USING VEGETATION AND STRUCTURES
- REPAIR AND MAINTAIN EXISTING PROTECTION STRUCTURES

RECREATIONAL USE MANAGEMENT

- SLOW NO-WAKE BOATING ONLY
- FAST BOATING AND WATERSKIING ALLOWED 10:00 AM TO SUNSET
- BUOY PLACEMENT TO BE DETERMINED BY THE POWERS LAKE WATER POLICE AND BLOOMFIELD AND RANDALL TOWN BOARDS
- ▲ POST ORDINANCES, PROVIDE SUMMER AND WINTER RECREATIONAL USE FACT SHEETS AND PROVIDE WASTE DISPOSAL CONTAINERS AT PUBLIC ACCESS SITES
  ● INCREASE WEEKEND ENFORCEMENT OF BOATING ORDINANCE
  ● CONDUCT SURVEYS OF WEEKEND RECREATIONAL USE
- LIMITED DREDGING FOR BOAT ACCESS

PUBLIC ACCESS

- RECOMMENDED AREA FOR A PUBLIC ACCESS SITE WITH LIMITED PARKING
- ● POTENTIAL PARKING AREA FOR A PUBLIC ACCESS SITE

MONITORING PROGRAM

- ● CONDUCT FISH SURVEY
  ● CONDUCT AQUATIC MACROPHYTE SURVEY
  ● CONTINUE WATER QUALITY SAMPLING

GRAPHIC SCALE
0 400 800 1200 FEET

Source: SEWRPC.

With respect to the recommended in-lake management measures, the DoPL participated continuously in monitoring the water quality of the Lake since 1986, under the auspices of the Citizen Lake Monitoring Network (CLMN). In addition, the Town of Randall has undertaken periodic review of the recreational boating and lake use ordinance provisions applicable to Powers Lake, and the WDNR has constructed a recreational boating access on CTH F that is consistent with the standards set forth in Chapter NR 1 of the *Wisconsin Administrative Code*.

PUBLIC RECREATIONAL WATER USE

Current public recreational boating access standards, as set forth in Sections NR 1.91(4) and NR 1.91(5) of the *Wisconsin Administrative Code*, establish minimum and maximum standards, respectively, for public recreational boating access development to qualify waters for resource enhancement services, such as fish stocking, provided by the Wisconsin Department of Natural Resources (WDNR). As noted in Chapter II of this report, Powers Lake is deemed to have adequate public access as defined in Chapter NR 1 of the *Wisconsin Administrative Code*, and recreational boating activities remain a popular pastime on the Lake. As noted in Chapter III of this report, over one-half of respondents to the community mail drop questionnaire survey reported engaging in motorized boat activities—such as high speed boating, waterskiing, and operating personal watercraft (PWCs)—for about 30 days per year. Operation of nonmotorized watercraft—such as kayaks and canoes—also was reported to be popular among respondents, with respondents engaging in these activities for just over two weeks per year on average.

Comments from respondents to the mail drop questionnaire survey conducted by the DoPL, described in Chapter III of this report, suggest that there is significant concern regarding the perceived over-use of the Lake by boaters, especially on summertime weekend days. High volumes of boat traffic and related activities, such as waterskiing, tubing, and jet-skiing, lead to congested conditions on the Lake and may, at times, pose certain safety risks to participants. In addition, high volumes of boat traffic, along with the noise and increased wave activity generated by boat wakes, tend to diminish the aesthetic quality of the Lake and impair the ability of other users to engage in activities such as canoeing, fishing, paddleboating, and swimming.

A further issue raised by the questionnaire respondents was that of overflow parking from the recreational boating access site that occurs along Bloomfield Road (CTH F). The narrow roadway, presence of pedestrians, and intensity of the summer season traffic flow add to the safety concerns voiced by the residents that occur when the parking lot at the launch site is full.

Lastly, as a consequence of the regional floods which have occurred during the early summer period in 2008, 2009, and 2010, some residents have proposed that the Town of Randall reconsider periodic implementation of slow-no-wake regulations pursuant to Chapter 20 of the Code of Municipal Ordinances of the Town of Randall in order to ensure protection of public safety, integrity of shorelands, and protection of property during high water periods.

Recommended Management Measures

Maintenance of the public recreational boating access opportunities at Powers Lake is recommended. The WDNR in cooperation with the DoPL and the Town of Randall should periodically review the lake access opportunities, especially with regard to the provision of recreational boating access, to ensure ongoing compliance with the State standards. In this regard, ongoing compliance with State recreational boating access standards is a prerequisite for resource enhancement services including eligibility of the DoPL to access State grant funds for lake management planning and lake protection activities, among others.

It is recommended that appropriate signage be provided at the public recreational boating access site in order to alert users of Eurasian water milfoil, zebra mussels, and other nonnative invasive species. Such information also should be included in the DoPL informational programming as an element of the aquatic plant management program set forth in this plan. To this end, it is further recommended that the DoPL continue participating in the University of Wisconsin-Extension (UWEX) Clean Boats-Clean Waters Program to enhance awareness of lake

users regarding nonnative species and the need to minimize opportunities for such species to be transported between lakes. The position of Powers Lake at the headwaters of the East Branch of the Nippersink Creek makes such participation especially important given that many nonnative species, when introduced into headwater areas, can make their way downstream into other waters that may not have been previously inoculated with such species.

Periodic review of Chapter 20, Water Use, of the Code of Municipal Ordinances of the Town of Randall is recommended to ensure currency with Chapter 30 of the *Wisconsin Statutes*, and continued applicability to recreational boating activities within the Town. Provision for slow-no-wake operation of motorized watercraft during periods of high water in the Lake should be considered; however, any such provision is recommended to be tied to an actual surface elevation relative to the National Geodetic Vertical Datum of 1929 in order to ensure the objective application of any such ordinance.

Finally, with regard to the application of the Town ordinance and State regulations, it is recommended that the DoPL continue to liaise with the Town with regard to interpretation of the Ordinance, provision of information to electors and property owners of the District, and users of the recreational boating access site, among others. The practice of the DoPL of annually disseminating copies of the boating rules applicable to Powers Lake is endorsed.

WATER QUALITY

Water Quality Management

Water quality is a descriptor of the overall health of a waterbody. The importance of good water quality can hardly be underestimated, as it impacts nearly every facet of the natural balances and relationships that exist in a lake between the myriad of abiotic and biotic elements present. Water quality is comprised of a number of physical, chemical, and biological components, which collectively create the in-lake conditions observed by lake residents and lake users. Because of the importance water quality plays in the functioning of a lake ecosystem, careful monitoring of this lake element represents a fundamental tool in the ongoing practice of lake management. Lake water quality monitoring, whether of a single parameter, such as water clarity, or multiple parameters, such as those included in the Trophic State Index determination—e.g., the concentrations of chlorophyll-*a* and total phosphorus—provide the quantitative basis necessary to identify and address water quality concerns at an early stage, when interventions need not be as drastic or costly as may be the case if such problems are allowed to fully develop.

Water quality data for Powers Lake continue to be collected by volunteers enrolled in the University of Wisconsin-Extension (UWEX) which operates the CLMN program. In addition, the DoPL has contracted with the U.S. Geological Survey (USGS) for the conduct of water quality monitoring services under their Trophic State Index (TSI). This latter program has been in place since 1986, as shown in Figure 1 in Chapter II of this report.

Array of Management Measures

The UWEX operates the CLMN program, formerly the WDNR Self-Help Monitoring Program. Volunteers enrolled in this program gather data at regular intervals on water clarity through the use of a Secchi-disk. Because pollution tends to reduce water clarity, Secchi-disk measurements are generally considered one of the key parameters in determining the overall quality of lake water, as well as trophic status. Secchi-disk measurement data are added to the WDNR-sponsored data base containing lake water quality information for most of the lakes in Wisconsin and are accessible on-line through the WDNR website.

The UWEX also offers an Expanded Self-Help Monitoring Program (Level II) that involves collecting data on several key physical and chemical parameters in addition to the Secchi-disk measurements. Under this program, samples of lake water are collected by volunteers at regular intervals and analyzed by the State Laboratory of Hygiene (SLOH). Data collection is more extensive and, consequently, places more of a burden on volunteers.

The basic UWEX CLMN program is available at no charge, but does require volunteers to be committed to taking Secchi-disk measurements at regular intervals—preferably weekly—throughout the spring, summer, and fall. The Expanded Self-Help Program requires additional commitment by volunteers to take a more-extensive array of measurements and samples for analysis, also on a regular basis. As with any volunteer-collected data, despite the implementation of standardized field protocols, individual variations in levels of expertise due to background and experiential differences, can lead to variations in data and measurements from lake-to-lake and from year-to-year for the same lake, especially when volunteer participation changes.

In addition to the UWEX volunteer-based CLMN program, the University of Wisconsin-Stevens Point (UWSP) also offers several volunteer-conducted water quality sampling programs. Under these latter programs, volunteers collect water samples and send them to the UWSP Water and Environmental Analysis Laboratory (WEAL) for analysis. The UWSP turnover sampling program requires only a once-a-year sampling, thereby requiring a smaller time commitment by the volunteers, but, there is a modest charge for the laboratory analysis, and, because sampling is performed by volunteers, is subject to those variations identified above. Additionally, since samples need to be taken as closely as possible to the actual turnover period, which occurs only during a relatively short window of time, volunteers need to monitor lake conditions as closely as possible to be able to determine when the turnover period is occurring.

Finally, the USGS also offers an extensive water quality monitoring program under their TSI monitoring program. The USGS program does not require volunteer sampling. USGS field personnel conduct a series of approximately five monthly samplings beginning with the spring turnover. Samples are analyzed by the SLOH for an extensive array of physical and chemical parameters. All sampling and analysis is undertaken using standardized field and laboratory techniques and protocols. As a result, a more standardized set of data and measurements may be expected. However, the cost of the USGS program is significantly higher than the UWSP program, even with State cost-share availability.

Recommended Management Measures

The WDNR offers small grant cost-share funding within the Chapter NR 190 Lake Management Planning Grant Program that can be applied to defraying the costs of laboratory analysis and sampling equipment. It is recommended that the DoPL continue to participate in the expanded CLMN program sponsored by the UWEX CLMN. Data gathered as part of this program should be presented annually by the volunteer monitors at meetings of the DoPL, where the citizen monitors could be given some recognition for their work. The lake coordinator of the WDNR, Southeast Region, could assist in enlisting more volunteers in this program. The information gained at first-hand by the public from participation in this program can increase the credibility of the proposed changes in the nature and intensity of use to which the Lake is subjected.

It is further recommended that the DoPL continue participating in the USGS TSI monitoring program. While the DoPL has participated continuously in this program since, it is recommended that the DoPL continue to do so into the future, at a minimum on a periodic basis every three to five years. This program or that of the UWSP is especially valuable as a means of assembling a comprehensive water quality determination on a periodic basis to supplement the annual CLMN data.

AQUATIC PLANT MANAGEMENT

The shoreland and aquatic macrophyte management elements of this plan consider alternative management measures consistent with the provisions of Chapters NR 40, NR 103, NR 107, and NR 109 of the *Wisconsin Administrative Code*. Further, the alternative aquatic plant management measures are consistent with the requirements of Chapter NR 7 of the *Wisconsin Administrative Code*, and with the public recreational boating access requirements relating to the eligibility under the State cost-share grant programs, set forth under Chapter NR 1 of the *Wisconsin Administrative Code.*

As stated in Chapter II of this report, recent aquatic plant management activities in Powers Lake can be categorized as primarily chemical herbicide treatment to control aquatic plant growth in the Lake. In addition, individual householders on the Lakes are known to have engaged in manual harvesting in the vicinities of their piers and docks.

Array of Management Measures

Aquatic plant management measures can be classed into four groups: ***physical measures***, which include lake bottom coverings and water level management; ***biological measures***, which include the use of various organisms, including herbivorous insects and plantings of aquatic plants; ***manual*** and ***mechanical measures***, which include harvesting and removal of aquatic plants; and ***chemical measures***, which include the use of aquatic herbicides. All control measures are stringently regulated and require a State of Wisconsin permit; chemical controls are regulated under Chapter NR 107 of the *Wisconsin Administrative Code*, and other aquatic plant management practices, with the exception of the placement of bottom covers, are regulated under Chapter NR 109 of the *Wisconsin Administrative Code*. Placement of bottom covers, a physical measure, also requires a WDNR permit under Chapter 30 of the *Wisconsin Statutes*. Costs range from minimal for manual removal of plants using rakes and hand-pulling, to upwards of $75,000 for the purchase of a mechanical plant harvester, for which the operational costs can approach $2,500 to $25,000 per year, depending on staffing and operation policies.

Physical Measures

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. Sand and gravel are usually widely available and relatively inexpensive to use as cover materials, but plants readily recolonize areas so covered in about a year. Synthetic materials, such as polyethylene, polypropylene, fiberglass, and nylon, can provide relief from rooted plants for several years. However, such materials, known as bottom screens, or barriers, generally have to be placed and removed annually. Such barriers also are susceptible to disturbance by watercraft propellers or the buildup of gasses from decaying plant biomass trapped under the barriers. Other physical alternatives include the use of dyes to reduce the penetration of sunlight into the Lake to limit the growth of bottom dwelling aquatic plants and algae. In the case of Powers Lake, however, the application of physical aquatic plant management measures to control aquatic plant growth does not appear to be warranted. Thus, such measures are not considered viable for Powers Lake.

Biological Measures

Biological controls offer an alternative approach to controlling nuisance plants, particularly purple loosestrife (*Lythrum salicaria*), an invasive shoreland wetland plant, and Eurasian water milfoil. Classical biological control techniques have been successfully used to control both nuisance plants with herbivorous insects.[2] Recent evidence shows that *Galerucella pucilla* and *Galerucella calmariensis*, beetle species, and *Hylobius transversovittatus* and *Nanophyes brevis*, weevil species, have potential as biological control agents for purple loosestrife.[3] Extensive field trials conducted by the WDNR in southeastern Wisconsin since 1999 have indicated that these insects can provide effective management of large infestations of purple loosestrife. In contrast, the few studies of Eurasian water milfoil control utilizing *Eurhychiopsis lecontei*, an aquatic weevil species, have resulted in variable levels of control, with little control being achieved on those lakes having extensive motorized boating traffic. Thus,

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[2]*B. Moorman, "A Battle with Purple Loosestrife: A Beginner's Experience with Biological Control,"* Lake Line, *Vol. 17, No. 3, September 1997, pages 20-21, 34-3; see also, C.B. Huffacker, D.L. Dahlsen, D.H. Janzen, and G.G. Kennedy,* Insect Influences in the Regulation of Plant Population and Communities, *1984, pages 659-696; and C.B. Huffacker and R.L. Rabb, editors,* Ecological Entomology, *John Wiley, New York, New York, USA.*

[3]*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.*

while the use of insects as a means of shoreland wetland plant management is considered to be viable, the use of *Eurhychiopsis lecontei* as a means of aquatic plant management control, is not considered a viable option for use on Powers Lake at this time.

The use of grass carp, *Ctenopharyngodon idella*, an alternative biological control used elsewhere in the United States, is not permitted in Wisconsin.

A variation on the theme of biological control is the introduction of aquatic plants into a waterbody as a means of encouraging or stimulating the growth of desirable native aquatic plant species in a lake. While few projects of this nature have been undertaken in the Southeastern Wisconsin Region, the Lac La Belle Management District, in partnership with the WDNR and University of Wisconsin-Milwaukee, did attempt to supplement the aquatic plant community of that Lake by selectively planting pondweeds (*Potamogeton* spp.).[4] Several hundred pondweeds were transplanted into Lac La Belle, and, while there is some evidence that a few of these transplants were successful, the net outcome of the project was disappointing. Few of the introduced plants were observed in subsequent years.[5] Given the extensive and diverse aquatic plant community present in Powers Lake, supplemental plantings are not considered to be a viable aquatic plant management option.

Manual and Mechanical Measures

The physical removal of specific types of vegetation by selective harvesting of plants provides a highly selective means of controlling the growths of nuisance aquatic plant species, including purple loosestrife and Eurasian water milfoil. Pursuant to Chapter NR 109 of the *Wisconsin Administrative Code*, manual harvesting of aquatic plants within a 30-foot-wide corridor along a 100-foot length of shoreline would be allowed without a WDNR permit, provided the plant material is removed from the Lake. Any other manual harvesting would require a State permit, unless employed in the control of designated nonnative invasive species, such as Eurasian water milfoil or curly-leaf pondweed.

In the shoreland area, where purple loosestrife may be expected to occur, bagging and cutting loosestrife plants prior to the application of chemical herbicides to the cut ends of the stems, can be an effective control measure for small infestations of this plant. Loosestrife management programs, however, should be followed by an annual monitoring and control program for up to 10 years following the initial control program to manage the regrowth of the plant from seeds. Manual removal of such plants is recommended for isolated stands of purple loosestrife.

In the nearshore area, specially designed rakes are available to assist in the manual removal of nuisance aquatic plants, such as Eurasian water milfoil. The use of such rakes also provides a safe and convenient method of controlling aquatic plants in deeper nearshore waters around piers and docks. The advantage of the rakes is that they are relatively inexpensive, easy and quick to use, and immediately remove the plant material from a lake. Removal of the plants from a lake avoids the accumulation of organic matter on the lake bottom, which adds to the nutrient pool that favors further plant growth. State permitting requirements for manual aquatic plant

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[4]*Donald H. Les and Glenn Guntenpergen, "Laboratory Growth Experiments for Selected Aquatic Plants, Final Report, July 1989-June 1990 (Year 1),"* Report to the Wisconsin Department of Natural Resources, *June 1990; Wisconsin Department of Natural Resources*, Environmental Assessment: Improvement of the Water Quality and Fisheries Habitat of Lac La Belle [sic] and the Lower Oconomowoc River, s.d.

[5]*At the 2003 annual meeting of the Lac La Belle Management District, a citizen reported observing a herbicide application in the vicinity of the planted area of the Lake. Such an application might explain the observed lack of success of this management measure. See SEWRPC Community Assistance Planning Report No. 47, 2nd Edition,* A Water Quality Management Plan for Lac La Belle, Waukesha County, Wisconsin, *May 2007.*

harvesting mandate that the harvested material be removed from the Lake. Should the DoPL 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.

Hand-pulling of stems, where they occur in isolated stands, provides an alternative means of controlling plants, such as Eurasian water milfoil, in the Lake, and purple loosestrife, on the lakeshore. Because this is a more selective measure, the rakes being nonselective in their harvesting, manual removal of Eurasian water milfoil is considered a viable option in Powers Lake, where practicable and feasible.

Aquatic macrophytes also may be harvested mechanically with specialized equipment consisting of a cutting apparatus, which cuts up to about five feet below the water surface, and a conveyor system that picks up the cut plants. Mechanical harvesting can be a practical and efficient means of controlling plant growth as it removes the plant biomass and nutrients from a lake. Mechanical harvesting is particularly effective as a measure to control large-scale growths of aquatic plants. Narrow channels can be harvested to provide navigational access and "cruising lanes" for predator fish to migrate into the macrophyte beds to feed on smaller fish. The harvesting of water lilies and other emergent native plants should be avoided.

"Clear cutting" aquatic plants and denuding the lake bottom of flora, using either manual or mechanical harvesting, should be avoided. However, top cutting of plants, such as Eurasian water milfoil, using mechanical harvesters, as shown in Figure 8, has proven to be beneficial in some lakes as a means of minimizing the competitive advantage of the Eurasian water milfoil plant and encouraging native aquatic plant growths.[6]

An advantage of mechanical aquatic plant harvesting is that the harvester typically leaves enough plant material in a lake to provide shelter for fish and other aquatic organisms, and to stabilize lake bottom sediments. Aquatic plant harvesting also has been shown to facilitate the growth of native aquatic plants in harvested areas by allowing light penetration to the lakebed. Many native aquatic plants are low-growing species that are less likely to interfere with human recreational and aesthetic uses of a lake. One disadvantage of mechanical harvesting is that the harvesting operation may cause fragmentation of plants and, thus, unintentionally facilitate the spread of some plants that utilize fragmentation as a means of propagation, as is the case with Eurasian water milfoil. Harvesting may also disturb bottom sediments in shallower areas where such sediments are only loosely consolidated, thereby increasing turbidity and resulting in deleterious effects, including the smothering of fish breeding habitat and nesting sites. Disrupting the bottom sediments also could increase the risk that an exotic species, such as Eurasian water milfoil, may colonize the disturbed area, since this is a species that tends to thrive under disturbed bottom conditions. To this end, most WDNR-issued permits do not allow harvesting in areas having a water depth of less than three feet. If done correctly and carefully, harvesting has been shown to be of benefit in ultimately reducing the regrowth of nuisance plants.

Manual harvesting is considered to be a viable option for control of aquatic plants in Powers Lake; mechanical harvesting, due to the vast expanses of shallow waters and loose bottom sediments in the Lake, is not considered to be a viable option for much of Powers Lake.

Chemical Measures

Chemical treatment with herbicides is a short-term method of controlling heavy growths of nuisance aquatic plants. Chemicals are generally applied to the growing plants in either a liquid or granular form. The advantages of using chemical herbicides to control aquatic macrophytes growth are the relatively low-cost and the ease, speed, and convenience of application. The disadvantages associated with chemical control include unknown long-term effects on fish, fish food sources, and humans; a risk of increased algal blooms due to the eradication of

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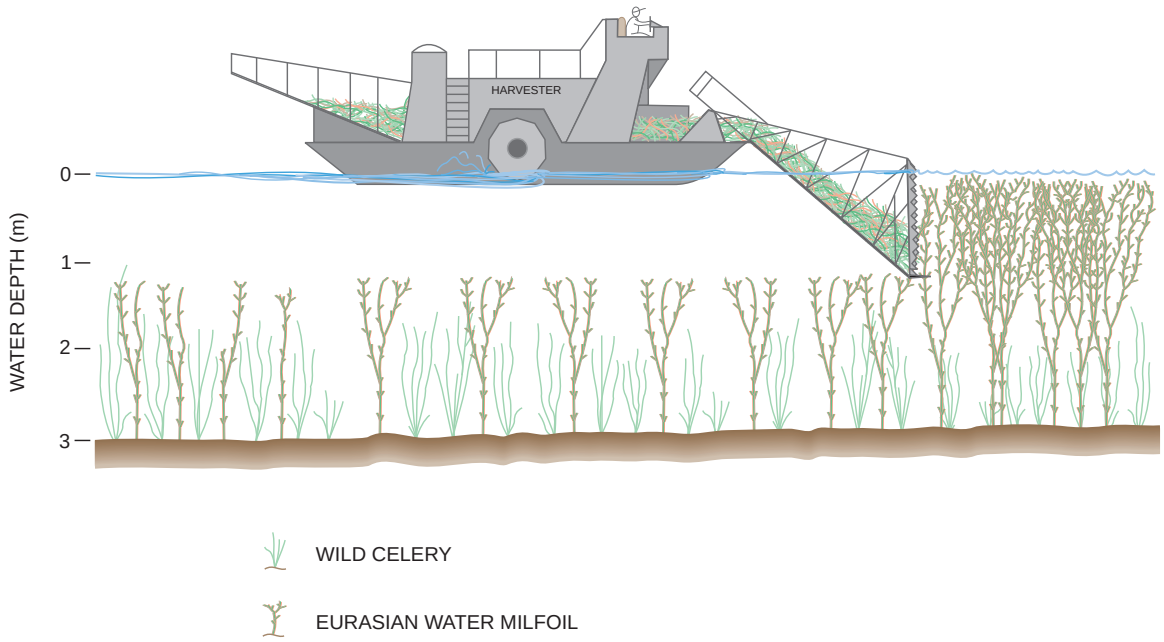
[6]*See SEWRPC Memorandum Report No. 143*, An Aquatic Plant Management Plan for the Lauderdale Lakes, Walworth County, Wisconsin, *August 2001*.

Figure 8

PLANT CANOPY REMOVAL WITH AN AQUATIC PLANT HARVESTER



NOTE: Selective cutting or seasonal harvesting can be done by aquatic plant harvesters. Removing the canopy of Eurasian water milfoil may allow native species to reemerge.

Source: Wisconsin Department of Natural Resources and SEWRPC.

macrophyte competitors; an increase in organic matter in the sediments, possibly leading to increased plant growth, as well as anoxic conditions which can cause fish kills; adverse effects on desirable aquatic organisms; loss of desirable fish habitat and food sources; and, finally, a need to repeat the treatment the following summer due to existing seed banks and/or plant fragments. Widespread chemical treatments can also provide an advantage to less desirable, invasive, introduced plant species to the extent that such treatments may produce conditions in which nonnative species can outcompete the more beneficial, native aquatic plant species. Hence, this is seldom a feasible management option to be used on a large scale. Widespread chemical treatment, therefore, is not considered a viable option for Powers Lake, although limited chemical control is often a viable technique for the control of the relatively small-scale infestations of aquatic plants, such as Eurasian water milfoil, or shoreland plants, such as purple loosestrife.

To minimize the possible impacts of deoxygenation, loss of desirable plant species, and contribution of organic matter to the sediments, early spring or late fall applications should be considered. Such applications also minimize the concentration and amount of chemicals used due to the facts that colder water temperatures enhance the herbicidal effects, while the application of chemical herbicides during periods when most native aquatic plants species are dormant limit the potential for collateral damage. Use of chemical herbicides in aquatic environments is stringently regulated and requires a WDNR permit and WDNR staff oversight during applications.

Use of early spring or late fall chemical controls, especially in those shoreline areas where mechanical harvesting would not be deemed viable, targeting growths of Eurasian water milfoil and purple loosestrife in and around the Lake, is considered a viable option for Powers Lake.

Recommended Management Measures

The most-effective plans for managing aquatic plants rely on a combination of methods and techniques, such as those described above. Therefore, to enhance the recreational uses of Powers Lake, while maintaining the quality and diversity of the biological communities, the following recommendations are made:

- Manual harvesting around piers and docks is the recommended means of controlling nonnative nuisance species of plants in those areas. In this regard, the DoPL 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. Although the rakes do not require a permit for use along a 30-foot-wide length of shoreline, State requirements for manual aquatic plant harvesting mandate that the harvested material be removed from the lake. Where feasible and practicable, hand-pulling of stems, where they occur in isolated stands, is also recommended as an alternative means of controlling Eurasian water milfoil and purple loosestrife. Manual control should target nonnative species.

- It is recommended that the use of chemical herbicides be limited to controlling nuisance growths of exotic species, particularly Eurasian water milfoil and purple loosestrife. It is recommended that chemical applications, if required, be made by licensed applicators in early spring or late fall, subject to State permitting requirements to maximize their effectiveness on nonnative plant species while minimizing impacts on native plant species and acting as a preventative measure to reduce the development of nuisance conditions. Such use should be evaluated annually and the herbicide applied only on an as-needed basis. Only herbicides that selectively control milfoil, such as 2,4-D and endothall, should be used. For the control of purple loosestrife, the use of glyphosate could be considered for application to the cut stems of the plants after the seed heads have been bagged and cut.

- The use of algicides, such as Cutrine Plus, is not recommended because there are few significant, recurring filamentous algal or planktonic algal problems in Powers Lake and valuable macroscopic algae, such as *Chara* and *Nitella*, are killed by this product. Maintenance of shoreland areas around docks and piers remains the responsibility of individual property owners.

- Few lakes in southeastern Wisconsin lack aquatic plant growth, and Powers Lake is no exception. However, some areas of the Lake, such as the mid-depth areas in the eastern half of the lake basin, could benefit from a greater diversity of native aquatic plants, especially where low-growing plants, such as muskgrass, which provide food and shelter for fish and waterfowl occur. Because of their low-growing height, these species are often outcompeted by the nonnative Eurasian water milfoil. Eurasian water milfoil grows rapidly to the lake surface, capturing the available sunlight and shading out the native species. Thus, control of the Eurasian water milfoil, using manual and chemical means as noted above, is one means of promoting the growth of native plants, and is recommended for Powers Lake.

- Through informational programming, riparian owners should be encouraged to monitor their shoreline areas, as well as open-water areas of the Lake, for new growths of nonnative nuisance plants and report such growths immediately to the DoPL so that a timely and effective response can be executed.

- It also is recommended that the DoPL consider the conduct of in-lake aquatic plant surveys at about three- to five-year intervals, depending upon the observed degree of change in the aquatic plant communities. In addition, information on the aquatic plant control program should be recorded and should include descriptions of major areas of nuisance plant growth and areas chemically treated.

- Additional periodic monitoring of the aquatic plant community is recommended for the early detection and control of future-designated nonnative species that may occur. Such control could be effected with the assistance of funds provided under the Chapter NR 198, aquatic invasive species control grant program, and should be undertaken as soon as possible once the presence of a nonnative, invasive species is observed and confirmed, reducing the risk of spread from waters where they are present and restoring native aquatic communities. Control of currently designated invasive species, designated pursuant to Chapter NR 109 of the *Wisconsin Administrative Code*, using appropriate control measures,[7] is recommended throughout the Lake.

Shoreline Protection

Shoreline protection measures refer to a group of management measures designed to reduce and minimize shoreline loss due to erosion by waves, ice, or related action of the water. Currently, the shoreline of Powers Lake is comprised of natural shoreline, as well as stretches of shoreline protected utilizing a variety of protection structures, including riprap, beach, bulkhead (vertical wall), and revetment (sloping wall). For a lake as heavily developed as it is, Powers Lake contains a large amount of natural shoreline compared to other lakes in the Region that are similarly developed. Riprap was the most commonly occurring type of protection structure and revetment was the least common type. To the extent practicable, continued use of vegetative shoreline protection is recommended. Where structural management measures were installed, most of the observed shoreline protection measures were in a good state of repair and no severe erosion-related problems were observed. Monitoring of shoreline vegetation for early detection and control of purple loosestrife and ongoing maintenance of shoreline protection structures is recommended.

Array of Management Measures

Five shoreline erosion control techniques are commonly used: vegetative buffer strips, riprap, rock revetments, wooden and concrete bulkheads, and beach. Factors affecting the choice of method include: cost; the shoreline bank height, vegetation, stability and composition; the shoreline geometry and geographic orientation; the lake bottom contour and vegetation immediately adjacent to the stretch of shoreline under consideration; the proximity to boat channels; possible influence of adjacent structures in producing flank erosion; and, the amount of open water (or "fetch") over which wind can act to produce wave action directly into the shoreline under consideration. A worksheet is provided within Section NR 328.08 Table 1 as a means of assisting property owners who wish to install or modify existing shoreline protection structures.

Maintenance of a vegetated buffer strip immediately adjacent to a lake is the simplest, least costly, and most natural method of reducing shoreline erosion. The size of such vegetated buffer strips is influenced by whether the target shoreline is along developed or undeveloped areas. Along developed areas, this technique employs natural vegetation, rather than maintained lawns, in the first five to 10 feet back from the waterline and the establishment of emergent aquatic vegetation from the waterline out to two to six feet lakeward. The use of such natural shorescaping techniques is generally required pursuant to Chapter NR 328 of the *Wisconsin Administrative Code*, except in moderate- to high-energy shorelines where more-robust structural approaches, such as placement of rock riprap, may be required. Along undeveloped areas, the WDNR recommends shoreland buffers extend from the water's edge onto land at least 35 to 50 feet, contain three layers of flora, herbaceous, shrub, and tree, found in natural Wisconsin lakeshores, and not be mowed except for a viewing access corridor.[8]

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[7]*Appropriate control measures include, but are not limited to, any permitted aquatic plant management measure, placement of signage, and use of buoys to isolate affected areas of the Lake. Such measures, as may be appropriate, should be determined in consultation with WDNR staff and conducted in accordance with required permits under Chapters NR 107, NR 109, and NR 198, among others, of the* Wisconsin Administrative Code.

[8]*Wisconsin Department of Natural Resources*, Delavan Lake (Walworth County, Wisconsin) Integrated Sensitive Area Report, *2007.*

Desirable plant species that may be expected and encouraged to form an effective buffer strip, or which could be planted, include arrowhead (*Sagittaria latifolia*), cattail (*Typha* spp.), water plantain (*Alisma plantago-aquatica*), bur-reed (*Sparganium eurycarpum*), and blue flag (*Iris versicolor*) in the wetter areas; and jewelweed (*Impatiens biflora*), elderberry (*Sambucus canadensis*), giant goldenrod (*Solidago gigantea*), marsh aster (*Aster simplex*), red-stem aster (*Aster puniceus*), and white cedar (*Thuja occidentalis*) in the drier areas. In addition, trees and shrubs, such as silver maple (*Acer saccharinum*), American elm (*Ulmus americana*), black willow (*Salix nigra*), and red-osier dogwood (*Cornus stolonifera*) could become established. These plants will develop a more extensive root system than lawn grass and the above-ground portion of the plants will protect the soil against the erosive forces of rainfall and wave action. A narrow path to the Lake could be maintained as lake access for boating, swimming, fishing, and other activities. A vegetative buffer strip would also serve to trap nutrients and sediments washing into the Lakes via direct overland flow. This alternative would involve only minimal cost.

Rock riprap is a highly effective method of shoreline erosion control applicable to many types of erosion problems, especially in areas of high wave energy and/or exposure to significant recurring boat wake impacts. The technique involves the shaping of the shoreline slope, the placement of a porous filter material, such as sand, gravel, or pebbles, on the slope and the placement of rocks on top of the filter material to protect the slope against the actions of waves and ice. The advantages of riprap structures are that they are highly flexible and not readily weakened by movements caused by settling or ice expansion, they can be constructed in stages, and they require little or no maintenance. The disadvantages are that they limit some uses of the immediate shoreline since the rough, irregular rock surfaces are unsuitable for walking; they require a relatively large amount of filter material and rocks to be transported to the lakeshore; and can cause temporary disruptions and contribute sediment to a lake. If improperly constructed, they may fail because of washout of the filter material.

Vertical bulkheads, which form barriers to wildlife and amphibians, are not recommended. Beaches, and the use of sand blankets for the control of aquatic plants within the shoreland zone, also are not recommended. Maintenance of existing beach areas is warranted, given the current intensity of use of these areas by the community.

Recommended Management Measures

The use of vegetative buffer strips, as shown in Figure 9, is recommended along privately owned shorelines. Stretches of shoreline located on town lands (parks) may require limited use of more robust shoreline protection in the form of riprap where some types of lakeside recreational activities, such as shoreline fishing or kayak launching, occur.

With regard to privately owned shorelines, vegetative buffer strips and riprap are recommended because they can be constructed, at least partially, by local residents; because most of the construction materials involved are readily available; because the measures would, in most 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. In those portions of the Lake subject to direct action of wind waves and ice scour, the use of riprap would provide a more-robust means of stabilizing shorelines, while elsewhere along the lakeshore creation of vegetated buffer strips would provide, not only shoreline erosion protection, but also enhanced shoreland habitat for fish and wildlife. It should be noted that the selection of appropriate shoreland protection structures is subject to the provisions of Chapter NR 328 of the *Wisconsin Administrative Code*.

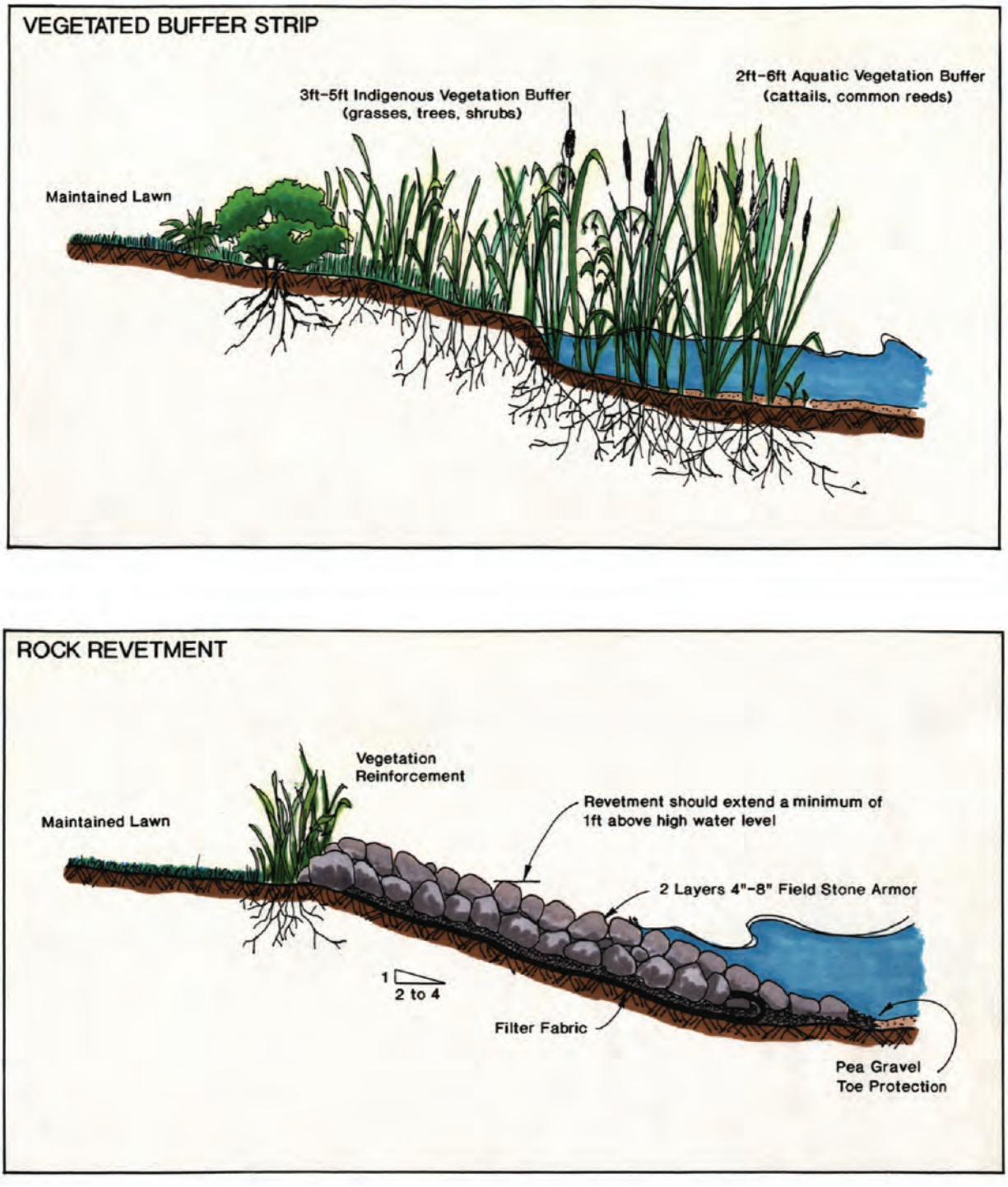
ANCILLARY PLAN RECOMMENDATIONS

Land Use and Acquisition

The DoPL has long recognized the importance of watershed management as an essential element of their lake management program. To this end, the DoPL has acquired ownership of extensive wetlands forming the headwaters of the unnamed tributary draining to the Lake from the lands east of CTH F. While portions of these wetland areas remain under conservancy zoning, future acquisition of these areas by the DoPL or other entity, such as the Kettle Moraine Land Conservancy or The Nature Conservancy, would ensure that these lands are

Figure 9

RECOMMENDED ALTERNATIVES FOR SHORELINE EROSION CONTROL



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: SEWRPC.

protected and provide assured protection for Powers Lake. Consequently, the recommendations set forth in the regional natural areas and critical species habitat protection and management plan are subsumed herein, specifically with regard to the proposed acquisition of the Powers Lake Tamarack Relict by the DoPL. Additionally, the recommendations regarding land use development, wastewater management, and stormwater management within the watershed tributary to Powers Lake, as set forth in the comprehensive multi-jurisdictional plan for Kenosha County,[9] and for Walworth County,[10] are endorsed and included herein.

Lake Outflow

The concerns regarding lake water levels associated with recent extreme weather events were noted as an issue of concern by the Board of Commissioners of the DoPL. Two aspects of this concern were determined to warrant further action by the Board; namely, the implications for extreme weather events on the discharge of water from Powers Lake through the outflow structure under Powers Lake Road, and the implications of high water levels on recreational watercraft use and lakefront properties.

Chapter IV notes the existence of a beaver dam on the East Branch of the Nippersink Creek downstream of Powers Lake and upstream of Tombeau Lake. In considering the implications of this structure, Hey & Associates, Inc., took note of the low stream gradient within this reach of the East Branch of the Nippersink Creek, and consequently suggested that the DoPL consider placing "beaver pipes" to convey additional water through this structure.[11] Such an action would serve to protect both Powers Lake and the downstream landowners from backwater effects created by the beaver dam. Although neither Hey & Associates, Inc., nor SEWRPC staff undertook detailed hydrologic or hydraulic modeling as part of this planning program, the passive approach suggested by Hey & Associates, Inc., is recommended, as it appears that the outlet structure of Powers Lake and the low stream gradient are likely to control flows out of Powers Lake into the East Branch of the Nippersink Creek.

Notwithstanding, consideration should be given to the conduct of an evaluation of the outlet structure to determine if this structure remains suitable for passing expected flood flows under current precipitation conditions.[12] In addition, the suggested agreement between the DoPL and the property owners immediately downstream of the Powers Lake outlet structure should be investigated with a view to concluding an agreement that would encourage the DoPL and the landowner to cooperate in maintaining the watercourse of the East Branch of the Nippersink Creek free of obstructions, and granting the DoPL emergency access rights to ensure the continuity of flows in the discharge channel which would be mutually beneficial to all parties.[13]

Public Informational and Educational Programming

As part of the overall citizen informational and educational programming to be conducted in the community, residents and visitors in the vicinity of the Lake should be made aware of the value of the ecologically significant areas in the overall structure and functioning of the ecosystems of the Lakes. Specifically, informational

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[9]*See SEWRPC Community Assistance Planning Report No. 299,* A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035*, April 2010; see also, SEWRPC Community Assistance Planning Report No. 255, 2nd Edition,* A Land and Water Resource Management Plan for Kenosha County: 2008-2012, *October 2007.*

[10]*SEWRPC Community Assistance Planning Report No. 288,* A Multi-Jurisdictional Comprehensive Plan for Walworth County: 2035*, November 2009.*

[11]*Hey & Associates, Inc., Memorandum, "Powers Lake Outlet and Outlet Channel Maintenance," July 2010.*

[12]*See SEWRPC Technical Report No. 40,* Rainfall Frequency in the Southeastern Wisconsin Region*, April 2000.*

[13]*Hey & Associates, Inc.,* op. cit.

programming related to the protection of ecologically valuable areas in and around the Lake is recommended and should focus on the need to minimize the spread of nuisance aquatic invasive species, such as purple loosestrife and Eurasian water milfoil.

With respect to aquatic plants, distribution of posters and pamphlets available from the UWEX and the WDNR 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, is recommended. Currently, many lake residents seem to view all aquatic plants as "weeds" and residents often spend considerable time and money removing desirable plant species from a lake without considering their environmental impact. Inclusion of specific public informational and educational programming within the activities of the DoPL is recommended. These programs should focus on the value and impacts of these plants on water quality, fish, and wildlife; and on alternative methods for controlling existing nuisance plants, including the positive and negative aspects of each method. These programs can be incorporated into the comprehensive informational and educational programs that also would include information on related topics, such as water quality, recreational use, fisheries, and onsite sewage disposal systems.

Educational and informational brochures and pamphlets, of interest to homeowners and supportive of the lake management program, are available from the UWEX Kenosha and Walworth County Offices, the WDNR, and many Federal government agencies. These brochures could be provided to homeowners through local media, direct distribution, or targeted library/civic center displays. Alternately, they could be incorporated into the DoPL website (districtofpowerslake.com) or into the newsletters produced and distributed by the DoPL. Many of the ideas contained in these publications can be integrated into ongoing, larger-scale activities, such as anti-littering campaigns, recycling drives, and similar community-oriented pro-environment activities.

Other informational programming offered by the WDNR, Walworth County, and the UWEX Lakes Program, such as the Project WET (Water Education Training) curriculum, can contribute to an informed public, actively involved in the protection of ecologically valuable areas within the area tributary to the Lake. Citizen monitoring and awareness of the positive value of native aquatic plant communities are important opportunities for public informational programming and participation.

District of Powers Lake Commissioner Continuing Education

As part of their commitment to the effective managing of Powers Lake, the DoPL Board members should avail themselves of opportunities to learn about current developments and issues involving lake management. There are numerous publications, writings, newsletters, seminars, and conventions available through governmental, educational, and other organizations and agencies dealing with the subject of lake management. Walworth County, UWEX, Wisconsin Lakes, the North American Lake Management Society, and WDNR all produce written materials and conduct meetings and seminars dealing with lake management issues. Publications, such as *Lake Tides*, published by the Wisconsin Lakes Partnership and available from UWEX, are also readily available and cover a wide range of lake-related topics. The statewide lakes convention, held annually in Green Bay, Wisconsin, provides valuable opportunities to learn about important and timely developments in lake management and learn about lake issues from experts in their fields. Participation in activities that will further understanding of lake management issues is deemed an important part of the lake management experience.

SUMMARY

This plan documents the findings and recommendations of a study of the issues of concern regarding Powers Lake, requested by the DoPL, and examines existing and anticipated conditions, potential management and protection problems, and recreational use issues on the Lake. The plan sets forth recommended actions and management measures for the resolution of those problems. The recommended plan is summarized in Table 17 and shown on Map 12.

Table 17

RECOMMENDED AQUATIC PLANT MANAGEMENT PLAN ELEMENTS FOR POWERS LAKE

Plan Element	Subelement	Management Measures	Management Responsibility
Key Issues of Concern	Public Recreational Water Use	Maintain recreational boating access from the public access sites pursuant to Chapter NR 1 guidelines	WDNR
		Maintain signage at public access sites regarding invasive species and UWEX Clean Boats-Clean Waters Program; provide disposal containers for disposal of plant material removed from watercraft at boat launch sites	WDNR, DoPL
		Periodically review the recreational boating ordinance applicable to Powers Lake for consistency with State Statute; consider reestablishing a slow-no-wake requirement for high water conditions	WDNR, Town of Randall
	Water Quality	Continue participation in UWEX CLMN program; consider periodic participation in U.S. Geological Survey TSI or similar program	WDNR, USGS, DoPL
	Aquatic Plant Management	Manually harvest around piers and docks as necessary[a] and collect floating plant fragments from shoreland areas to minimize rooting of Eurasian water milfoil and deposition of organic materials in Lake	Private landowners
		Where they occur, remove isolated stands of purple loosestrife through bagging, cutting, herbicide application to cut stems	WDNR, DoPL and private landowners
		Limited use of aquatic herbicides for control of nuisance nonnative aquatic plant growth where necessary; specifically target Eurasian water milfoil[b] and curly leaf pondweed as necessary	DoPL
		Encourage growth of native plants through use of vegetated buffer strips and control of invasive species such as purple loosestrife	DoPL and private landowners
		Monitor shorelines and open water areas for new growths of nonnative invasive species and immediately report any new growths to the DoPL	DoPL and private landowners
		Conduct periodic in-lake reconnaissance surveys of aquatic plant communities and update aquatic plant management plan every three to five years	DoPL
		Additional periodic monitoring of the aquatic plant community for the early detection and control of future-designated nonnative species that may occur	WDNR, DoPL and private landowners
	Shoreline Protection Management	Maintain existing shoreline structures and repair as necessary using vegetative means insofar as practicable; reconstruction may require WDNR Chapter 30 permits	Kenosha County, Walworth County, Town of Bloomfield, Town of Randall, DoPL, WDNR, and private landowners
Ancillary Management Measures	Land Use and Acquisition	Implement land conservation recommendations set forth in the county multi-jurisdictional comprehensive plans, land and water resource management plans, and regional natural areas and critical species habitat protection and management plan	Kenosha County, Walworth County, Town of Bloomfield, Town of Randall, Town of Wheatland, and DoPL
		Implement land development, wastewater and stormwater management recommendations set forth in the county multi-jurisdictional comprehensive plans and land and water resource management plans	Kenosha County, Walworth County, Town of Bloomfield, Town of Randall, Town of Wheatland, and DoPL

Table 17 (continued)

Plan Element	Subelement	Management Measures	Management Responsibility
Ancillary Management Measures (continued)	Lake Outflow	Consider placement of a "beaver pipe" to maintain downstream flows in the beaver dam downstream of Powers Lake on the East Branch of the Nippersink Creek	DoPL and private landowners
		Consider the conduct of a hydrologic and hydraulic analysis of the East Branch of the Nippersink Creek downstream of Powers Lake with a view to evaluating the efficacy of the Powers Lake outlet structure in passing regional floods; reconcile datums between Kenosha and Walworth Counties	DoPL, Kenosha County, Walworth County, and SEWRPC
	Public Informational and Educational Programming	Continue to provide informational material and pamphlets on lake-related topics, especially the importance of aquatic plants and the protection of ecologically significant areas; consider offering public informational programming on topics of lake-oriented interest and education	DoPL, WDNR, and UWEX
		Encourage inclusion of lake studies in environmental curricula (e.g., Pontoon Classroom, Project WET, Adopt-A-Lake)	Area school districts, UWEX, WDNR, Kenosha County, Walworth County, Town of Bloomfield, Town of Randall, and DoPL
	DoPL Continuing Education	Maintain awareness of current developments in the area of lake management through informative publications such as "Lake Tides" (available free through the Wisconsin Lakes Partnership) and attendance at lake education conventions, workshops, and seminars	DoPL

NOTE: The following abbreviations have been used:

DoPL = District of Powers Lake
USGS = U.S. Geological Survey
UWEX = University of Wisconsin-Extension
WDNR = Wisconsin Department of Natural Resources

[a]*Manual harvesting beyond a 30-linear-foot width of shoreline is subject to WDNR individual permitting pursuant to Chapter NR 109 of the* Wisconsin Administrative Code*.*

[b]*Use of aquatic herbicides requires a WDNR permit pursuant to Chapter NR 107 of the* Wisconsin Administrative Code*.*

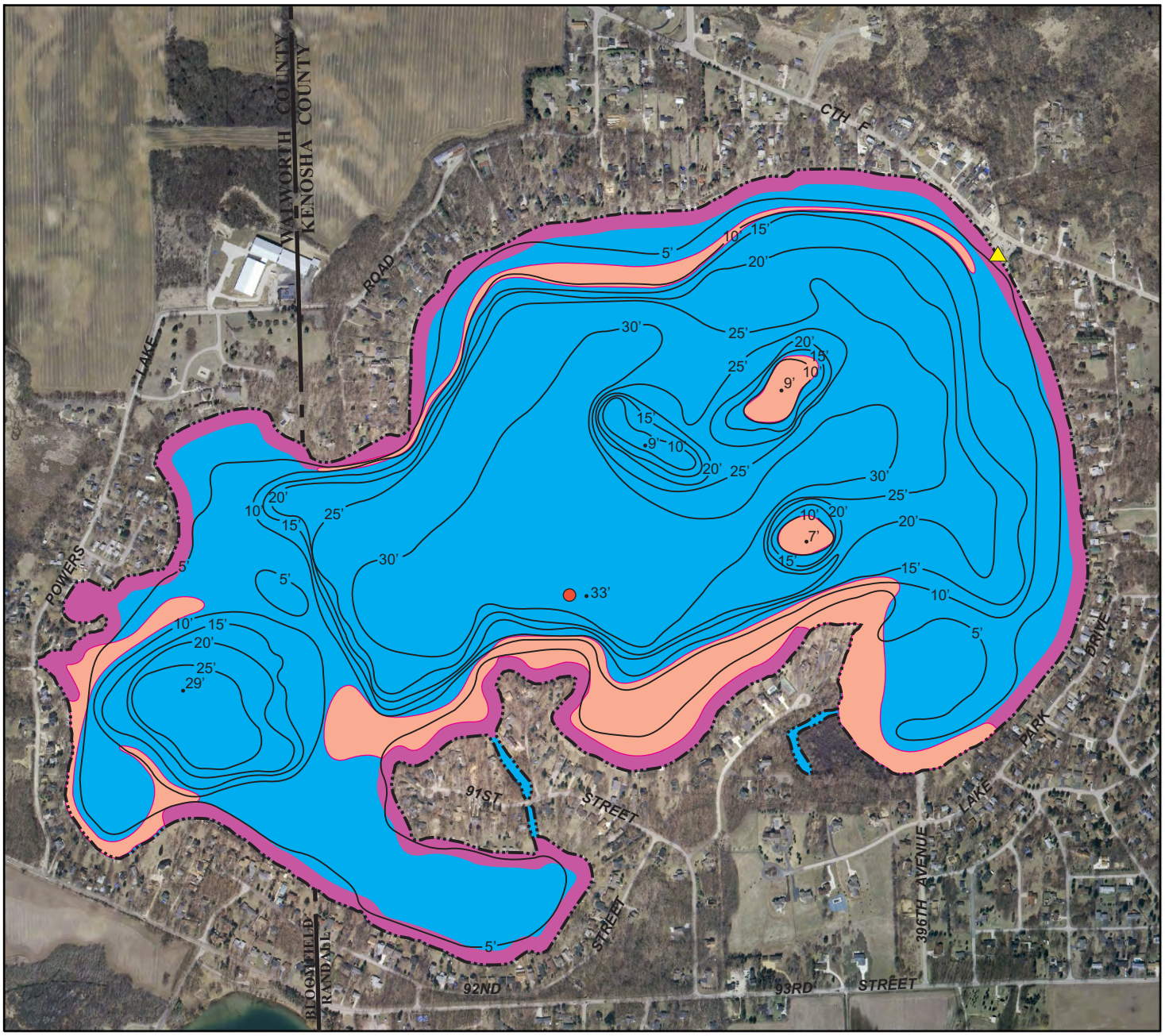
Source: SEWRPC.

Powers Lake was found to be a mesotrophic lake of somewhat above average water quality. Preservation of environmental corridor lands, and especially within the shoreland areas situated immediately adjacent to the Lake, is recommended. Kenosha County, Walworth County, the Towns of Bloomfield and Randall, and the DoPL should support appropriate land management practices designed to reduce nonpoint source pollutant discharges in stormwater runoff into the Lake. Further, the DoPL should promote appropriate shoreline management practices, including the use of riprap and vegetative buffer strips, where applicable.

The shoreland protection and aquatic plant management elements of this plan recommend actions be taken that would reduce human impacts on ecologically valuable areas in and adjacent to the Lake, encourage a biologically diverse community of native aquatic plants, and limit the spread of nonnative invasive plant species. The plan recommends the use of mechanical harvesting of nuisance plants in those areas where depth of water and bottom substrate are sufficient to support such activity, limited use of chemical herbicides mainly in areas where nuisance levels of nonnative invasive species are present, manual harvesting aquatic plants around piers and docks with

Map 12

RECOMMENDED AQUATIC PLANT MANAGEMENT PLAN FOR POWERS LAKE



—20'— WATER DEPTH CONTOUR IN FEET

MAINTAIN ADEQUATE PUBLIC RECREATIONAL BOATING ACCESS

- MAINTAIN SIGNAGE
- PERIODICALLY RENEW ORDINANCE

CONTINUE WATER QUALITY MONITORING

- CITIZEN LAKE MONITORING PROGRAM
- USGS TSI MONITORING PROGRAM

AQUATIC PLANT MANAGEMENT MEASURES

TARGET EURASIAN WATER MILFOIL POPULATIONS FOR HERBICIDE TREATMENT

CONDUCT PERIODIC AQUATIC PLANT SURVEYS

CONTROL PURPLE LOOSESTRIFE ON SHORELANDS: MANUALLY HARVEST AQUATIC PLANTS AROUND PIERS AND DOCKS

ANCILLARY MANAGEMENT MEASURES

- CONTINUE PUBLIC INFORMATIONAL PROGRAMMING
- ACQUIRE CRITICAL WETLANDS WHEN POSSIBLE
- MONITOR LAKE OUTFLOW: CONSIDER HYDROLOGICAL AND HYDRAULIC ANALYSIS TO ASSESS ABILITY OF CREEK TO PASS REGIONAL FLOODS
- SUPPORT IMPLEMENTATION OF LOCAL AND COUNTY MULTI-JURISDICTIONAL COMPREHENSIVE PLANS

DATE OF PHOTOGRAPHY: APRIL 2005

GRAPHIC SCALE
0 500 1000 FEET

Source: SEWRPC.

subsequent removal of cut material from the Lake, and monitoring of invasive species populations. The plan further recommends periodic in-lake aquatic plant surveys every three to five years to monitor changes in the aquatic plant community and assess effectiveness of aquatic plant management techniques.

The plan recommends regular participation in the expanded UWEX CLMN volunteer water quality monitoring program with consideration of participation in the Expanded Level II CLMN program, and periodic conduct of USGS, or equivalent, comprehensive water quality surveys. With regard to recreational uses of the Lakes, the plan recommends maintaining the public access site in a manner consistent with Chapter NR 1 standards and Chapter NR 7 guidelines, as well as maintaining signage regarding aquatic and other invasive species as recommended by the UWEX Clean Boats, Clean Waters program, and suggested in terms of the prohibitions and restrictions on the conveyance of nonnative species set forth in Chapters NR 40 and NR 109 of the *Wisconsin Administrative Code*.

Finally, the recommended plan includes continuation of an ongoing program of public information and education, focusing on providing riparian residents and lake users with an improved understanding of the lake ecosystem. Additional options regarding household chemical use, lawn and garden care, onsite sewage disposal system operation and maintenance, shoreland protection and maintenance, and recreational use of the Lake should be made available to riparian property owners, thereby providing riparian residents with alternatives to traditional activities. Additionally, DoPL Commissioners, property owners, and electors are encouraged to maintain and broaden their awareness of current developments in the area of lake management through participation in meetings, seminars, conventions and other lake management-related events, and educational opportunities.

Adherence to the recommendations contained in this plan should provide the basis for a set of protection actions that are: aligned with the goals and objectives set forth in Chapter I of this report; reflective of the ongoing commitment by the DoPL, to sound planning with respect to the Lake; and sensitive to current needs, as well as those in the immediate future.

APPENDICES

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Appendix A

REPRESENTATIVE ILLUSTRATIONS OF AQUATIC PLANTS FOUND IN POWERS LAKE

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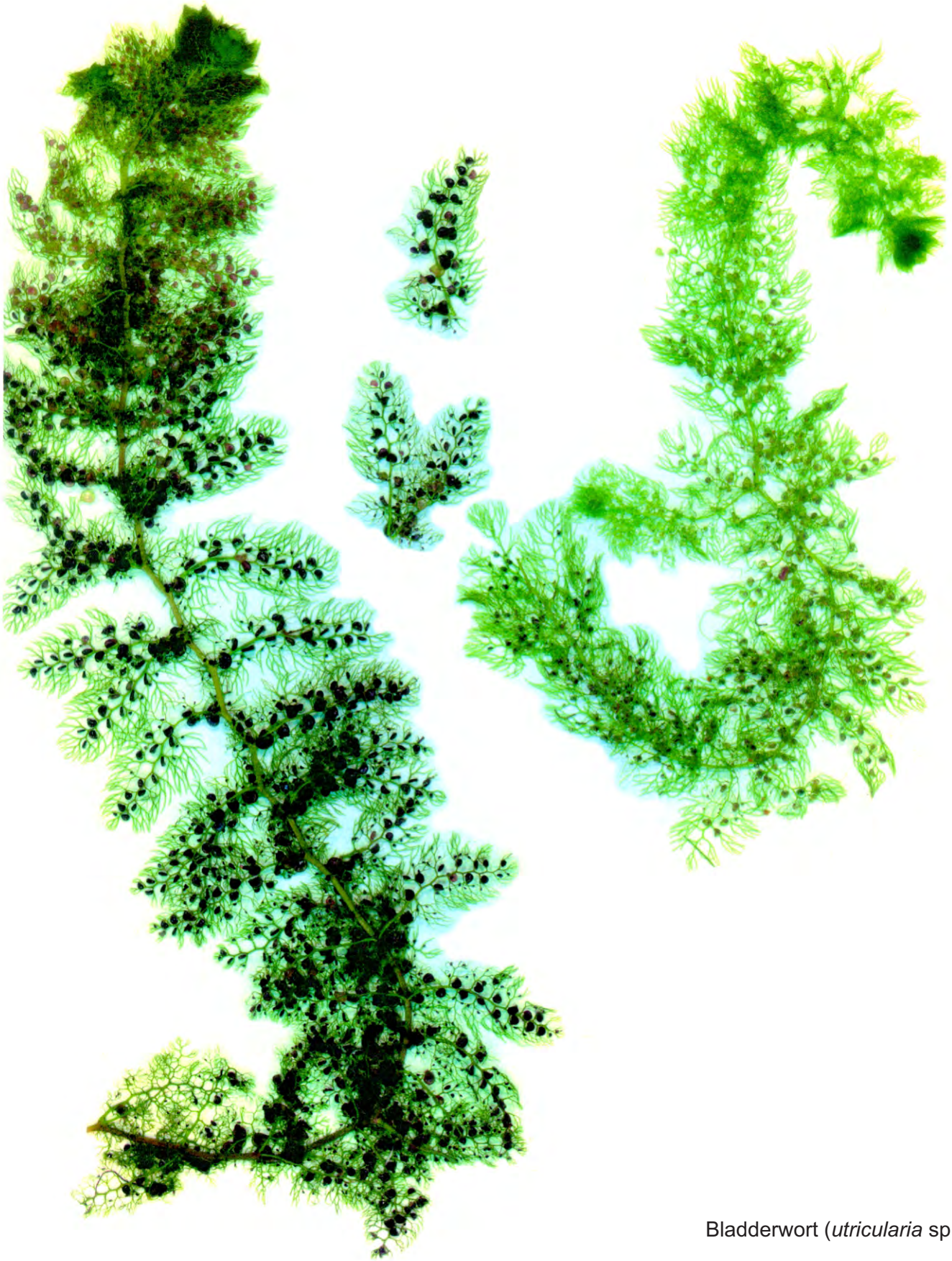


Bladderwort (*utricularia* sp.)

Bushy Pondweed (*najas flexilis*)

Clasping-Leaf Pondweed
(*potamogeton richardsonii*)

Coontail (*ceratophyllum demersum*)

Curly-Leaf Pondweed (*potamogeton crispus*)
Exotic Species (nonnative)

Eurasian Water Milfoil (*myriophyllum spicatum*)
Exotic Species (nonnative)

Flat-Stem Pondweed (*potamogeton zosteriformis*)

Floating-Leaf Pondweed (*potamogeton natans*)

Illinois Pondweed (*potamogeton illinoensis*)

Muskgrass (*chara vulgaris*)

Nitella (*nitella* spp.)

Sago Pondweed (*potamogeton pectinatus*)

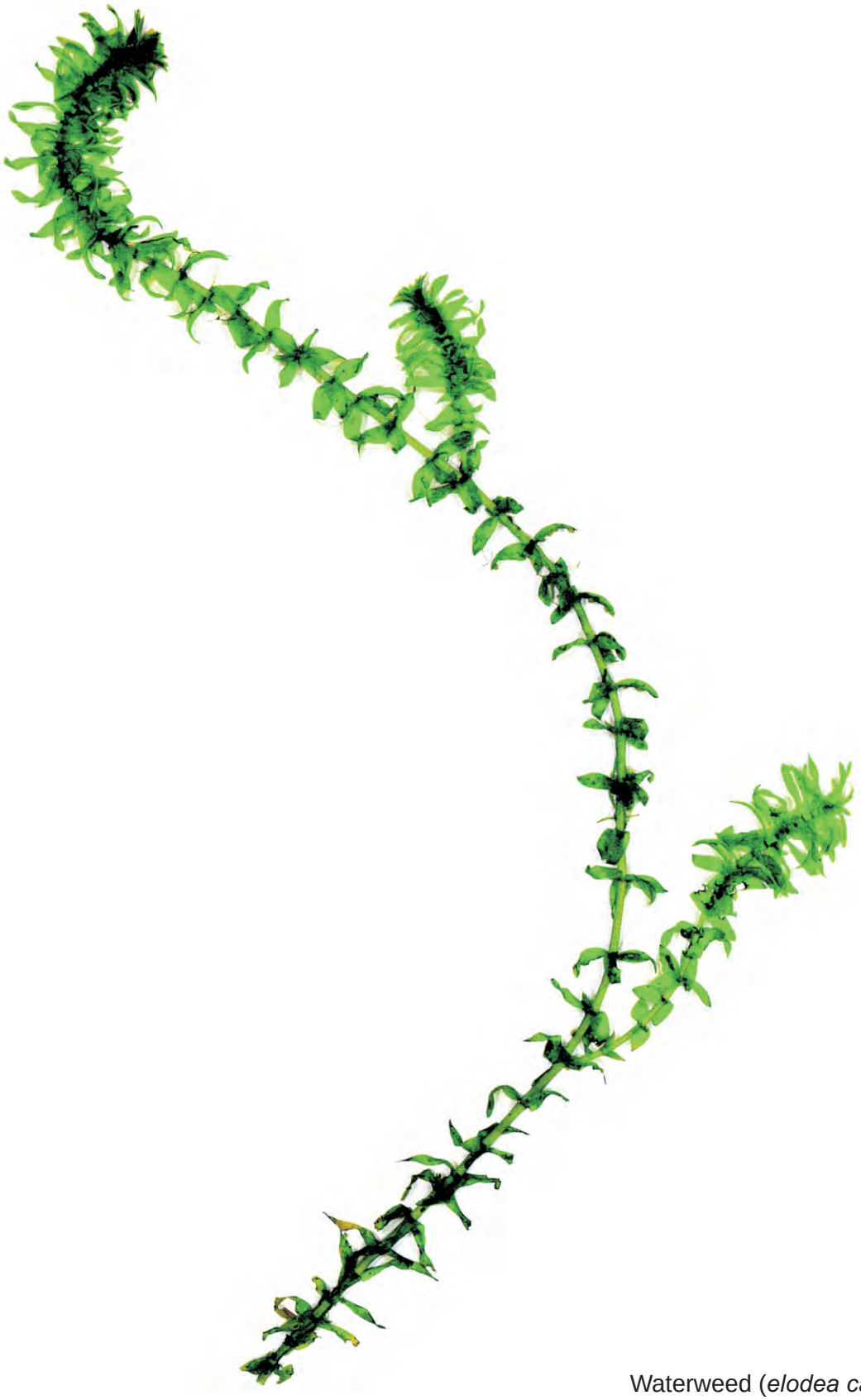
Small Pondweed (*potamogeton pusillus*)

Spiny Naiad (*najas marina*)

Variable Pondweed (*potamogeton gramineus*)

Water Smartweed (*polygonum amphibium*)

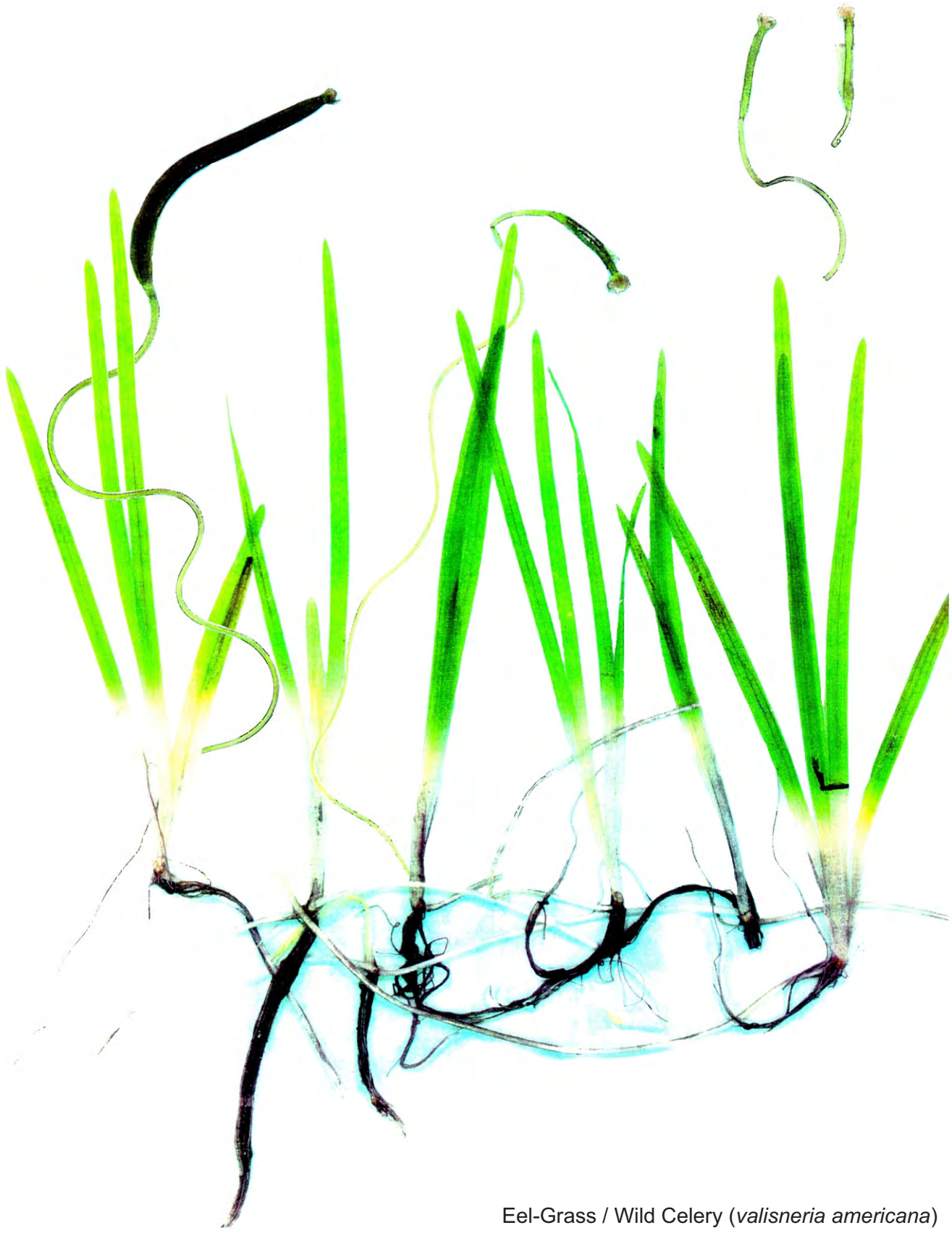
Water Stargrass (*zosterella dubia*)



Waterweed (*elodea canadensis*)

White Water Lily (*nymphaea odorata*)

White Water Crowfoot (*ranunculus longirostris*)



Eel-Grass / Wild Celery (*valisneria americana*)

Yellow Water Lily (*nuphar variegatum*)

Appendix B

RECREATIONAL BOATING ORDINANCE APPLICABLE TO POWERS LAKE

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CHAPTER 20

WATER USE

CHAPTER 20
WATER USE ORDINANCE

20.01 Title/Purpose

This ordinance is entitled the "Water Use Ordinance". The purpose of this ordinance relating to the boating and water code is to provide for the public health, safety and general welfare of all people for the enjoyment of aquatic recreation consistent with statutes of the State of Wisconsin and the rights of the public in interest of Powers Lake, Lake Benedict, and Lake Tombeau.

20.02 Authority

The Town Board has the specific statutory authority, powers and duties, pursuant to Chapter 30, (1991-1992) Wis. Stats., the specific sections noted in this ordinance and/or by its adoption of village powers under Sec. 60.10, (1991-1992) Wis. Stats., to regulate, control, license, register or permit persons engaged in certain uses, activities, businesses and operations, to assess these persons with appropriate fees for licenses, registrations or permits as noted herein and to enforce, by revocation or penalty, the provisions of these ordinances and the provisions of the licenses, registrations and permits. These ordinances related to boating, pursuant to Sec. 30.77, (1991-1992) Wis. Stats., must be submitted to the State Department of Natural Resources for advisory review at least sixty (60) days prior to final approval of these ordinances. These ordinances related to boating once adopted, pursuant to Sec. 30.77, (1991-1992) Wis. Stats., must be prominently posted and filed with the State Department of Natural Resources.

20.03 Adoption of Ordinance

The Town Board has, by adoption of this ordinance, confirmed the specific statutory authority, powers and duties noted in the specific sections of this ordinance and has established by these sections and this ordinance license, registration and permit ordinances to regulate and control, by ordinance:

(1) Persons engaged in certain uses, activities, businesses and operations in the Town,

(2) To regulate, by these licenses, registrations and permits, the persons engaged in these uses, activities, businesses and operations at certain locations within the Town,

(3) To assess these persons with appropriate fees for the licenses, registrations or permits, and

(4) To enforce, by revocation or penalty, the provisions

of these ordinances and the provisions of the license, registration and permits.

20.04 Applicability and Enforcement

(1) The provisions of this ordinance are adopted in the interest of public health and safety and shall apply to persons, boats, watercraft and objects upon, in and under the waters of Powers Lake and Lake Benedict within the jurisdiction of the Townships of Randall, Kenosha County, and Bloomfield, Walworth County, respectively, which are all of the townships having jurisdiction over the waters of said lakes and Lake Tombeau within the jurisdiction of the Town of Bloomfield, Walworth County, Wisconsin.

(2) Any reference in this chapter made to the word "lake" or "water" shall be construed also in the plural and shall apply to all of the lakes and waters within the territorial jurisdiction of the respective municipalities.

(3) The provisions of this chapter shall be enforced by the officers, employees and agents of the municipalities who are authorized to do so and they shall be properly designated as the Water Safety Patrol.

20.05 State Statutes Adopted

(1) Except where more stringent provisions of this chapter apply, the statutory provisions describing and defining regulations with respect to water traffic, boats, watercraft, boating and related activites in the following enumerated sections of the Wisconsin Statutes, exclusive of any provisions therein relating to the penalties to be imposed or the punishment for violation of such statutes, are hereby adopted and by reference made a part of this chapter as if fully set forth herein:

30.50 (Definitions)
30.501 (Capacity plates on boats)
30.51 (Certificate of number and registration; requirements; exemptions)
30.52 (Certificate of number and registration; application; certification and registration period; fees; issuance)
30.523 (Certification or registration card to be on board; display of stickers or decals and identification number)
30.53 (Certificate of origin; requirements; contents)
30.531 (Certificate of title; requirements; exemptions)
30.533 (Application for certificate of title; hull and engine identification numbers)

30.539 (Contents of certificate of title)
30.54 (Lost, stolen or mutilated certificates)
30.541 (Transfers of boat titles)
30.543 (Report of stolen or abandoned boats)
30.544 (Inspection of boats purchased out-of-state)
30.549 (Transfer of ownership of boats with a certificate of title, certificate of number or registration)
30.55 (Notice of abandonment or destruction of boat or change of address)
30.60 (Classification of motor boats)
30.61 (Lighting equipment)
30.62 (Other equipment)
30.625 (Rental of personal watercraft)
30.63 (Sales and use of certain outboard motors restricted)
30.64 (Patrol Boats)
30.65 (Traffic rules)
30.66 (Speed restrictions)
30.67 (Accidents and accident reports)
30.675 (Distress signal flag)
30.68 (Prohibited operation)
30.681 (Intoxicated boating)
30.682 (Preliminary breath screening test)
30.683 (Implied consent)
30.684 (Chemical tests)
30.686 (Report arrests to department)
30.687 (Officier's action after arrest for violating intoxicated boating law)
30.69 (Water skiing)
30.70 (Skin diving)
30.71 (Boats equipped with toilets)

(2) All rules and orders created by the Department of Natural Resources designated Chapter NR 5 of the Wisconsin Administrative Code, modifying or supplementing the foregoing provisions of the state law or which may be adopted or made in the future are hereby incorporated in and made a part of this ordinance by reference to the same as if they are or were to be set out herein verbatim.

(3) All deletions, additions and amendments which may be made to the sections of the State laws enumerated under subsection 20.05(1) above, are hereby adopted and incorporated herein by reference as of the time of their respective effective dates, as if they were to be set out herein verbatim.

20.06 General Boating Provisions

(1) Capacities

No person shall operate nor shall any owner of a boat or watercraft allow a person to operate a boat or watercraft on the waters where the boat or watercraft leaves its docked location for operation on the waters with passengers in excess of the capacity recommended by the manufacturer of the boat or watercraft.

This section applies to vessels manufactured after January 1, 1966 and prior to November 1, 1972. All vessels manufactured after November 1, 1972, shall comply with appropriate federal regulations.

(2) Horsepower

No person shall operate nor shall any owner of a boat or watercraft allow a person to operate a boat or watercraft on the waters where the boat or watercraft leaves its docked location on the waters for operation on the waters powered by a motor with horsepower in excess of the capacity recommended by the manufacturer of the boat or watercraft.

(3) Traffic Lane

A traffic lane is hereby established on Powers Lake embracing the waters of said lake in its entirety, excepting that area between the shore and a line two hundred (200) feet in distance from and parallel to the shoreline or as posted by navigation aids or identifying buoys. A traffic lane is hereby established on Lake Benedict embracing the waters of said lake in its entirety, excepting that area between the shore and a line one hundred and fifty (150) feet in distance from and parallel to the shoreline or as posted by navigation aids or identifying buoys.

(4) Speed Restriction

(a) No motorboat or watercraft shall be operated within the traffic lane at a speed greater than "slow-no-wake" between the hours of sunset and 10 o'clock a.m..

(b) Outside the traffic lane, no motorboat or watercraft shall be operated at any time at a speed greater than "slow-no-wake".

(c) No person shall operate a motorboat or watercraft on the waters of the lakes at a speed greater than is reasonable and prudent under the

conditions, and having regard for the actual and potential hazards then existing.

(d) Speed Exception

The speed limit set forth in this chapter shall not apply to Water Safety Partol watercraft or other authorized Police Patrol or emergency watercraft in situations involving emergencies, or while engaged in law enforcement, nor to boats participating in a duly authorized race, regatta or water ski meet duly authorized by a permit while operating in the designated area authorized by said permit.

(e) Slow No Wake

1. No watercraft shall be operated at a speed greater than "slow-no-wake" at any time:

a. On Jefferson Bay when the water level of Powers Lake reaches a water elevation level of twenty four (24) inches as determined and calculated in accordance with subparagraph 2., below;

b. On Powers Lake, within 400 feet of the shore, when the water level on Powers Lake reaches a water elevation level of twenty (20) inches as determined and calculated in accordance with subparagraph 2., below.

c. On Lake Tombeau at any time.

2. There is a bench mark "x" chisled square in the center of the east side of the bridge outlet on Powers Lake Road (County Trunk Highway "FF") which is at an assumed elevation of 100.00 according to the records on file with the Wisconsin Department of Natural Resources and specifically as designated on the lake survey map of Powers Lake dated May, 1960, revised July 1967. The water elevation level referred to in subparagraph 1., above shall mean that water elevation level in relation to and measured from the benchmark "x" referred to in this section.

3. When the lake level elevation is at or greater than the water elevation level set forth in subparagraph 1., above, the Town of Randall, in respect to Powers Lake and Lake Benedict, and the Town of Bloomfield, in respect to Lake Tombeau, shall cause a notice to be posted, at

all public access points on the lake or lakes affected thereby stating that the "slow-no-wake" speed restriction is in effect. Notices shall be posted in conspicuous places at all public access points. Such notices shall be removed upon the lowering of the lake elevation level to a point below that in subparagraph 1., above.

4. Slow-No-Wake Defined

In this chapter, "slow-no-wake" means that speed at which a boat or watercraft moves as slowly as possible while still maintaining steerage control.

(f) No person may operate a boat at a speed in excess of slow-no-wake within 100 feet of any other boat. A "boat" is defined as every description of watercraft used or capable of being used as a means of transportation on water. (Created 10 Sept 1998)

(5) Mooring Lights

No person shall moor or anchor any boat, watercraft, raft, buoy or other floating object or permit the same to drift in the traffic lane between sunset and sunrise, unless there is prominently displayed a white light of sufficient size and brightness to be visible from any direction for a distance of two (2) miles on a dark night with clear atmosphere. This provision shall not apply to authorized structures within the pierhead line nor to boats, watercraft or objects moored or anchored in mooring areas approved by the Town Board when the entire area is marked by lights or other markers.

(6) Mooring and Anchoring of Watercraft (Recreated 8 July 1999)

(a) No person shall operate or cause, allow or permit any person to operate a boat or watercraft on the waters where the boat or watercraft is moored or anchored at any private or public beach, park, landing, pier, raft or wharf without approval of the owner of the beach, park, landing, pier, raft or wharf. No watercraft or boat shall be moored or anchored at any private or public beach, park, landing, pier, raft, wharf or other location other than the landings, piers or wharves designated by the Town Board as public boat landing areas. This provision shall not apply in an emergency situation

where the public health and public safety of persons on the boat or watercraft is in jeopardy.

(b) No person may moor or anchor or stop a boat or watercraft at or in or along any Town owned pier unless said person is the Lessee. This provision shall not apply in an emergency situation where the public health and public safety of persons on the boat or watercraft is in jeopardy.

(7) Unnecessary Horns and Whistles

No person shall cause, allow or permit any person to unnecessarily sound a horn, whistle or other sound-producing device on any boat or watercraft while at anchor or underway on the waters . The use of any siren on any boat or watercraft on the water, except duly authorized Water Saftey Patrol watercraft or other authorized Police Patrol watercraft on patrol or on duty is prohibited.

(8) Circuitous Operation

No person shall operate repeatedly a motorboat on the waters in a circuitous course around any boat, watercraft or around any person swimming if such circuitous course is within two hundred (200) feet of such boat or watercraft or swimmer; nor shall any person or waterskier operate or approach closer than one hundred (100) feet to any skindiver's flag or any swimmer unless the boat or watercraft is part of the skindiving operation or is accompanying the swimmer or unless other conditions make compliance impossible.

(9) Public Landings

The anchoring or mooring of any boat or watercraft in the waters within fifteen (15) feet of a public landing is prohibited except that boats may be tied to piers within such public landing areas upon approval of the Town Board.

(10) Swimming Areas

No person shall operate or cause, allow or permit any person to operate any boat or watercraft on the water marked by buoys or otherwise reserved and designated by the Town Board as areas for persons to swim.

(11) Secure Anchoring

No person shall anchor or cause, allow or permit any person to anchor any boat or watercraft on the water without

causing such boat or watercraft to be at all times tied, secured and anchored with proper care and with proper equipment and in a manner to prevent the boat or watercraft from escaping moor or anchor.

20.07 Miscellaneous Water Provisions

(1) Molesting or Destroying Aids to Navigation and Regulatory Markers

No person shall cause, allow or permit any person to move, remove, molest, tamper with, destroy, moor or fasten a boat or watercraft (except to mooring buoys) to any navigation aids or regulatory markers, signs or other devices established and maintained to aid boaters on the waters.

(2) Obstructions to Navigation

No person shall cause, allow or permit any person:

(a) To unlawfully obstruct any navigable waters and thereby impair the free navigation on the waters.

(b) To unlawfully place in navigable waters any substance that may float into and obstruct any such waters or impede the free navigation on the waters.

(c) To construct or maintain in navigable waters any boom not authorized by law.

(d) To obstruct or interfere, by a watercraft or float, with free navigation of any river, canal, water channel or slip within the waters.

(3) Parasailing and Paragliding

No person shall engage in the activity known as parasailing or paragliding except as a special activity for which a permit has been obtained.

(4) Shooting of Projectiles Prohibited

No person by use of a contrivance or device, or otherwise in any manner, shall throw, propel, send forth or shoot any missile, projectile or object toward or in the direction of a person, boat, watercraft or other property.

(5) Ice Racing

No person shall conduct or participate in a race,

COPY

ORDINANCE NUMBER 20.07 (9)

AN ORDINANCE RELATED TO WATERCRAFT AT FOX PARK

AN ORDINANCE CREATING SECTION 20.07 (9) OF THE MUNICIPAL CODE OF THE TOWN OF RANDALL, KENOSHA COUNTY, WISCONSIN

The Town Board of the Town of Randall, Kenosha County, Wisconsin, does ordain as follows:

SECTION 1: Section 20.07 (9) of the Municipal Code of the Town of Randall, Kenosha County, Wisconsin, is hereby created to read as follows:

20.07 (9) FOX PARK

(a) No watercraft or boat is allowed to be placed or located at or on the shoreline of Benedict Lake or on the waters of Benedict Lake within 200 feet of the shoreline of Fox Park, except as provided in (b) below. The shoreline is defined as the intersection of the land surface abutting the water mark.

(b) No watercraft or boat, except rubber rafts under six (6) feet in length, may be placed on the land surface of Fox Park.

SECTION 2: EFFECTIVE DATE. This Ordinance shall take effect upon passage and posting or publication as provided by law.

The foregoing Ordinance was adopted at a regular meeting of the Town Board of the Town of Randall, Kenosha County, Wisconsin, this 9th day of May, 2002.

TOWN OF RANDALL:

By: _____
Lauren Fox, Town Chairperson

Attest: _____
Phyllis Kaskin, Town Clerk

rally, endurance contest or other competitive event involving the use of any motor driven device, which shall include, but not be limited to, automobiles, motorcycles, minibikes and snowmobiles, upon the ice covering the surface of Powers Lake, Lake Benedict and Lake Tombeau, which lakes are located in the Towns of Randall and Bloomfield except as a special activity for which a permit has been obtained.

(6) Driving Automobiles or other Motor-driven Vehicle on the Ice

(a) No person shall use or operate any automobile or other motor-driven vehicle in any manner so as to endanger persons engaged in skating or in any other winter sport or recreational activity upon the ice, nor shall any person, while using or operating an automobile or motor-driven vehicle, tow, pull or push any person or persons on skates, sled, skis, toboggon, or device or thing of any kind designed or utilized to carry or support one or more persons.

(b) No person shall use or operate any automobile at a speed in excess of twenty (20) miles per hour on the ice.

(c) No person shall operate any aerodynamic propeller-driven vehicle, device or thing, whether or not designed for the transportation of a person or persons, on the ice of the waters.

(d) "Automobile" as used in this chapter shall be construed to mean all motor vehicles of the type and kind permitted to be operated on the highways in the State as defined in Sec. 340.01(4) and 340.01(35) (1991-1992) Wis. Stats.

(e) All traffic on the ice bound waters of the lakes shall be at the risk of the traveler as set forth in Sec. 30.81(3) (1991-1992), Wis. Stats.

(7) Dilapidated Structures

No person shall cause, allow or permit any person to maintain any dilapidated structure or building near the shores of the waters wherein such structure, due to its condition and proximity to shore, may be washed into the waters and which may hinder, obstruct or destroy navigation by boats or other watercraft in the waters. For purposes of this section, "near the shores" shall mean within twenty (20) feet from the shoreline (ordinary highwater mark) of the waters.

(8) Lakeside Park (Created 8 July 1999)

(a) No watercraft or boat is allowed to be placed or located at or on the shoreline of Powers Lake or on the waters of Powers Lake as located between Lakeside Park and the Town of Randall owned piers, except as provided in (b) below. The shoreline is defined as the intersection of the land surface abutting the water mark. The waters of Powers Lake is defined as that area of water located between the beach/swim area of Lakeside Park and the Town of Randall owned piers.

(b) No watercraft or boats, except rubber rafts under six (6) feet in length may be placed on the land surface of Lakeside Park.

20.08 Swimming Regulations

(1) Competent Persons; Personal Flotation Devices; Distances from Boat

No operator of a boat or watercraft or any person within the boat or watercraft shall cause, allow or permit any person to swim, float, snorkel or engage in other swimming operations on the waters from any boat or watercraft on the waters except if the boat or watercraft is properly anchored and then only if the person remains within fifty (50) feet of the boat or watercraft during the swimming, floating, snorkeling or other swimming operations. Said boat or watercraft shall be manned by a competent person. In addition, no person shall cause, allow or permit any person to swim, float, snorkel or engage in other swimming operations on the waters from any boat or watercraft unless the boat or watercraft is fully equipped with the proper amount and type of U.S. Coast Guard approved personal flotation equipment or devices to be used in water rescue emergency.

Exception: A person is permitted to swim in the traffic lane on the waters if the person is accompanied by a competent person in the boat or watercraft and swims within twenty five (25) feet of said boat or watercraft.

(2) Distances Allowed when Swimming

No person shall swim on Powers Lake more than one hundred (100) feet from the shore or more than fifty (50) feet from any pier, raft or wharf, unless within marked authorized areas. No person shall swim on Lake Benedict more than one hundred (100) feet from the shoreline inclusive of any pier, raft, or wharf, unless within marked authorized areas.

(3) Time of Day for Swimming

No person shall swim in the water traffic lane between sunset and sunrise.

(4) Scuba Diving

No person shall be engaged in scuba diving activities unless that person is certified or is under the direct supervision of a certified scuba diver. This section shall not apply to rescue, emergencies, or enforcement activities.

20.09 Water Skiing

(1) Operators and Observers; Towlines

No person shall operate or cause, allow or permit any person to operate a boat or watercraft on the waters for the purpose of towing a person or persons on waterskis, aquaplanes or similar water recreation devices unless there are at least two (2) persons present in the boat or watercraft at the time of the towing operation, with one (1) person to operate the boat or watercraft and with one (1) competent person to observe the towed person. In addition, no person shall permit himself or herself to be towed by a boat or watercraft unless there are at least two (2) persons in the boat or watercraft at the time of the towing operation with one (1) person to operate the boat or watercraft and with one (1) competent person to observe the towed person.

(2) Prohibition as to Time of Day

No person shall operate a boat or watercraft for the purpose of towing a water skier or engage in water skiing between the hours of sunset and 10:00 a.m..

(3) Towlines and Personal Flotation Devices

No person shall operate a boat or watercraft with more than two (2) tow lines or allow more than one (1) person per tow line as a means of waterskiing or similar sport. An exception is allowed for two (2) person on one tow line while on devices designed for two person to be towed by a boat or watercraft. The persons being towed shall wear U. S. Coast Guard approved personal flotation devices, either of Type I, Type II, Type III or Type V while being towed.

(4) Direction of Travel

No operator of a boat or watercraft and no person

shall engage in water skiing, aquaplaning, or similar sport or activity outside of the traffic lane as defined in this Ordinance, and said persons must operate in a counterclockwise pattern in the traffic lane, as well as conform to all sections of this Ordinance. A counterclockwise direction is determined by viewing the direction of the boat or watercraft as that direction as viewed from a bird's-eye view of the entire lake.

(5) Length of Tow Rope

No person shall use any tow rope of more than one hundred (100) feet for purposes of water-skiing, aquaplaning, or similar activity. No operator of a boat or watercraft shall cause, allow or permit any person to be towed when the towed person is using a tow rope of more than one hundred (100) feet.

(6) Conformity

The operators of all boats or watercraft by means of which water skis, surfboards, aquaplanes or similar objects are being towed, and the riders of such objects, must conform to the same rules and clearances as provided in this chapter for motorboats or watercraft.

(7) Careful and Prudent Operation of Person Towed

No person shall waterski, aquaplane or engage in other similar water recreation operations on the waters in such an improper, careless, negligent or willful and wanton manner that in any way may endanger the health or safety of persons or property.

(8) Careful and Prudent Operation by Operator

No person shall operate or cause, allow or permit any person to operate a motorboat or watercraft on the waters having in tow a person on waterskis, aquaplane or similar water recreation device unless the person is operating the boat or watercraft in a careful and prudent manner and at a reasonable distance from person and property so as not to endanger the life or property of any person.

(9) Exceptions

The limitations of this section shall not apply to participants in ski meets or exhibitions authorized and conducted as provided in Section 20.10.

20.10 Permit for Special Activity

(1) Required Permits

No person shall conduct or participate in any motorboat race, motorboat regatta, water-ski meet, sailboat race, sailboat regatta or other water sporting event or exhibition unless such event has been authorized by the Town Board or their authorized agent and a permit issued.

(2) Issuance of Permits

A permit issued under this section shall specify the course or area of water to be used by participants in such event. Permits shall be issued only when, in the opinion of the respective Town Boards or their authorized agents, the proposed use of the water can be carried out safely and without danger to or substantial obstruction of other watercraft or persons using the lake. Permits shall be valid only for the day or days and hours and areas specified thereon.

(3) Rights of Participants

Watercraft and participants in any such permitted event shall have the right-of-way in the marked area.

20.11 Pollution/Littering Provisions

(1) Solid Waste Pollution

No person shall cause, allow or permit any person to discharge any solid waste or any other waste in any waters, on the ice of any waters or upon other public or private property adjacent to waterways. This provisiondoes not apply to a person who deposits or discharges solid waste or any other waste in conformance with Chapters 30, 31, 144, and 147, (1991-1992) Wis. Stats., or has a permit, license or other approval by the State Department of Natural Resources under these chapters.

(2) Motor Vehicles and Watercraft Abandonment

Any person who has placed or who has cause, allowed or permitted any person to place any motor vehicle, boat, watercraft or other vehicle into the waters shall remove said motor vehicle, boat, watercraft or other vehicle from the waters within ten (10) days of the discharge, deposit, placement or abandonment of the motor vehicle, boat, watercraft or other vehicle into the waters.

(3) Solid Waste Discharge from Watercraft

No person shall cause, allow or permit any person to

deposit or discharge any solid waste or any other waste from any boat or watercraft into the waters, nor shall any person operating any boat or watercraft cause, allow or permit any such deposit or discharge into the waters.

(4) Solid Waste from Adjoining Land

No person shall cause, allow or permit any person to deposit or discharge or allow any such deposit or discharge of any solid waste or any other waste on land owned or occupied by that person wherein such solid waste or other waste will naturally flow or will, by aid of an artificial structure, flow into the waters or onto the ice of the waters.

(5) Overboard Discharge Inactivation

No boat or watercraft equipped with a means of discharging sewage directly from a toilet or holding tank into the water upon which the boat or watercraft is moored or is moved shall enter the lake until such means of discharge is inactivated. An owner or operator of a boat equipped with such means of discharge shall contact a representative of the Department of Natural Resources or a local law enforcement official with respect to inactivation before entering the lake. Overboard discharge inactivation shall include as a minimum either disconnection of the toilet piping, removal of the pumping device, securely plugging the discharge outlet, sealing the toilet bowl, with wax or other method approved by the official contacted. The inspecting official shall provide the boat or watercraft owner or operator with a signed written statement as to the method of inactivation accepted. The owner or operator shall give information as to the lake he or she plans to navigate and as to the time of stay on such waters. (Pursuant to Wisconsin Administrative Code Provisions, Ch. ILHR 86.07.)

(6) Sanitation

No person shall deposit, place or throw away from the shore, boat, watercraft, raft, pier or platform or similar structure any cans, bottles, debris, refuse, garbage, solid or liquid waste, sewage or effluent into the waters of the lake or upon the ice when formed, or cause or permit the same to be done by any agent or employee.

20.12 General Artificial Structure in Water Provisions

(1) Regulation of Artificial Structures, Rafts, Buoys, Platforms

No person shall cause, allow or permit any person to maintain rafts, buoys, platforms or any other artificial structure (other than a wharf or pier) in or upon waters of the lake of the Town without first obtaining a written permit from the Town Board or its agent having jurisdiction over the lake. This provision does not apply to those structures regulated by the Department of Natural Resources under Chapter 30, (1991-1992) Wis. Stats.

(a) Any person required to seek and obtain a permit under these provisions shall file an application with the Town Clerk. The application shall request, at minimum, the following information from the applicant:

1. The name of the applicant
2. The address of the applicant
3. The business and residential telephone number of the applicant
4. The age of the applicant
5. The type of proposed structure
6. The location of the proposed structure
7. The projected commencement and termination dates of the construction of the project
8. The design and dimension of the project with attached maps and diagrams, including the type and amount of construction material to be used. Such maps and diagrams shall include a scale drawing indicating the survey stakes nearest the lake, if possible, and the distances from such stakes to the proposed structure.
9. The height of the project above and below the water line
10. The width of the project
11. The permanency of the structure, including projected time period for removal, if any
12. The purpose and uses of the structure, including estimated number of persons to use the structure at any one time
13. The type and nature of the anchorage of the structure
14. The safety equipment to be used in the structure, if any

(b) The Town Board shall consider the following items in reaching its written determination and in reaching its decision to issue a permit, issue a permit upon conditions or deny the permit:

1. The interference with the public right to navigate in navigable waters

2. The interference with the riparian rights of other riparian proprietors

3. If a mooring buoy is involved:

a. The mooring buoy, on Powers Lake shall not be more than one hundred and fifty (150) feet from the shoreline (ordinary high water mark) and the mooring buoy, on Lake Benedict shall not be more than one hundred (100) feet from the shoreline (ordinary high water mark).

b. Such buoys shall be all white with a blue stripe midway between the top and the water-line. They will be spherical or ovate in shape with a minimum of eighteen (18) inches above the water-line.

C. There shall be only one mooring permit issued for the lake frontage of the riparian owner unless a variance is requested and subsequently granted by the Town Board.

d. There shall be no more than one boat or watercraft attached to a single mooring.

e. The mooring lines or chains shall not exceed in length more than three (3) times the depth of the water in which the boat or watercraft is moored.

4. Whether there will be interference with other property, marked swimming areas, structures, piers, ramps, docks or wharves.

5. If a raft or platform is involved:

a. The structure shall be so anchored so that at least twelve (12) inches of freeboard extends above the water line.

b. The structure shall be painted white or kept its original color if made of reflective aluminum. If not of either above mentioned configuration then a red reflector of not less than three (3) inches in

diameter shall be attached thereto no more than twelve (12) inches from each corner or projection.

c. The structure shall be placed within the lot lines of the riparian owner. 12½' 20.12(3)

d. The structure shall no be greater than one hundred (100) from the shoreline (ordinary highwater mark).

6. The Town Board within fifteen (15) days of receipt of the application for permit shall:

a. Review the application for permit

b. Personally inspect the subject premises or request the designee of the Town Board to inspect the premises if deemed an inspection is necessary

7. The Town Board within thirty (30) days of the receipt of the application for permit shall:

a. Provide a written determination whether the proposed structure or structures will be detrimental to the public health or safety, will constitute an unreasonable obstruction or interference of the waters or will cause injury to persons or damage to property

b. Issue the permit, issue the permit upon conditions or deny the permit

c. The permit, if issued by the Town Board, may be revoked or suspended by the Town Board at anytime for cause after a public hearing. The permittee shall be given ten (10) days written notice of the hearing.

d. Permits under this section shall be issued for a term, unless specifically otherwise noted in the permit, of three (3) years from the date of issuance and shall automatically renew from year to year unless revoked for cause as outlined in subsection c. above.

(2) Regulation of Wharves and Piers

No person shall cause, allow or permit any person to construct, place, extend or maintain any wharf or pier in

the waters in the Town without first obtaining a written permit from the Town Board or its agent having jurisdiction over the lake. This provision does not apply to those piers or wharves regulated by the Department of Natural Resources under Chapter 30, (1989-1990) Wis. Stats.

(a) Any person required to seek and obtain a permit under these provisions shall file an application with the Town Clerk. The application shall request, at minimum, the following information from the applicant:

1. The name of the applicant
2. The address of the applicant
3. The business and residential telephone number of the applicant
4. The age of the applicant
5. The tax parcel number of the property
6. The location of the proposed pier or wharf
7. The design and dimension of the project with attached maps and diagrams, including the type and amount of construction material to be used. Such maps and drawings shall include a scale drawing indicating the survey stakes nearest the lake, if possible, and the distances from such stakes to the proposed structure.
8. The height of the project above the water line
9. The estimated number of persons to use the pier or wharf at any one time
10. The type and nature of the anchorage of the structure
11. The safety equipment to be used in the structure, if any

(b) The Town Board shall consider the following items in reaching its written determination and in reaching its decision to issue a permit, issue a permit upon conditions or deny the permit:

1. The interference with the public right to navigate in navigable waters

2. The interference with the riparian rights of other riparian proprietors

3. The structure shall extent not more than one hundred (100) feet from the shoreline (ordinary highwater mark) unless the person has a permit

issued by the Department of Natural Resources under Sec. 30.12, (1989-1990) Wis. Stats.

4. The structure shall not interfere with the free movement of water underneath the pier or wharf

5. The structure shall be placed within the lot lines of the riparian owner. 12½' per 20.12(3)

6. Whether the structure will create a public nuisance.

(c) The Town Board within fifteen (15) days of receipt of the application for permit shall:

1. Review the application for permit

2. Personally inspect the subject premises or request the Building Inspector of the Town to inspect the premises if deemed an inspection is necessary

(d) The Town Board within thirty (30) days of the receipt of the application for permit shall:

1. Provide a written determination whether the proposed structure or structures will be detrimental to the public health or safety, will constitute an unreasonable obstruction or interference of the waters or will cause injury to persons or damage to property

2. Issue the permit, issue the permit upon conditions or deny the permit

3. The permit, if issued by the Town Board, may be revoked or suspended by the Town Board at anytime for cause after a public hearing. The permittee and also the neighboring owners of abutting riparian lands shall be given ten (10) days written notice of the hearing.

4. Permits under this section shall be issued for a term, unless specifically otherwise noted in the permit, of three (3) years from the date of issuance and shall automatically renew from year to year thereafter unless revoked for cause as outlined in subsection 3. above.

(3) Location of Wharves, Piers, Swimming Rafts and Structures Attached Thereto

(a) No wharf, pier, swimming raft, or any structure attached thereto, shall be located, built, constructed or maintained on a lot or parcel within a distance of twelve and one-half (12-1/2) feet from a riparian proprietor's property line where such property line intersects the shoreline, nor shall the above be located, built, constructed or maintained within a distance of twelve and one-half (12-1/2) feet from a riparian proprietor's property line, as extended waterward from the shoreline. This restriction shall not apply to permissible preexisting wharves, piers, swimming rafts and structures attached thereto pursuant to the provisions in paragraph (3)(c) below.

(b) The provisions of Chapter NR 326 of the Wisconsin Administrative Code as amended from time to time shall apply in establishing the riparian proprietor's property line as extended waterward from the shoreline.

(c) A wharf, pier, swimming raft or structure attached thereto is a permissible preexisting wharf, pier, swimming raft or structure attached thereto, if it existed prior to January 1, 1993, if it is not extended or expanded after that date, and if the ownership of the land to which it is attached did not change after that date, except that a wharf, pier, swimming raft or structure attached thereto continues its status as a permissible preexisting wharf, pier, swimming raft or structure attached thereto for one year after the date of the change of ownership is recorded. The seasonal removal of a wharf, pier, swimming raft or structure attached thereto does not affect its status as a permissible preexisting wharf, pier, swimming raft or structure attached thereto if it is reestablished in substantially the same form. The owner of a wharf, pier, swimming raft or structure attached thereto may submit evidence to the Town Board that it is a permissible preexisting wharf, pier, swimming raft or structure attached thereto at any time after the effective date of this ordinance.

(4) Fire Lane Obstructed

No pier, wharf, raft, platform, mooring buoy, vehicle or other structure shall be placed in the waters located

within the boundary of a designated fire lane unless so approved by the Town Board.

(5) Removal of Piers and Shore Stations

All piers, their supports and all shore stations shall either be completely removed from the water by December 1st of each year, or allowed to remain completely intact in the water through the winter months. If left in the water after December 1st, the pier or shore station shall be marked by readily visible red reflective flags, spaced at intervals of not less than ten (10) feet, at a height of at least thirty (30) inches above the deck in such a manner as to give a warning to other users of the Lake. All buoys shall be removed from the water by December 1st of each year. Any pier, shore station or buoy removed from the water pursuant to this section may be replaced in the next year after the ice is out of the waters.

(6) Interference with Public Rights

No person shall cause, allow or permit any person to construct or maintain any wharf, pier, beach, mooring or any other structure in the waters which interferes with the public right to navigate in navigable waters unless the person has a permit issued by the Department of Natural Resources under Sec. 30.12, (1991-1992) Wis. Stats.

(7) Interference with Riparian Rights

No person shall cause, allow, or permit any person to construct or maintain a wharf, pier, beach, mooring or any other structure which interferes with the riparian rights of other riparian proprietors on waters unless the person has a permit issued by the Department of Natural Resources under Sec. 30.12, (1989-1990) Wis. Stats.

(8) Removal of Wharves and Piers in Navigable Waters

No person shall cause, allow or permit any person to maintain any wharf or pier in the waters if the wharf or pier is so old, dilapidated or is in such need of repair that it is dangerous, unsafe or unfit for use by the public. The Town Board may proceed under Sec. 66.0495, (1991-1992) Wis. Stats., or may proceed under Chapter 823, (1991-1992) Wis. Stats.

20.13 Water Safety Patrol, Markers and Navigation Aids

(1) Duty of Chief of Water Saftey Patrol (Recreated 8 July 1999)

(a) The Chief of Water Safety Patrol is authorized and directed to place and maintain suitable regulatory markers, navigation aids and signs, and waterway markers in such areas of the lake as shall be necessary under this ordinance, state law and state administrative code provisions, and to advise the public of the provisions of this ordinance and such state law and state administrative code provisions, and he or she shall post and maintain a copy of this ordinance at all public access points to the lake within the jurisdiction of the Town Board.

(b) Water Safety Patrol watercraft and authorized personnel of the Water Safety Patrol when on duty, are exempt from provision of this instant chapter when said watercraft and personnel are used and employed in the lawful execution of their duties and responsibilities during the enforcement of this instant chapter.

(2) Standard Markers

All buoys, regulatory markers, aids to navigation or waterway markers shall conform to requirements of NR 5.09 Wisconsin Administrative Code and shall have affixed thereto such numbers as are assigned to them by the chief of the Water Safety Patrol; such numbers are to be located at least twelve (12) inches above the waterline.

(3) Interference with Markers

No person shall, without authority, remove, damage or destroy or moor or attach any watercraft to any buoy, beacon or marker placed in the waters of the lake by the authority of the United States, the State, municipality or by any private person pursuant to the provisions of this chapter.

20.14 Repeal of Conflicting Ordinances

Any ordinance conflicting with the provisions of this ordinance or any part thereof is hereby repealed.

20.15 Separability

If any section, subsection, sentence, clause, phrase or portion of this ordinance is for any reason held to be invalid or unconstitutional, by reason of any decision of any court of competent jurisdiction, such decision shall not affect the

validity of any other section, subsection, sentence, clause, or phrase or portion thereof. The Town Board hereby adopting this ordinance declares that they would have passed this ordinance and each section, subsection, sentence, clause, phrase or portion thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, phrases or portions thereof may be declared invalid or unconstitutional.

20.16 Money Deposits

(1) If a person is cited or arrested, the person may deposit the amount of money the enforcing officer directs by mailing the deposit and a copy of the citation to the office of the municipal court having jurisdiction or by going to the municipal court or the office of the Water Safety Patrol.

(2) The person receiving the deposit shall prepare a receipt in triplicate showing the purpose for which the deposit is made, stating that the defendant may inquire at the office of the municipal court regarding the disposition of the deposit and notifying the defendant that if he or she fails to appear in court at the time fixed in the citation, he or she will be deemed to have tendered a plea of no contest and submitted to a forfeiture and a penalty assessment plus costs not to exceed the amount of the deposit which the court may accept. The original of the receipt shall be delivered to the defendant in person or by mail. If the defendant pays by check, the check shall be considered a receipt.

(3) If the court does not accept the deposit as a forfeiture for the offense, a summons shall be issued. If the defendant fails to respond to the summons, an arrest warrant shall be issued.

20.17 Penalties

(1) The statutory provisions set forth in Sec. 30.80, (1991-1992) Wis. Stats., describing and defining penalties with respect to violations of the provisions of Sections 30.50 through 30.71, (1991-1992) Wis. Stats., as adopted by subsection 20.05(1) of this ordinance, are hereby adopted and by reference made a part of this chapter as if fully set forth herein.

(2) Any person who shall violate any provisions of this ordinance set forth in sections 20.01 through 20.13, inclusive, except as specified in paragraphs 20.17(1) of this subsection, shall, upon conviction thereof, forfeit not

more than Fifty Dollars ($50.00) for the first offense and not more than One Hundred Dollars ($100.00) upon the conviction of the same offense a second and subsequent time within one (1) year.

Appendix C

DISTRICT OF POWERS LAKE WATER QUALITY AND LAKE USE SURVEY INSTRUMENT: 2010

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The District of Powers Lake
P.O. Box 462
Powers Lake, WI 53159-0462

THE DISTRICT OF POWERS LAKE

LAKE USE AND WATER QUALITY SURVEY

Dear Friends and Neighbors,

The District of Powers Lake has sought your opinions and ideas, through a questionnaire survey similar to this one that you now hold in your hands, at approximately 10-year intervals since its inception. Initially, 20 years ago, the District of Powers Lake was engaged in developing a lake management plan for Powers Lake. This Plan has guided the actions of the District during the past two decades. We now stand at the threshold of a new decade, and the District is again seeking your thoughts and ideas for managing Powers Lake. As previously, the District is working in close cooperation with the Southeastern Wisconsin Regional Planning Commission (SEWRPC) in the conduct of the questionnaire survey. We are conducting this survey to determine your opinions regarding the state of the Lake and surrounding development, and to gauge our success in implementing measures to protect and enhance our community.

Please take a few minutes to provide us with your opinions and responses to the following questions and return your thoughts to SEWRPC in the prepaid envelope provided. Your responses will be kept in strict confidence, and will help us to continue to develop an appropriate strategy for protecting our shared water resources. Thanks for your participation. Your reply by August 31, 2009, would be appreciated.

Sincerely,

Jim Michels, Chairman
Board of Commissioners
District of Powers Lake

JAT/
#139699 v1 - POWERS LAKE COMMUNITY SURVEY INSTRUMENT

Enclosure

POWERS LAKE

RECREATIONAL WATER USE AND WATER QUALITY SURVEY

PART I. Please tell us about how your time is spent at Powers Lake
(circle one residency type, then answer questions below):

A. Is this your:

1. Primary residence? If **YES**.…

   a. Are you eligible to vote in local elections (Randall, Wheatland, Bloomfield) **YES / NO**
   b. Do you vote in local elections? **YES / NO**

2. Secondary residence? If **YES**, select one description that best describes your time spent at Powers Lake.

   a. Summer season [June-August]
   b. Extended summer [spring to fall]
   c. Summer weekends
   d. Vacations only
   e. Weekends year-round

B. How many days per year do you spend at Powers Lake? _____

C. How many years have you lived in this area?

1. Less than one year
2. One year to five years
3. Six years to 10 years
4. More than 10 years

D. Do you use other Southeastern Wisconsin Lakes for recreation (fishing, swimming, skiing, picnicking, camping, etc.)? If **YES**, please list them.

1. YES, _____

2. NO

PART II. How do you use Powers Lake?

A. **<u>Open Water Fishing</u>** (*If you do not fish skip to C*)

1. Days fished per year _____

   Usually fish from: pier boat both equally

2. Which species of fish did you catch last year? (circle all that apply)

a. Northern Pike	e. White Sucker	i. Other (please specify)
b. Walleye	f. Panfish	_____
c. Largemouth Bass	g. Yellow Perch	_____
d. Smallmouth Bass	h. Crappie	_____

3. Which of the following fish do you think **increased** in NUMBER of fish caught (write I), **decreased** in NUMBER of fish caught (write D), or **remained the same** (write S), within the last ten years?

a. Northern Pike ___	e. White Sucker ___	i. Other (please specify)
b. Walleye ___	f. Panfish ___	_____
c. Largemouth Bass ___	g. Yellow Perch ___	_____
d. Smallmouth Bass ___	h. Crappie ___	_____

4. Do you think the number of CARP in Powers Lake have increased, decreased, or remained the same, within the last ten years?

   ____ a. Increased ____ b. Decreased ____ c. Stayed the Same

5. How do you rate the fishing quality?

____ a. excellent	____ c. fair
____ b. good	____ d. poor

B. **<u>Ice-fishing</u>** (*If you do not fish skip to C*)

1. How many days did you ice fish over the past year? _____ days

2. Which species of fish did you catch last winter? (circle all that apply)

a. Northern Pike	e. White Sucker	i. Other (please specify)
b. Walleye	f. Panfish	_____
c. Largemouth Bass	g. Yellow Perch	_____
d. Smallmouth Bass	h. Crappie	_____

3. How do you rate the quality of the ice-fishing?

a. excellent	c. fair
b. good	d. poor

C. **Other Recreational Uses**

1. The following list contains a number of popular water based activities. If you engage in any of these activities, please indicate the approximate number of days per year you spend on the activity in the space provided. In the last column indicate the relative importance of that activity to you by ranking the activities from 1 through 5, with 1 being least important and 5 being most important.

	Year Round (number of days)	Spring/Summer Only (number of days)	Fall/Winter Only (number of days)	Relative Importance (1-5)
*Power Boat				
*PWC/Jet Ski				
Water ski/Wakeboard/Tube				
*Sail/Boardsail				
*Row/Canoe/Kayak/Paddle				
Swim/SCUBA Dive				
Snowmobile				
Cross-Country Ski				
Bird Watch				
Picnic/Barbecue				
Walk/Jog				
Other (specify _____)				

If you indicated boating use of the Lake, please complete the following:

Type of Boat:	*Ski Boat*	*Pontoon Boat*	*Fishing Boat or Other Motor Boat*	*Personal Watercraft/ Jet Ski*	*Other Boats (Non-motorized boats, sailboats, canoes, etc.*
Horse Power:					
Number Owned:					

2. Manner in which you pursue these activities.

   a. When you use Powers Lake, do you usually do so…. (circle one):

   1.) on your own 3.) with friends
   2.) with family 4.) in a group

   b. On WEEKDAYS, do you consider the Lake to be…. (circle one):

   1.) lightly used 3.) heavily used
   2.) moderately used 4.) over used

   c. On WEEKENDS, do you consider the Lake to be.... (circle one):

   1.) lightly used 3.) heavily used
   2.) moderately used 4.) over used

   Why? _____

   _____

   _____

PART III. Please tell us how you feel about the following issues that can affect your use of Powers Lake.

A. **<u>Regulations and Law Enforcement Issues</u>**:

1. How would you rate your general level of satisfaction with *law enforcement* on the Lake (e.g., boating, fish and game regulations)? (circle one)

   a. Well satisfied
   b. Satisfied
   c. No strong feeling
   d. Not satisfied
   e. Very dissatisfied

   Why? _____

2. How would you rate your general level of satisfaction with *boating regulations* on the Lake? (circle one)

   a. Well satisfied
   b. Satisfied
   c. No strong feeling
   d. Not satisfied
   e. Very satisfied
   f. Need more information

3. If you answered "Not satisfied" or "Very dissatisfied" to Question 2 above, how would you change the *boating regulations* on the Lake?

   _____

   _____

B. <u>Watershed Issues</u> (all land that drains to Powers Lake):

1. How do you rate your general level of satisfaction with the *level of development* (land use zoning regulations) in the Lake watershed? (circle one)

   a. Well satisfied
   b. Satisfied
   c. No strong feeling
   d. Not satisfied
   e. Very dissatisfied
   f. Need more information

   Why? _____

2. How do you rate your general level of satisfaction with *stormwater management* (land use zoning regulations) in the Lake watershed? (circle one)

   a. Well satisfied
   b. Satisfied
   c. No strong feeling
   d. Not satisfied
   e. Very dissatisfied
   f. Need more information

   Why? _____

3. How do you rate your general level of satisfaction with *sanitation regulations* (waste disposal, sewerage) in the Lake watershed? (circle one)

   a. Well satisfied
   b. Satisfied
   c. No strong feeling
   d. Not satisfied
   e. Very dissatisfied
   f. Need more information

   Why? _____

C. <u>Water Quality issues:</u>

1. Do you consider the Lake to have *good water quality*…

   Yes No

   a. Based upon **WATER CLARITY** and/or water tests? (circle one)

      YES No

   b. Based upon algae and/or **AQUATIC PLANTS**? (circle one)

      YES No

   c. Based upon **AESTHETICS** and/or wildlife conditions? (circle one)

      YES No

2. How would you describe good water quality?

   _____

   _____

3. In your opinion, how has the quality of the Lake changed since you first moved to or visited the area? (circle one)

   a. Improved
   b. Stayed the same
   c. Deteriorated
   d. Don't know

D. <u>Aquatic Plant Management Issues</u>:

1. Do you feel that the Lake has excessive algae and/or aquatic plant growth? (circle one)

   a. YES b. NO c. DON'T KNOW

Why? _____

If you answered **<u>NO</u>** or **<u>DON'T KNOW</u>** to the previous question, *skip to Part E, Major Concerns*.

If you answered **<u>YES</u>** to the previous question, please answer the following question.

2. How would you like to see the excessive algae and aquatic plants controlled?

1 2 3 4 5

Least Preferred.....Most Preferred

a.	Mechanical harvesting of weeds	1	2	3	4	5
b.	Use algae/aquatic plant chemicals	1	2	3	4	5
c.	Biological control [i.e. weevil]	1	2	3	4	5
d.	Place additional development controls on these areas:					
	– Along the shoreline	1	2	3	4	5
	– Within 500 feet of the lakeshore	1	2	3	4	5
	– Within 1,000 feet of the lakeshore	1	2	3	4	5
	– Within the watershed	1	2	3	4	5
e.	Dredging	1	2	3	4	5
g.	Septic pumping required by District	1	2	3	4	5
h.	Other _____	1	2	3	4	5
i.	Other _____	1	2	3	4	5

E. **<u>Major Concerns Relating to Powers Lake</u>**:

What are your **top FIVE concerns** about Powers Lake (place a number "1" next to the issue that is most important to you, a number "2" next to the second most important issue, and so on)?

___ General water quality
___ Number of boats
___ Speed of boats
___ Size of boats
___ Number of water skiers
___ Number of PWCs/jet skiers
___ Boat and trailer parking
___ Decline in fishery resources
___ Parking for nonresidents
___ Excessive noise
___ Unpleasant odors
___ Farm runoff
___ Urban stormwater runoff
___ Development around the lake
___ Shoreline erosion
___ Wetland preservation
___ Water levels that fluctuate too much
___ Sedimentation/shallow areas
___ Use of lake and access sites by nonresidents
___ Other (please specify) _____

What do you think could be done about your concerns to improve the situation?

_____

_____

_____

F. **Other Issues**:

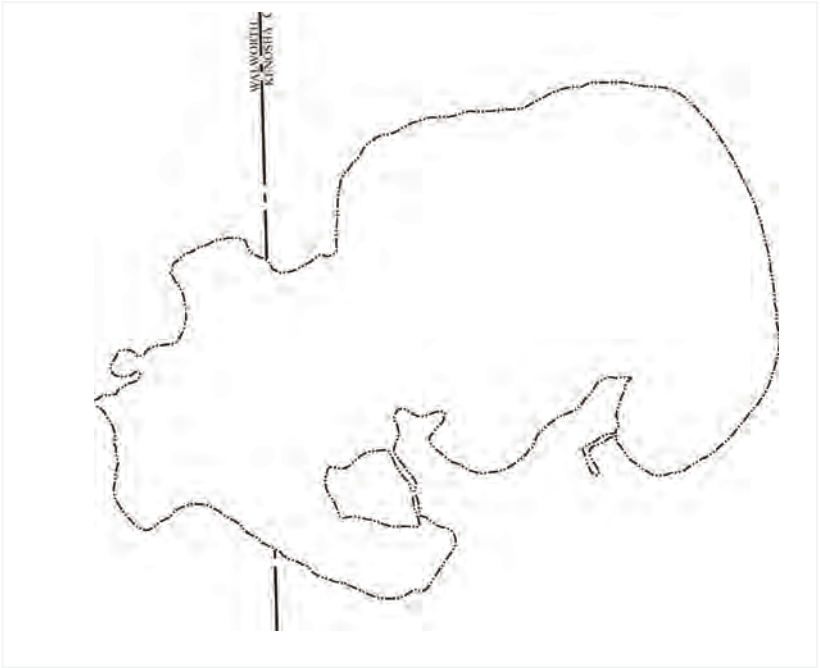
1. Should any of the following activities be restricted to certain AREAS of the Lake? (check all that apply)

____ a. Swimming	____ e. Fishing
____ b. Power boating	____ f. Other boating (e.g. non-powered or sailing)
____ c. Water skiing	____ g. Snowmobiling
____ d. Personal watercraft	____ h. Other (please specify)_____

2. Should any of the following activities be restricted to certain HOURS of the day on the Lake? (check all that apply)

____ a. Swimming	____ e. Fishing
____ b. Power boating	____ f. Other boating (e.g. non-powered or sailing)
____ c. Water skiing	____ g. Snowmobiling
____ d. Personal watercraft	____ h. Other (please specify)_____

3. If you answered either of the above questions, which areas of the Lake and/or what hours of the day would you feel appropriate for the activity/activities indicated? (Please shade in the appropriate area on the map below and use the space for further description.)



G. **Lake Management District Issues:**

1. Would you be prepared to pay more than you currently do for any improvements to the lake or river environment or facilities that you may have indicated above? (circle one)

   a. Yes b. No

   If *NO*, who should pay? _____

   how should the funds be raised? _____

   If *YES*, which additional improvements would you be willing to pay for?

   _____

   _____

2. Do you think the Lake Management District is generally doing a good job in lake management? Please comment.

   _____

   _____

3. Lake management districts are required to hold an annual meeting between Memorial Day and Labor Day to approve the annual budget, elect commissioners, and conduct any other business brought before the districts.

   I regularly attend the annual meeting (circle one)

   a. Yes b. No

   If *NO*, please indicate if you do not attend because (check all that apply):

   ____ I have to work ____ I am out of town during this period

   ____ The meetings are held at an inconvenient time ____ I would prefer the meetings to be held on another day

   If you have checked any of the boxes above, please tell us what time, date, or other accommodation we can make to better meet your scheduling needs:

   _____

4. Would you attend quarterly meetings if they were not held on Fridays at 5 PM?

   a. Yes b. No

   If *YES*, please specify a time that you would attend _____

5. Are you aware of the District of Powers Lake website [http://www.districtofpowerslake.com]?

   a. Yes b. No

6. Do you read the *District of Powers Lake Newsletter*?

   a. Yes b. No (Please go to the next question)

   (If *YES*, what types of articles do you find most interesting or informative?)

   _____

   _____

7. Do you subscribe to the University of Wisconsin-Extension publication *Lake Tides*?

   a. Yes b. No

8. Are you a member of the Wisconsin Association Lakes? Do you subscribe to the *Lake Connection*?

   a. Yes b. No

9. Have you ever attended the Wisconsin Lakes Convention or the Southeast Wisconsin Lakes Workshop?

   a. Yes b. No

   (If *YES*, which event did you attend and when did you last attend these events)____

10. Are there any subjects or issues about which you would like more information?

11. Are there any other issues that you would like to draw to our attention at this time?

THANK YOU FOR YOUR COOPERATION

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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Appendix D

SUMMARY OF RESPONSES TO THE DISTRICT OF POWERS LAKE COMMUNITY SURVEY

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POWERS LAKE

RECREATIONAL WATER USE AND WATER QUALITY SURVEY

There were a total of 93 questionnaires, or 30 percent of the 298 questionnaires dispatched, returned during the study period August through December 2009.

PART I. Please tell us about how your time is spent at Powers Lake
(circle one residency type, then answer questions below):

A. Is this your:

1. Primary residence? If **YES**.…

   a. Are you eligible to vote in local elections (Randall, Wheatland, Bloomfield)
   YES **(20)** / NO **(10)**
   b. Do you vote in local elections?
   YES **(19)** / NO **(11)**

2. Secondary residence? If **YES**, select one description that best describes your time spent at Powers Lake.

   a. Summer season [June-August] **(5)**
   b. Extended summer [spring to fall] **(39)**
   c. Summer weekends **(6)**
   d. Vacations only **(0)**
   e. Weekends year-round **(24)**

B. How many days per year do you spend at Powers Lake? (average = **83**)

C. How many years have you lived in this area?

1. Less than one year **(0)**
2. One year to five years **(4)**
3. Six years to 10 years **(8)**
4. More than 10 years **(77)**

D. Do you use other Southeastern Wisconsin Lakes for recreation (fishing, swimming, skiing, picnicking, camping, etc.)? If **YES**, please list them.

1. YES **(17)**

   Geneva Lake
   Twin Lakes
   Lily Lake
   Silver Lake
   Bohner Lake
   Rock Lake
   Lake Mills
   Lake Benedict
   Tombeau Lake
   Lake Como
   Delavan Lake

2. NO **(65)**

PART II. How do you use Powers Lake?

A. **Open Water Fishing** (*If you do not fish skip to C*)

1. Days fished per year (average = **8**)

   Usually fish from: pier (**16**) boat (**14**) both equally (**9**)

2. Which species of fish did you catch last year? (circle all that apply)

a.	Northern Pike (**13**)	e.	White Sucker (**1**)	Other (please specify):
b.	Walleye (**8**)	f.	Panfish (**24**)	bluegill (**1**)
c.	Largemouth Bass (**21**)	g.	Yellow Perch (**12**)	rock bass (**1**)
d.	Smallmouth Bass (**12**)	h.	Crappie (**11**)	catfish (**1**)

3. Which of the following fish do you think **increased** in NUMBER of fish caught (write I), **decreased** in NUMBER of fish caught (write D), or **remained the same** (write S), within the last ten years?

a.	Northern Pike (**1/10/8**)	i.	White Sucker (**0/1/6**)	Other (please specify):
b.	Walleye (**0/14/2**)	j.	Panfish (**4/5/11**)	_____
c.	Largemouth Bass (**5/8/11**)	k.	Yellow Perch (**3/5/8**)	_____
d.	Smallmouth Bass (**2/9/5**)	l.	Crappie (**1/10/6**)	_____

4. Do you think the number of CARP in Powers Lake have increased, decreased, or remained the same, within the last ten years?

   (9) a. Increased (**3**) b. Decreased (**16**) c. Stayed the Same

5. How do you rate the fishing quality?

   (1) a. excellent (**22**) c. fair
   (13) b. good (**0**) d. poor

B. **Ice-fishing** (*If you do not fish skip to C*)

1. How many days did you ice fish over the past year? (average = **8**) days

2. Which species of fish did you catch last winter? (circle all that apply)

a.	Northern Pike (**5**)	e.	White Sucker (**0**)	Other (please specify)
b.	Walleye (**1**)	f.	Panfish (**2**)	bowfin (**1**)
c.	Largemouth Bass (**2**)	g.	Yellow Perch (**1**)	_____
d.	Smallmouth Bass (**0**)	h.	Crappie (**0**)	_____

3. How do you rate the quality of the ice-fishing?

   (**0**) a. excellent (**6**) c. fair
   (**1**) b. good (**0**) d. poor

C. **Other Recreational Uses**

1. The following list contains a number of popular water based activities. If you engage in any of these activities, please indicate the approximate number of days per year you spend on the activity in the space provided. In the last column indicate the relative importance of that activity to you by ranking the activities from 1 through 5, with 1 being least important and 5 being most important.

	Year Round (number of days)	Spring/Summer Only (number of days)	Fall/Winter Only (number of days)	Relative Importance (1-5)
*Power Boat	**35**	**34**	**12**	**4.2**
*PWC/Jet Ski	**41**	**39**	**12**	**3.8**
Water ski/Wakeboard/Tube	**26**	**27**	**9**	**4.1**
*Sail/Boardsail	**31**	**16**	**8**	**2.9**
*Row/Canoe/Kayak/Paddle	**19**	**19**	**4**	**3.3**
Swim/SCUBA Dive	**46**	**39**	**5**	**4.2**
Snowmobile	**5**	**4**	**11**	**3.2**
Cross-Country Ski	**13**	**12**	**8**	**2.3**
Bird Watch	**211**	**71**	**13**	**3.2**
Picnic/Barbecue	**84**	**24**	**12**	**4.0**
Walk/Jog	**67**	**41**	**31**	**4.2**
Other (specify: Bike riding)	**52**	**66**	**10**	**5.0**

If you indicated boating use of the Lake, please complete the following:

Type of Boat:	*Ski Boat*	*Pontoon Boat*	*Fishing Boat or Other Motor Boat*	*Personal Watercraft/ Jet Ski*	*Other Boats (Non-motorized boats, sailboats, canoes, etc.*
Horse Power:	**209**	**65**	**87**	**106**	**9**
Number Owned:	**1.1**	**1.0**	**1.0**	**1.5**	**1.8**

2. Manner in which you pursue these activities.

   a. When you use Powers Lake, do you usually do so…. (circle one):

      1.) on your own (**4**) 3.) with friends (**13**)
      2.) with family (**71**) 4.) in a group (**2**)

   b. On WEEKDAYS, do you consider the Lake to be…. (circle one):

      1.) lightly used (**62**) 3.) heavily used (**0**)
      2.) moderately used (**29**) 4.) over used (**0**)

   c. On WEEKENDS, do you consider the Lake to be.... (circle one):

      1.) lightly used (**0**) 3.) heavily used (**48**)
      2.) moderately used (**18**) 4.) over used (**25**)

   Why? _____

PWC has increased
Too many large boats on lake making it unsafe
Too many people who don't live on lake launch boats; number of launches should be limited
Too many motorboats, skiing, and jet skis
I like the limited parking at the launches
Too many (fishing) boats to ski safely;
Mondays, Tuesdays we see very little activity compared to weekends
Too many boats allowed to launch
Business allowed to put in multiple piers without restrictions and rent them for year round boat parking to nonresidents
Too many weekend boat launches without knowing rules
On weekends in Jefferson Bay - numerous wave runners spinning in circles and acting reckless
Waves and stirred-up bottom make the water unclear for days after weekends
Don't charge enough at launch
Too many PWCs going every direction
Too many nonresident boats
Shut down the boat ramp when parking lot is full
People not obeying rules

PART III. Please tell us how you feel about the following issues that can affect your use of Powers Lake.

A. **<u>Regulations and Law Enforcement Issues</u>**:

1. How would you rate your general level of satisfaction with *law enforcement* on the Lake (e.g., boating, fish and game regulations)? (circle one)

   a. Well satisfied (**16**) d. Not satisfied (**21**)
   b. Satisfied (**38**) e. Very dissatisfied (**2**)
   c. No strong feeling (**13**)

   Why? _____

Over-enforced
PWC's not policed enough
Better the past 2 years - seem more concerned with safety and ticket only for serious violations
Not patrolled enough
Need more emphasis on safety
Often harass boaters who are obeying the rules and ignore skiers who are going the wrong direction
No enforcement during the week
Should spend more time watching incoming boats who don't follow rules
There needs to be 2
Police boat blocks entrance to Jefferson Bay
We always see a presence of law enforcement on the weekends
Don't seem to be too many incidents of bad or dangerous behavior
Driving after dark without lights
Often the police boat is at the dock long before sunset, so some boats continue to pull skiers after sunset
Need to better monitor speed of boats and cleanliness of boats coming on lake
Boating after hours, littering, drinking, dangerous and disrespectful driving, excessively loud stereos
Excessively loud music
Repeat offenders

2. How would you rate your general level of satisfaction with *boating regulations* on the Lake? (circle one)

a.	Well satisfied	(**16**)	d. Not satisfied	(**22**)
b.	Satisfied	(**43**)	e. Very satisfied	(**1**)
c.	No strong feeling	(**7**)	f. Need more information	(**1**)

3. If you answered "Not satisfied" or "Very dissatisfied" to Question 2 above, how would you change the *boating regulations* on the Lake?

All counterclockwise
Half turns allowed
No-wake sirens
Enforce education based
Waterski route should not be mandatory to go into Jefferson Bay depending on how busy Bay is; be able to cut in front of sand bar depending on how many boats are parked there
Regulate the number of boats on the lake
We like no wake until 10 am
More "quiet times"
Patrol boat cannot sit at entrance to Jefferson Bay - too narrow
Earlier start before 10 am
Increase no-wake hours on weekends
Limit number of boats on lake

Charge much more at launch site
Younger kids need to attend boating school
Make PWCs obey boating laws
Too many boats operating inside the buoys not paying attention to swimmers, etc.
10 am is too late to start wake
Need tougher rules on cleanliness of boats entering lake
More control during sailboat racing
Need cut-across for skiers
A 2-hour period for no wake noon to 2 pm on weekends
Need to pay more attention to jet skiers
No wake after 6 pm on Fridays, Saturdays, Sundays
Some areas should be for fishing only
Control noise (loud music) from boats
Repeat offenders should lose boating for 30 days

B. **<u>Watershed Issues</u>** (all land that drains to Powers Lake):

1. How do you rate your general level of satisfaction with the *level of development* (land use zoning regulations) in the Lake watershed? (circle one)

   a. Well satisfied (**7**) d. Not satisfied (**5**)
   b. Satisfied (**41**) e. Very dissatisfied (**2**)
   c. No strong feeling (**18**) f. Need more information (**17**)

   Why? _____

   Over-regulated
   Question is too vague
   Two launches not necessary
   Need boat washers at launches
   Commercial development of golf gifts
   Too many oversized piers
   Building too close to wetlands
   Should ban fertilizers and pesticides from lawns
   Houses have been built in sensitive watershed areas
   Creek should be cleaned - beaver dams and downed trees

2. How do you rate your general level of satisfaction with *stormwater management* (land use zoning regulations) in the Lake watershed? (circle one)

   a. Well satisfied (**6**) d. Not satisfied (**3**)
   b. Satisfied (**31**) e. Very dissatisfied (**0**)
   c. No strong feeling (**28**) f. Need more information (**20**)

   Why? _____

   There is stormwater management on Powers Lake?
   Concerned about lake levels which vary a lot

3. How do you rate your general level of satisfaction with *sanitation regulations* (waste disposal, sewerage) in the Lake watershed? (circle one)

a.	Well satisfied (**3**)	d.	Not satisfied (**14**)
b.	Satisfied (**36**)	e.	Very dissatisfied (**1**)
c.	No strong feeling (**18**)	f.	Need more information (**15**)

Why? _____

People in Jefferson Bay should be required to put in holding tanks since the land is so boggy
Too many septic tanks between house and lake
We need sewers
Old septic systems
Lake seems to be dirtier and more difficult to see some animals that were fairly common years ago

C. Water Quality issues:

1. Do you consider the Lake to have *good water quality*…

   Yes **87** No **8**

   a. Based upon **WATER CLARITY** and/or water tests? (circle one)

      YES **83** NO **8**

   b. Based upon algae and/or **AQUATIC PLANTS**? (circle one)

      YES **43** NO **34**

   c. Based upon **AESTHETICS** and/or wildlife conditions? (circle one)

      YES **63** NO **6**

2. How would you describe good water quality?

Clear water
Healthy weeds & fish
Sustain wildlife
Drinkable without fear of bacteria
Limited weeds and algae
22 ppb is probably a good number for a lake this developed
Testing results
No invasive plants or fish
Variety of plant and animal life
Low e-coli
No green scum
No odor
No invasive plants or animals
Limited boats and piers in water
A healthy safe environment for all native species

3. In your opinion, how has the quality of the Lake changed since you first moved to or visited the area? (circle one)

   a. Improved (**3**) c. Deteriorated (**43**)

   b. Stayed the same (**41**) d. Don't know (**4**)

D. <u>Aquatic Plant Management Issues</u>:

1. Do you feel that the Lake has excessive algae and/or aquatic plant growth? (circle one)

   a. YES (**44**) b. NO (**23**) c. DON'T KNOW (**16**)

Why? _____

Seems OK
Milfoil and algae major problems on east shore-the Knolls
I've been on other SE Wis. Lakes
Milfoil and algae a problem in Jefferson Bay
[Only] in some areas
Boats spread plants lake to lake
Use of fertilizer on lakefront lawns
Big boats and wake board boats chop weeds and spread them
It has deteriorated in past 25 years
Too much muck in some areas of the lake
Don't see any (algae)
Because they are invasive
Areas of the lake have excessive growth
Types of plants have changed over the years
Powers Lake has program for weed control
Natural (native) is normal and needed
Invasive plants continue to flourish
Seems like less milfoil
Mussels, snails - new findings

If you answered **<u>NO</u>** or **<u>DON'T KNOW</u>** to the previous question, *skip to Part E, Major Concerns*.

If you answered **<u>YES</u>** to the previous question, please answer the following question.

2. How would you like to see the excessive algae and aquatic plants controlled?

1 ------2---------3------ 4 ---------5

Least Preferred.....Most Preferred

a. Mechanical harvesting of weeds **3.5**
b. Use algae/aquatic plant chemicals **3.2**
c. Biological control [i.e. weevil] **3.4**
d. Place additional development controls on these areas:
   – Along the shoreline **3.8**
   – Within 500 feet of the lakeshore **3.1**
   – Within 1,000 feet of the lakeshore **2.7**
   – Within the watershed **3.5**
e. Dredging **2.8**
g. Septic pumping required by District **3.8**
h. Other _____

Power wash at launch
Fine people that fertilize
Close all boat launches but one
Police and educate all boats coming and going at launch
Limit boats at ramp
Install sewers
Need to dredge Honey Bear Bay

E. **Major Concerns Relating to Powers Lake**:

What are your **top FIVE concerns** about Powers Lake (place a number "1" next to the issue that is most important to you, a number "2" next to the second most important issue, and so on)?

1.5 General water quality
2.8 Number of boats
3.3 Speed of boats
2.9 Size of boats
3.2 Number of water skiers
3.1 Number of PWCs/jet skiers
3.3 Boat and trailer parking
3.1 Decline in fishery resources
4.0 Parking for nonresidents
3.5 Excessive noise
2.0 Unpleasant odors
3.7 Farm runoff
2.5 Urban stormwater runoff
3.9 Development around the lake
3.1 Shoreline erosion
3.1 Wetland preservation
3.2 Water levels that fluctuate too much
3.4 Sedimentation/shallow areas
2.5 Use of lake and access sites by nonresidents
___ Other (please specify) _____

Wakeboard boats
Milfoil and zebra mussels
Law enforcement
Make businesses adhere to same regulations as homeowners regarding number and size of piers

Nonresident fishing
Bringing things to lake that can kill off lake
Waverunners doing donuts in bay
Restrict nonresident use
Increase launch fee for nonresidents
Require wash down
Light pollution
Have a no-wake period from 11-2 on weekends
Pier control
Lack of control over contaminated boats using the lake
Boats with tubes

What do you think could be done about your concerns to improve the situation?

Relax zoning regs
Need more buoys by swim area
Raise price to launch
Be more strict on inspections
No parking on Bloomfield Road
Enforce launch fees for nonresidents and ticket illegal trailer parking
Too much trailer parking
Purchase wetlands
Limit the number of boats
Corn farming in watershed is fertilizer
Close the 2nd launch
I dislike the new boats which are designed to generate huge wakes [for wakeboarding] - when there are several on the lake it becomes quite choppy
Inspect and wash clean all boats before launching to control invasives
Restrict some jetski usage
Remove boat ramp
Purchase of land by DoPL
More supervision
Control zebra mussels, algae, and aquatic plants
Create better water levels controls
Limit use of lake to area home owners
Restrict lighting at beach and public areas
Dredge shallow areas
Stock fish
Regulate number on nonresident boaters
Make all boat drivers take a course on boating
Improve lake outflow control
Two-hour no wake periods on weekends noon to 2 pm
No wake until noon
Limit further development
Ban lawn chemicals

Shorter times for wakes and have no-wake days
Education
Close boat ramp when parking lot is full
Reduce nonresident access on weekends
Limit number of day-users to number of parking spots in parking lot
Enforce rules of boats on lake
Ask ski boaters to be more considerate about music blasting from back of their boats
Do fish census to see how we are doing

F. **Other Issues**:

1. Should any of the following activities be restricted to certain AREAS of the Lake? (check all that apply)

5____ a. Swimming	**7**____ e. Fishing
11___ b. Power boating	**2**____ f. Other boating (e.g. non-powered or sailing)
10___ c. Water skiing	**6**____ g. Snowmobiling
13___ d. Personal watercraft	____ h. Other (please specify)_____

Boats anchored in the ski lane
Waverunners not in bay
Tubes and towed craft
No more restrictions
Fishermen should have to stay 25 feet from private piers
Kayaks near buoy line only
No more than 2 or 3 boats at sandbar

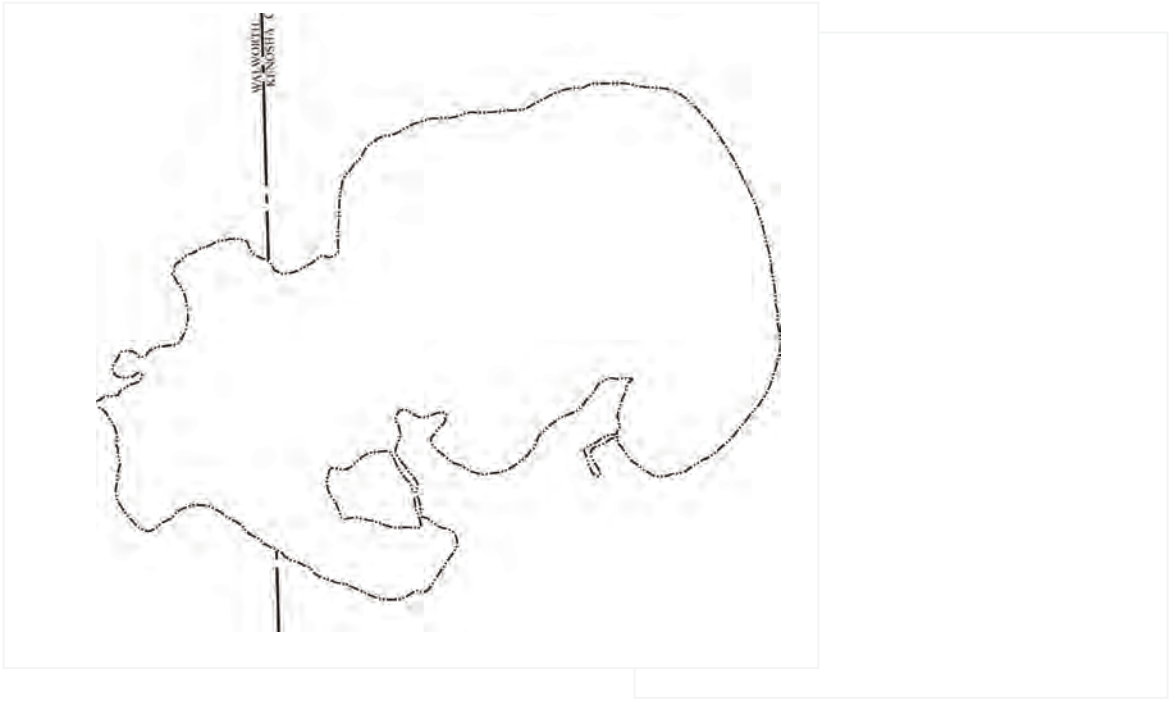
2. Should any of the following activities be restricted to certain HOURS of the day on the Lake? (check all that apply)

1____ a. Swimming	**3**____ e. Fishing
47___ b. Power boating	**1**____ f. Other boating (e.g. non-powered or sailing)
39___ c. Water skiing	**16**___ g. Snowmobiling
39___ d. Personal watercraft	_____ h. Other (please specify)_____

Need definite clock times for boating, etc.- not "sunset" (too open to interpretation)
10:00 am to 7:00 pm
No wake dusk to noon
No PWC in [southwest bay] -area too small
No power and jet ski before 11 AM or after 7:30 on all of lake
Restrict fishing to inside buoys and between 10 am and sundown
No fishing in ski lanes until 12 pm then after 7:00 or 8:00 pm; no anchoring in ski lanes during ski hours
Leave hours as they are
10:00 am to dusk
Swimming should be between no wake buoys and shoreline
Current is fine
Need to enforce no wake at sunset

Anything that makes noise
Noise

3. If you answered either of the above questions, which areas of the Lake and/or what hours of the day would you feel appropriate for the activity/activities indicated? (Please shade in the appropriate area on the map below and use the space for further description.)



Full and half turns again
Current nowake rules are adequate
Too many users
10 am to sunset entire lake
Keep PWC's in smaller area
I don't know what you are trying to prove with the above questions - there are laws and regulations already - only need to be enforced
10 am to 8 pm or dusk
Map: shoreline along east and south shores
Power boats noon to 8:00 pm
Map: (the 3 bays were shaded-in)
No-wake in 4 main bays
Power boats 10:30 am to 6 pm
Keep skiers and power boats farther away from shore and swimming areas and out of shallow areas
Keep fishing boats inside buoys or in the center out of the ski path
10 to 5
Add no wake 1-2 pm
No wake in Jefferson Bay
Please check the signs at the launches - the sign at the Knolls is incorrrect; boaters are ticketed if they follow that usage board

Sunrise to sunset because of congestion
Main basin of the lake
Fine the way it is
Add additional no-wake period for 2 hours each day on weekends
Restrict fishermen to a certain distance from shore
Wake times 10am-6 pm six days a week; snowmobiles 9am-5pm
Slow no wake should follow state - sunset to sunup
Skiers should not be restricted from cutting across the lake
Boat stereos way too loud

G. **Lake Management District Issues:**

1. Would you be prepared to pay more than you currently do for any improvements to the lake or river environment or facilities that you may have indicated above? (circle one)

   a. Yes (**37**) b. No (**41**)

   If *NO*, who should pay? _____

People who launch
WDNR
All Randall Township
Charge all the people who come and use our lake that do not own property on the lake
State of Wisconsin but NOT raise our taxes
We already pay too much taxes - there should be enough
Govt grants
Out of state licensed boats
Nonresidents
County
Power boaters
Operate within your budget
Rule breakers

how should the funds be raised? _____

Local fundraisers
Raise launch fees
In budget, $9500 for "education"
Private-public depending on the improvement
Taxes
Charge for trailer parking
Existing taxes
Reallocate tax money
Grants
Charge fee by horsepower
Raise fines for breaking boating rules

If *YES*, which additional improvements would you be willing to pay for?

Adequate weed control
Acquire wetlands and patrolling lake
Plant coontail
Police should be at launch until 10 am
Ramp destruction and 2 patrol boats
Dredging
Sewers
More supervision
Weevils
Water quality
Control water level
More police enforcement on lake
Fishing
More non-chemical invasive species control
Fish stocking
Land use controls in watershed

2. Do you think the Lake Management District is generally doing a good job in lake management? Please comment.

a. Yes (**56**) b. No (**2**) c. Maybe (**3**)

Getting things done
We talk, but nothing changes
Too much trying to take personal advantage of their positions
Need to check on outside boats on a constant basis
Not sure yet
Lighten up on ecology and make boating rules
Too many boats, not enough enforcement, invasive species since public ramp opened
Do more education of public

3. Lake management districts are required to hold an annual meeting between Memorial Day and Labor Day to approve the annual budget, elect commissioners, and conduct any other business brought before the districts.

   I regularly attend the annual meeting (circle one)

   a. Yes (**24**) b. No (**54**)

   If *NO*, please indicate if you do not attend because (check all that apply):

   14____ I have to work **20**____ I am out of town during this period

   25____ The meetings are held at an inconvenient time **7**____ I would prefer the meetings to be held on another day

   If you have checked any of the boxes above, please tell us what time, date, or other accommodation we can make to better meet your scheduling needs:

   Prefer another day
   Saturday afternoon
   Saturday
   Friday night
   Evening is better
   Weekday evenings
   Summer is too busy; spring or fall would be better
   Early Saturday mornings
   Fall
   Weekends
   Late Sunday afternoon

4. Would you attend quarterly meetings if they were not held on Fridays at 5 PM?

   a. Yes (**29**) b. No (**30**)

   If *YES*, please specify a time that you would attend _____

   Saturday afternoon
   Sat or Sun AM
   7 pm
   Any day but Friday
   Midweek 7:30 pm
   6 pm
   Saturday
   Fridays at 5pm are great for me
   Mondays and Tuesdays
   No weekends
   Friday late

5. Are you aware of the District of Powers Lake website [*http://www.districtofpowerslake.com*]?

   a. Yes (**63**) b. No (**16**)

6. Do you read the *District of Powers Lake Newsletter*?

a. Yes (**82**) b. No (Please go to the next question) (**2**)

(If *YES*, what types of articles do you find most interesting or informative?)_____

What is being done
More lake-specific info
Lake news
Fish stocking
Weed control
Updates on lake condition
Seasonal activities
New boating regulations
All
Pier rules
State laws, e.g. Phosphorus ban
Water quality
Beach closure information
Neighborhood happenings
Anything that educates me

7. Do you subscribe to the University of Wisconsin-Extension publication *Lake Tides*?
   a. Yes (**9**) b. No (**72**)

8. Are you a member of the Wisconsin Association Lakes? Do you subscribe to the *Lake Connection*?
   a. Yes (**4**) b. No (**72**)

9. Have you ever attended the Wisconsin Lakes Convention or the Southeast Wisconsin Lakes Workshop?
   a. Yes (**2**) b. No (**79**)

   (If *YES*, which event did you attend and when did you last attend these events)____

   State conv. 2 or 3 times

10. Are there any subjects or issues about which you would like more information?

Regulation enforce.
Detailed accounting of money spent
Please list all available resources on the newletter with contact information
Dnr responsibility
Future plans for weed control
Sanitary sewers
Water quality improvement options
Does the wdnr have any fish management plans?
WI Lakes Association, "Lake Connection", WI lakes convention, Southeast WI lakes workshops

What logic was used to restrict s-n-w hours and ski pattern?

11. Are there any other issues that you would like to draw to our attention at this time?

Regulation enforce.
Control invasives by having access ONLY at public site and requiring all boats be powerwashed there and users pay for it
You are making headway with EWM on east shore (the Knolls); please continue
Leave lake restrictions alone
Pay attention to water quality
Don't waste money
Does a poor job of budgeting; carries too big a surplus
Pier boundary regulations are too strict
If the ski pattern in going to include the rock bar cut around, there must be a reg for no fishing or swimming in that merge area - it's way too dangerous to merge in there with stopped boats
Zebra mussels are awful; our kids cut themselves frequently
Large boats and excessive size makes large waves that beat against shoreline
Need to dredge
Develop safety rules for floating trampolines
Ban summer fishing tournaments because warm water temperatures stress them in live wells and they die when released
Boats that can adjusts ballast because their wakes stir up bottom
Would like to see some effort to keep channel open between Jefferson Bay and lake
Need to do better job monitoring what comes into lake and shut down ramp when parking lot is full
Water quality has changed: failed my "white towel test"
We need a more professional WDNR - they are extremely arrogant and disrespectful
Boat size limits
Powers Lake is unsafe for resident boaters due to too many weekend boats being allowed to launch without paying or knowing the rules
Real estate taxes on our small cottage have tripled in past 10 years; we may not be able to afford to keep it when we retire due to the taxes for which we get virtually no services
No-wake weekends is a poor idea